Your comprehensive guide to the

Duckworth/Lewis method

for resetting targets in one-day cricket

by Frank Duckworth & Tony Lewis

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The moral right of the authors has been asserted

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(Standard Edition)

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Frank Duckworth was born and brought up in Lytham St Annes, Lancashire, and attended King Edward VII School, Lytham. He then spent seven years at Liverpool University where he gained a BSc(Hons) in physics and a PhD in physical metallurgy. In 1965 he moved down to Gloucestershire as a research officer at the Berkeley Nuclear Laboratories of the former Central Electricity Generating Board, later Nuclear Electric plc, where he worked on the statistical analysis of data relating to the performance of the Magnox nuclear power stations.

In 1992 Frank helped his company to achieve its performance objectives by taking early retirement! This allowed him to work on the many statistical and mathematical topics that had fascinated him throughout his career, notably sporting statistics. He kept his contacts with the world of statistical analysis by taking over as honorary editor of *RSS NEWS*, the monthly news magazine of the Royal Statistical Society. He recently served a five-year term on the Council of that Society and actively contributes to its business on several topics, notably sports, having organised special sessions on *Statistics in Sport* at three of their recent international conferences. It was as a direct result of one of these sessions that he made the acquaintance of Tony Lewis in 1994 and their liaison began.

He has always been a keen and competent armchair cricketer. On the pitch, however, he bowls erratic off-breaks and can boast a highest score of eleven not out achieved in a junior school house match.

Frank gives many lectures and informal talks on topics of mathematical interest, such as risk, coincidences, sporting statistics and of course cricket, both to university and local interest group audiences. He is a keen globetrotter and used two of his recent vacations ‘down-under’ to meet with officials of the New Zealand and Australian cricket authorities to preach the virtues of the D/L method.

Tony Lewis spent his early years in Lancashire, living near Preston and attending Kirkham Grammar School. He played cricket for his school and his village before taking up a place at Sheffield University, from where he emerged with a BSc(Hons) degree in statistics and mathematics, an MSc in statistics and a Diploma in Education.

He started work teaching mathematics (and rugby and cricket!) at Wrekin College, Shropshire, before moving into tertiary education, first at Leicester Polytechnic (now de Montfort University) then the University of the West of England and later Oxford Brookes University where he presently lectures in mathematical subjects related to business decision making. In between these appointments Tony spent some 15 years in Australia lecturing in the Faculty of Business at Edith Cowan University, Perth. During this time he became an Australian citizen and even barracked for Australia in the Ashes series!

Interspersed with his academic appointments Tony has spent periods in industry practising what he preaches. One of these was at Wolsey Ltd, Leicester, manufacturers of knitwear, and another was at the Western Australian Government Railways. These periods in industry and involvement with various consultancy projects have enabled him to give his mathematics teaching a very practical emphasis.

Tony met Frank Duckworth when following up the work from a student's research project into the formula from which the Duckworth/Lewis method has evolved. Nowadays, when not involved in his lecturing duties, he spends much of his time monitoring the method's progress, writing articles and giving talks on how the method works. These are done at both the practical level of its operation and also at academic conferences around the world where there is considerable interest in the method's firm theoretical foundations.

For relaxation Tony plays bridge and a respectable game of golf.

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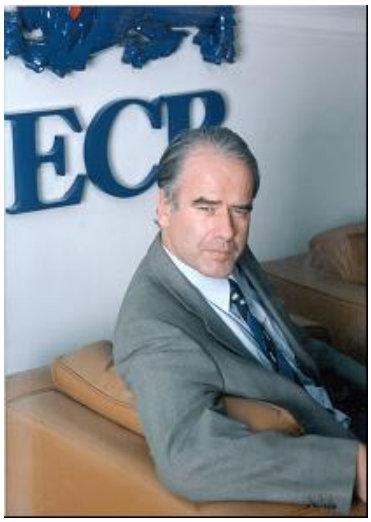
Foreword

by Tim Lamb, Chief Executive of the England and Wales Cricket Board



How to revise targets when the weather interferes in limited-overs cricket has been a problem ever since "instant cricket" first appeared in the early sixties. The traditional method based on average run rate almost always gave an unfair advantage to the side batting second and previous attempts to find an alternative solution have had some notable failures.

It was in the wake of the most infamous of these failures, the 1992 World Cup semi-final match between England and South Africa, that I was first introduced to what was to develop into the Duckworth/Lewis method. In its earliest form it relied entirely on the computer and I had to admit that cricket was not quite ready for such sophistication.

It was about two years later that I learnt that Frank Duckworth and Tony Lewis had joined forces. They had completed a research project that involved carefully analysing the scorebooks from many hundreds of one-day matches, mainly internationals. And, most importantly of all, they had succeeded in simplifying the formula so that their method could be implemented with nothing more than a single table of numbers and a pocket calculator.

I quickly realised that here was a method that had no bias to either side and was worth giving a trial. The England and Wales Cricket Board adopted it for their 1997 season and the International Cricket Council also chose it for a number of their own tournaments and sent full details to all other ICC Full Member nations.

Over the next three years, the Duckworth/Lewis method gradually spread throughout the world and at the present time has been used in over 450 matches in 20 countries. The ECB alone has used it in over 200 matches during seven seasons.

The method is not difficult to understand and to apply, provided one is prepared to take a little time, and is easily the fairest method so far devised. This booklet explains everything one needs to know to apply it in any possible circumstance.

Frank Duckworth and Tony Lewis are to be congratulated on addressing this major problem in one-day cricket. In so doing it means that rain-affected matches are now won by the team playing the better cricket rather than determined by the vagaries of the weather.

Tim Lamb
Lord's, January 2004

Important notice - the Professional Edition

This booklet explains how the D/L method may be used to calculate targets without the aid of a computer and is the method that was used by all national cricket authorities up to October 2003. This original version of the D/L method is now called the *Standard Edition*. In October 2003, the *Professional Edition* of the D/L method was adopted by the ICC for all one-day internationals and it is likely that this will be adopted by national cricket authorities for most of their major domestic competitions from 2004.

The Professional Edition cannot be implemented using a single set of tables and a pocket calculator as described in this booklet; it requires the computer program CODA, versions 6.1 or later. This is because each Team 1 innings may give rise to its own set of resource tables and so no single set will suffice for all matches. Where computing facilities are not available, e.g. at lower levels of the game, then the Standard Edition, which is the method described herein, will continue to be used.

Nevertheless, except in the one respect described in the paragraph below, the Professional Edition carries out the calculations in exactly the same way as does the Standard Edition, but using the appropriate set of resource tables for the particular Team 1 innings. For Team 1 innings with less than average scores (i.e. less than 235 for an uninterrupted innings), these resource tables will be the same as those published here for the Standard Edition.

The one respect in which the calculations in the Professional Edition differ from those in the Standard Edition is in setting the revised target when Team 2 have more resource than Team 1. In the former, these are obtained by scaling up Team 1's score in direct proportion to the resources available to the two sides, whereas in the Standard Edition, the target enhancement is calculated by applying Team 2's excess resource to the value of G50 as described in Chapter 3 and Appendix 2 §5.6.

It is intended that the computer program CODA, which is necessary for operating the Professional Edition of the D/L method, will eventually be available for purchase by the general public. Details will be given on the ICC's website www.icc.cricket.org

Preface to second edition

Our method has now been in operation for more than seven years and it is five years since the first edition of this booklet was published. In 1999, the method was adopted by the International Cricket Council (ICC) as the world standard and re-confirmed as such in 2001 as part of ICC's periodic review process. At the present time, it has been used over 450 times to our knowledge (and probably many other times not to our knowledge) in more than 20 countries. As well as having been used for rain or poor-light interruptions, it has also been called upon in eight instances of floodlight failure, three of crowd disturbance, one of a sandstorm and one of a snowstorm!

In the closing pages of the first edition we explained how we were keeping the tables under review to ensure that they continued to reflect the way the game was being played. We have resisted the temptation to make frequent changes as we believe in the importance of stability, but in 2002 we finally decided that the game had changed sufficiently to warrant the updating of the tables. In international matches in particular, teams have realised that it is preferable to push the score along right from the start of an innings rather than stick to the traditional procedure of building a base from which they can accelerate later on. The fielding restrictions during the first 15 overs have undoubtedly encouraged this changed attitude, but we also believe that a more uniform scoring rate throughout an innings leads to a higher expected total and that players are coming to realise this.

From September 2002 we therefore changed the value of G50 (see page 53), for teams at the top level of the game, from 225 to 235 and we updated the tables. These revised tables are the ones presented herein (see pages 62 - 68) and we have reworked all the examples and case exercises accordingly. This does mean, however, that the revised targets produced in these exercises may not quite correspond with what happened in the actual match, but the differences are small and in no case would the actual result of the match have changed.

Also changed since the first edition was produced in 1999 are the rules and regulations of the game. In 2000 the laws of cricket (of all types) were changed to incorporate the award of penalty runs for a variety of infringements such as damaging the pitch or bad behaviour on the field of play. To prevent the occasional absurdity of negative scores, the penalty runs, five per offence, are not deducted but are awarded to the other side. Penalty runs may be awarded to either side at any stage of a match, and there is one case where this has implications on the operation of the D/L method. This is when the side batting second commits an infringement. A ruling has been made on how this operates and is summarised in regulation 6 of Appendix 2.

In some countries there has been a change also to the rule on penalising the side fielding first for a slow over rate (see the section on page 28 and §4 of Appendix 2). We have chosen to retain in this booklet the description of how to calculate revised targets when overs have been deducted from the innings of the side batting second, as this method of penalising slow over rates is still used in some competitions.

Other changes to the game may occur and we may have to further adapt the method to keep abreast with these. Watch this space!

Frank Duckworth & Tony Lewis
January 2004

Chapter 1: Why did we need a new method?

Average-run-rate method

Since the beginning of one-day cricket in the sixties revised targets have been needed when the match was shortened after it had started. The earliest method, and one that was retained in most parts of the cricketing world until recently, was the "average-run-rate" method. With this method the target for the team batting second (Team 2) was set by adjusting the score made by the team batting first (Team 1) in proportion to the number of overs the two teams had the opportunity of facing.

This was a simple process, which probably explains why it was kept for so long, but it had its problems. All too frequently it presented one of the teams, usually Team 2, with an unfair advantage. So on winning the toss, if there was rain around, captains nearly always chose to bat second regardless of what they would otherwise have preferred to do.

The main problem with the average-run-rate method is that it is based on the assumption that the number of runs a side can make is in direct proportion to the numbers of overs it has to face. This is simply not the case.

For instance, in a 40-over one-day innings a typical average score is 200 runs which is 5 runs per over. But for a greater number of overs this run rate is harder to sustain. 300 runs off 60 overs is a much harder target and 500 runs off 100 overs is even harder. This is because the limited number of overs is not the only factor that determines the total runs a team can make. The more overs there are the more likely it is that the total is limited by the 10 wickets they have available. So the average runs in the overs available has what is called a "diminishing-returns" nature.

On the other hand, for a smaller number of overs for the innings a run rate of 5 an over is *easier* to achieve. 150 runs off 30 overs is an easier target than 200 off 40. And 50 runs off 10 overs is easier still. The fewer overs there are the *less* likely it is that the total is limited by the side having only 10 wickets to lose.

So if Team 1 have scored 200 in their 40 overs and Team 2's innings is reduced to 20 overs before it starts, then to set them a score to beat of only 100, which is half as many runs, is giving them a much too easy task because they still have all their 10 wickets in hand. Some people have suggested that you should take away some wickets, but this wouldn't be practicable. [See Frequently Asked Question (FAQ) number 6.] What you *can* do, however, is leave them with all 10 wickets but set them a higher target than half the runs so that their task is equivalent to what it would have been if they had had their full 40 overs, as we shall see shortly.

If Team 2's innings is shortened before it begins, then the average-run-rate method favours Team 2. But average run rate does not *always* favour Team 2 as is generally believed.

For instance, suppose that Team 1 again scored 200 in 40 overs and Team 2 have made 140/0 after 30 overs. The balance of the match is with Team 2 because, with all 10 wickets in hand, scoring 61 to win off 10 overs is a relatively easy task - but on average run rate they are *losing.* Any loss of overs will make their task harder than it was, and in the extreme case of the innings being washed out completely they will have lost!

But suppose that Team 2 in reply to the same score have reached 160/9 after those 30 overs. In this case they are clearly much more likely to lose than to win – the balance of the match is with Team 1. But if there is then a stoppage and overs are lost, as Team 2 are ahead of the required run rate, any correction based on average run rate will make their task easier, and if the game is washed out they will have won - on a faster run rate.

So the average-run-rate method of correction might well cause an interruption to change the balance of the match. Over recent years several alternative ideas have been tried. In 1992 Australia even held a competition to find a better method. We will now summarise these methods and add some comments on their suitability and shortcomings.

Most productive overs

This was the first official method used attempting to overcome the inequity of average-run-rate targets. The score teams have to beat is set by finding the total runs scored in the same number of the highest scoring overs of Team 1.

For example, suppose Team 1 have scored 250 runs in 50 overs. If Team 2's innings is reduced to 40 overs, the score to beat is the total runs from the *best* 40 overs of Team 1. It is the runs from the 10 least productive overs that are deducted from the target. If these 10 overs produced only 10 runs then the target would be 241 in 40 overs.

This method favoured the side batting first even when the stoppage occurred between innings, and it usually gave a very strong advantage to Team 1 when stoppages occurred at any other stage of the match. Its shortcomings came to the world's attention in the 1992 World Cup in Australia, most notoriously in the semi-final, when South Africa, requiring 22 off 13 balls to beat England, had their target reduced to 21 from 1 ball after a short shower took away 2 overs. (See Case 8 of Chapter 4).

Discounted total runs

This is a refinement of the most-productive-overs method and was brought into use by the Australian Cricket Board soon after the 1992 World Cup. Its logic is essentially the same as the most-productive-overs method except that the total of runs from these overs is reduced by half a percent for each over lost.

In the example used above, the most productive 40 overs yielded 240 runs. Discounting this by 5% (0.5% for each of the 10 overs lost) gives 228 and so the target is 229. This may give a fair target for a stoppage between innings but is still grossly unfair to Team 2 if, for instance, it is the *last* 10 overs that are lost from the match.

Parabola and ICC (1995) methods

The parabola method was the brainchild of a young South African, Wayne do Rego. He used one season's average total scores in the three, different length, English one-day competitions to devise a parabola representing the average total score from a given number of overs - the sort of "diminishing returns" relationship mentioned in the early part of this chapter.

Again it works satisfactorily for stoppages between innings but not so for stoppages at any other stage of the match. Nevertheless, it found favour with some countries for several years. Following a slight modification to convert the figures to percentages, the ICC adopted it in 1995 as their official method. It was in place for the 1996 World Cup in the Asian sub-continent although it was never called into action in that competition.

Clark curves

At the same time as the Duckworth/Lewis method was being developed, Dick Clark, a South African systems engineer, was devising his method. His system defines six stoppage types, three for each innings, for stoppages occurring before the innings commences, during the innings, or to terminate the innings. It applies different rules for each type of stoppage some of which, but not all, allow for wickets that have fallen. Because of these different rules, the target can suddenly jump by many runs just for the passage of one ball.

To our knowledge, only South Africa have used this method, for their domestic one-day competitions and for one-day internationals with touring sides.

* * *

Now that you know about the problem of target-resetting in one-day cricket and are aware of the alternative systems that have been tried, we shall tell you how the Duckworth/Lewis method works. Following what has become the custom in cricketing circles, we shall usually abbreviate its title to the "D/L method".

Chapter 2: How the D/L method works – a summary

For most purposes, all that you need to apply the method is the seven-point summary on the next page together with the D/L table.

For a more formal explanation covering every eventuality, you may wish to turn to Appendix 2, which explains the procedures in precise detail and illustrates them with worked examples. This is based on the information supplied to cricket authorities throughout the world.

But if you want to really understand what you are doing, read this summary and then turn over to the next chapter and go through the step-by-step guide.

Photographer: Paul McGregor

Rain clouds gather at Worksop

The D/L method at a glance

- The D/L method sets a revised target for the side batting second (Team 2) when overs have been lost by a suspension in play. The revision is not in proportion to the numbers of **overs** the two sides can receive but is in accordance with the run-scoring **resources** the two sides have at their disposal. These resources include both **overs** and **wickets** in combination.

- A single table gives the **resources** remaining at any stage of an innings for any number of **overs left** and **wickets lost**. The resources are expressed in terms of the percentages of the resources of a full 50-over innings.

- If either innings is shortened after it has started then the balance of resources of the two sides is upset and a revised target needs to be set in accordance with the **resources available** to the two sides. To find the resources available for either innings, you use the table to find out the **resources lost** from that innings and subtract this from the resources with which the innings **started**. If the innings started with 50 overs to be received, the resources at the start of the innings are 100%. But if the innings is shortened before it starts, or if the match is of less than 50 overs per side, then the resources at the start are less than 100%.

- To find the resources **lost** from an innings due to an interruption:
  (i) note the numbers of **overs left** and **wickets lost** at the start of the suspension; use the table to find the resources remaining;
  (ii) note the same at the resumption of play and from the table read off the resources now remaining;
  (iii) subtract (ii) from (i) to give the **resources lost**.

- To find the **resources available** subtract the **resources lost** from the resources that were available when the innings **started**.

- When a revised target has to be set, find the **resources available** for both sides and calculate the revised target as follows, *always rounding down to a whole number*.

- If the resources available to Team 2 (denote this by **R2**) are *less* than those for Team 1 (**R1**), then the target is revised *downwards* in proportion to the resources. Thus Team 2's revised target = Team 1's actual score x **R2**/**R1**, plus one run. (One run less than the target gives a tie.)

- If the resources available to Team 2 are *greater* than those for Team 1, then Team 2's target must be revised *upwards*. The excess runs required are calculated by applying the excess resource to the average 50-over total of 235 (or whatever number is decided upon for the appropriate class of game).

- Thus Team 2's revised target = Team 1's actual score + (**R2 - R1**) x 235/100, plus one run. (One run less than the target gives a tie.)

Chapter 3: Learn as you go - a step by step guide

This chapter guides you step by step through the full calculation procedure. First comes reading the table, next calculating resource percentages lost and then setting and revising targets. At each stage you will have the opportunity to practise what you have learnt.

The D/L table

The table of resource percentages is the key to the application of the D/L method. The full table is given at the back of this booklet from page 62 onwards. It is presented in two forms:

- over-by-over, from 50 overs remaining down to 0
- ball-by-ball, 10 overs to a page.

How to read from the table

To read the table you need to know the number of overs *left* as well as the number of wickets *lost*. Wickets lost is no problem as this is always given as part of the score. But the overs left usually needs a bit of arithmetic as it depends on the number of overs at the start and on any that may have been lost to the weather.

So before reading any number from the table, **always write down the number of overs left**. For example, if a team have reached 90/3 in 23 out of their 50 overs then they have 27 overs left with 3 wickets lost.

Examine the over-by-over table on page 62. The numbers in the table tell you the percentage of the run scoring resources *for a full 50-over innings* that remain for any combination of numbers of overs left and wickets lost.

Don't worry if you are playing a 45-over innings (or any other number of overs). You still use the same table and you still read the percentages of a 50-over innings. This will become clear as you do the exercises that follow.

Resources left for 50-over innings

For the moment, let us only deal with a 50-over innings. First, think what is happening just as the innings is about to start. No wickets have been lost and all 50 overs are left. So we look in the column for 0 wicket lost and the line at the top for 50 overs left, and we read the figure 100%. No surprise there! With the whole innings ahead of them, the team have 100% of their run scoring resources still in hand.

Now go down this column (0 wicket lost) and see how the percentage of their resources decreases as the overs left are reduced. Stop at 40 overs left, and read the figure of 89.3%. Ask yourself "What does this mean?"

✓ What it means is that if no wickets have been lost when 10 overs have been received, then our team still have 89.3% of their run scoring resources in hand. So although they have only four-fifths (80%) of their *overs* still to face, because they have managed to preserve their wickets, they have almost 90% of their *run scoring resources* in hand.

Stay with 40 overs left and read the numbers across the table to see what happens if wickets have been lost. If 2 wickets have been lost we see that only 77.8% of the resources are still left, and if they have managed to lose 7 wickets then they only have 22.0% left. With 9 wickets down, they would only have 4.7% resources left as they are unlikely to be able make use of many of the 40 overs they have left to face.

Now move down further to the half-way mark of our 50-over innings, where 25 overs have been bowled and 25 overs are left. What is the resource percentage left if all ten wickets are still in hand?

- ✓ The number in the table is 66.5%.

This means that if they manage to keep all ten wickets intact for the first 25 overs of the innings, they still have about two-thirds of their run scoring resources ahead of them. So although they are half way through their overs, they are only about one-third the way through their run scoring resources. They are in fact on course for a score about three times that which they have made so far.

In this way you can read from the table the resource percentage remaining for any combination of numbers of overs left and wickets lost. In the example earlier the team had reached 90/3 in 23 out of 50 overs and so with 27 overs left and 3 wickets lost you will see from the table that they had a resource percentage remaining of 58.4%.

Innings of less than 50 overs

Let us now turn to a match that is only scheduled to have 40 overs per innings. There is only one table, which gives resource percentages of a 50-over innings. But you read the numbers from it just the same.

The only thing to remember now is that you must not think of the resource percentages as percentages of this particular innings. They are percentages of a 50-over innings. But don't worry. Write the numbers down and carry on as instructed. Just don't try to interpret the numbers in terms of the proportion of the innings used or to come.

At the start of the 40-over innings there are 40 overs left and 0 wickets lost (of course), and the resource percentage left is 89.3%. This means that a team may on average be expected to make 89.3% of the runs that they would make in a 50-over innings. The same applies if the match is shortened before it starts due to play not being able to commence on time.

Suppose that when play can start it is ruled that there is only time for 25 overs per side. The teams start their innings with 66.5% resource percentage ahead of them, *not* 100%, because the resource percentages are always expressed in terms of a full 50-over innings.

For a team at 145/6 in 32 out of 40 overs, they have 8 overs left and, for 6 wickets lost, have 19.9% resources remaining, but the 19.9% is relative to a 50-over innings, not to a 40-over innings.

Photographer: Rob Cox

Ground-staff at Bellerive oval rush to protect the pitch

Try some yourself

Now try your hand at reading from the table. Here are ten scenarios - be careful, they are for different lengths of innings. You are given the number of overs at the start of the innings and the score after a certain number of overs have been bowled. Carefully fill in the next two columns, overs *left* and wickets lost. Then refer to the table and write down in the end column the resource percentage remaining in each case. The figures for Scenario 1 have already been entered for you.

For Scenarios 5 and 8 you will need to turn to the appropriate pages of the ball-by-ball version of the table but this is used in exactly the same way. For all others you need only use the over-by-over version of the table.

When you have completed the exercise (on a blank sheet of paper if you prefer) turn over the page and check you have done it correctly.

Exercise 1

scen. no.	overs at start	Scenario	overs left	wkts lost	resource percentage remaining
1	50	25/0 after 10 overs	40	0	89.3
2	50	75/0 after 20 overs			
3	50	75/2 after 20 overs			
4	50	120/2 after 31 overs			
5	50	134/4 after 28.4 overs			
6	45	150/6 after 35 overs			
7	40	150/7 after 35 overs			
8	25	35/0 after 6.1 overs			
9	50	110/5 after 25 overs			
10	50	110/5 after 35 overs			

Now turn over the page and check your numbers.

✓ ***Answers to Exercise 1***

scen. no.	overs at start	scenario	overs left	wkts lost	resource percentage remaining
1	50	25/0 after 10 overs	40	0	89.3
2	50	75/0 after 20 overs	30	0	75.1
3	50	75/2 after 20 overs	30	2	67.3
4	50	120/2 after 31 overs	19	2	50.5
5	50	134/4 after 28.4 overs	21.2	4	46.2
6	45	150/6 after 35 overs	10	6	22.8
7	40	150/7 after 35 overs	5	7	12.5
8	25	35/0 after 6.1 overs	18.5	0	54.1
9	50	110/5 after 25 overs	25	5	42.2
10	50	110/5 after 35 overs	15	5	33.5

All correct?

Now look closely at Scenarios 9 and 10. Scenario 10 has the same score as Scenario 9 but with 10 overs fewer left. These two scenarios would represent the situation of play being suspended at Scenario 9 and then 10 overs being lost from the innings. When play resumes we have in effect Scenario 10 (15 overs now remaining).

When play was suspended (Scenario 9) the resource percentage remaining was 42.2%. When play is resumed (Scenario 10) the resource percentage remaining is 33.5%. So the loss of the 10 overs has resulted in a loss of resource percentage of 42.2 - 33.5 = 8.7%. If this situation occurred during Team 2's innings then, under the D/L method, the target would be adjusted to reflect this 8.7% loss of their run scoring resources.

We are now ready to look at other suspensions in play.

Photographer: Rob Cox

Supporters take shelter at Bellerive

Calculating resource percentages lost and available

Resource percentage lost

Scenarios 9 and 10 showed how we calculate the resource percentage lost by a stoppage. Here is a summary of the process.

- Subtract the resource percentage remaining upon the restart from the resource percentage remaining at the stoppage. This is the resource percentage lost by the stoppage.

- If a stoppage terminates the innings then the loss is simply the resource percentage that remained at that stoppage.

- If an innings is interrupted more than once then the resource percentages lost at each stoppage are accumulated.

Resource percentage available

Once we know what resource percentage has been lost from an innings we can calculate the resource percentage a team now have *available* to them for the whole of their innings.

- Identify the resource percentage available at the start of the innings.

- From this subtract the accumulated lost resource percentage that we have already calculated.

For the team in Scenarios 9 and 10, they *started* their 50-over innings with 100% resources. In the stoppage they *lost* 8.7% of their resources, so the percentage they have *available* for their innings is 100 - 8.7 = 91.3%.

Suppose the same team then advance to 140/7 in 5 more overs so that there are now 10 overs left and 7 wickets lost and then further rain terminates their innings. From the table this terminal stoppage represents a further lost resource percentage of 17.9%.

The total resource percentage lost is now 8.7 + 17.9 = 26.6%, and the resource percentage *available* is now 100 - 26.6 = 73.4%. Alternatively, this could be calculated by updating the resource percentage available after the previous stoppage, i.e. 91.3 - 17.9 = 73.4%.

Some examples

In this way we calculate the resource percentage *available* to teams for their innings whenever either or both innings have been interrupted. We denote these resources available by **R1** for Team 1 and **R2** for Team 2.

Here is an example that we shall use not only to show further how **R1** and **R2** are calculated but also to suggest a style of layout of the calculations that will be seen many times in the examples and exercises in this booklet.

Example 1

In a 40 overs-per-side match Team 1 score 114/5 in 27 overs when rain deducts 7 overs from each team. There are no further interruptions. What are **R1** and **R2,** the resources available to the two teams?

Team 1:

Resource available at start (40 overs left, 0 wicket lost)				89.3%
Resource remaining at suspension	(13 overs left, 5 wkts lost)		30.8%	
Resource remaining at resumption	(6 overs left, 5 wkts lost)		17.8%	
Resource lost due to suspension	30.8 - 17.8	=		13.0%
Resource available for the innings	89.3 - 13.0	=	**R1 =**	**76.3%**

Team 2:

Resource available at start (33 overs left, 0 wicket lost) **R2 = 79.8%**

Try some yourself

Let us do a few more exercises and then we will be ready to revise targets.

Exercise 2

In the Scenarios 11-19 that follow, what are **R1** and **R2,** the resources available to each team for their innings?

11. 50 overs-per-innings match. Team 1 score 240/8 in their 50 overs. Team 2 make 120/4 from 25 overs when play is suspended and 5 overs are lost.

12. 45 overs-per-innings match. Team 1 score 220/5 in their 45 overs. Team 2's innings is delayed by rain and when it starts there is only time for 30 overs.

13. 50 overs-per-innings match. Team 1 are all out for 197 in 46.3 overs. Team 2 reach 186/7 in 47 overs when rain causes the match to be abandoned.

14. 50 overs-per-innings match. Rain before the start causes the match to be reduced to 36 overs per side. Team 1 make 11/0 in 3.2 overs when more rain causes the match to be reduced further to 26 overs per side (10 more overs per side lost). There are no more stoppages and they go on to make a total of 155.

15. 50 overs-per-innings match. Team 1 make 200/2 in 40 overs when rain causes their innings to be terminated and there is just time for Team 2 to receive 40 overs.

16. As in Scenario 15, but Team 1 make 200/9 in their 40 overs and Team 2 have 40 overs to face.

17. 40 overs-per-innings match. Team 1 make 105/7 in 25 overs and rain causes the match to be reduced to 30 overs per side. In their remaining 5 overs Team 1 take their score on to 125/8. Rain causes Team 2's innings to be delayed and when play can restart there is only time for them to face 28 overs.

18. As in Scenario 17, but after 10 overs, with Team 2's score at 60/3, further rain causes the loss of 3 more overs.

19. 45 overs-per-innings match. Team 1 make 30/1 in 9.4 overs when rain causes the match to be reduced to 40 overs per side. After 20.2 overs, they have reached 68/4 when a further 10 overs are lost per side, reducing the match to 30 overs per side. Team 1 resume their innings and are all out for 113 in 29.4 overs.

Answers to Exercise 2

Check your answers carefully and understand any mistakes you may have made. Have a look at the comments under each answer as they will help you to understand the logic behind the way the revised targets are set.

✓ **11**. **R1** = 100%; **R2** = 94.6%. These have been calculated as follows.

- In a 50-over innings, Team 1 started with 100% resource and their innings was not shortened, so they had 100% available.
- When play was suspended Team 2 had 25 overs left to face and they had lost 4 wickets; the table tells us that there were 50.0% resources remaining.
- When play resumed there were only 20 overs left, but still 4 wickets lost, so the resource remaining was 44.6%.
- So the resource lost was 50.0 - 44.6 = 5.4%.
- They started with 100% and have lost 5.4%, so their resource available was 94.6%.

We suggest that you lay out the calculation this way:

Team 1:				
Resource available at start (50 overs left, 0 wicket lost)			**R1**	**= 100.0%**
Team 2:				
Resource available at start (50 overs left, 0 wicket lost)				100.0%
Resource remaining at suspension	(25 overs left, 4 wkts lost)		50.0%	
Resource remaining at resumption	(20 overs left, 4 wkts lost)		44.6%	
Resource lost due to suspension		50.0 - 44.6 =		5.4%
Resource available for the innings		100.0 - 5.4 =	**R2**	**= 94.6%**

✓ **12**. **R1** = 95.0%; **R2** = 75.1%.

- As there are only 45 overs per innings, Team 1 started their innings with 95.0% (from the table, for 45 overs left and 0 wicket lost) and as there were no stoppages this was the resource available for their innings.
- At the start of their innings (30 overs left, 0 wicket lost) Team 2 had 75.1% remaining and this was their resource available.

Team 1:		
Resource available at start (45 overs left, 0 wicket lost)	**R1**	**= 95.0%**
Team 2:		
Resource available at start (30 overs left, 0 wicket lost)	**R2**	**= 75.1%**

✓ **13**. **R1** = 100%; **R2** = 91.3%.

- The fact that Team 1 were all out before receiving all of their 50 overs is irrelevant. They started with 100% and there were no stoppages, so the resource available for their innings was 100%.
- Team 2 also started their innings with 100% resource.
- With 3 overs left and 7 wickets down, when they still had 8.7% resource remaining, the match was abandoned and this 8.7% was lost. So the resource they had available for their innings was 100 - 8.7 = 91.3%.

Team 1:
Resource available at start (50 overs left, 0 wicket lost) **R1 = 100.0%**
Team 2:
Resource available at start (50 overs left, 0 wicket lost) 100.0%
Resource remaining at termination and lost (3 overs left, 7 wkts lost) 8.7%
Resource available for the innings 100.0 - 8.7 = **R2 = 91.3%**

✓ **14**. **R1** = 66.8%; **R2** = 68.3%.
Team 1:
Resource available at start (36 overs left, 0 wicket lost) 84.1%
Resource remaining at suspension (32.4 overs left, 0 wkt lost) 79.3%
Resource remaining at resumption (22.4 overs left, 0 wkt lost) 62.0%
Resource lost due to suspension 79.3 - 62.0 = 17.3%
Resource available for the innings 84.1 - 17.3 = **R1 = 66.8%**
Team 2:
Resource available at start (26 overs left, 0 wicket lost) **R2 = 68.3%**

In this scenario the loss of 10 overs from Team 1's innings cost them a greater loss of resource than did the loss of 10 overs from the start of Team 2's innings. This was because Team 1 were initially pacing their innings to last 36 overs and so would not have scored as quickly in those first 3.2 overs as they might otherwise have done. Team 2 knew right from the start they had only 26 overs to face and would be able to take slightly greater risks throughout.

✓ **15**. **R1** = 69.2%; **R2** = 89.3%.
Team 1:
Resource available at start (50 overs left, 0 wicket lost) 100.0%
Resource remaining at termination and lost (10 overs left, 2 wkts lost) 30.8%
Resource available for the innings 100.0 - 30.8 = **R2 = 69.2%**
Team 2:
Resource available at start (40 overs left, 0 wicket lost) **R1 = 89.3%**

This is another scenario where the loss of the same number of overs affects Team 1 more severely than Team 2. Team 1 were pacing their innings expecting to have 50 overs and had wickets in hand from which position they would have expected to be able to accelerate their scoring. Team 2, however, knew they had only 40 overs to face right from the start.

✓ **16**. **R1** = 95.3%; **R2** = 89.3%.

Team 1:

Resource available at start (50 overs left, 0 wicket lost)				100.0%
Resource remaining at termination and lost (10 overs left, 9 wkts lost)				4.7%
Resource available for the innings	100.0 - 4.7	=	**R1** =	**95.3%**

Team 2:

Resource available at start (40 overs left, 0 wicket lost)			**R2** =	**89.3%**

This scenario illustrates that the loss of the same number of overs from each innings does not always affect Team 1 more severely than Team 2. In this case although they had 10 overs still to receive Team 1 had lost 9 wickets and it is unlikely they would have been able to make use of all those remaining 10 overs. So the termination of their innings at that point was of relatively little cost to them and so it is they, Team 1, who have the greater run scoring resource as a result of the interruption to the match.

✓ **17**. **R1** = 81.6%; **R2** = 71.8%.

Team 1:

Resource available at start (40 overs left, 0 wicket lost)					89.3%
Resource remaining at suspension	(15 overs left, 7 wkts lost)		20.2%		
Resource remaining at resumption	(5 overs left, 7 wkts lost)		12.5%		
Resource lost due to suspension		20.2 - 12.5	=		7.7%
Resource available for the innings		89.3 - 7.7	=	**R1** =	**81.6%**

Team 2:

Resource available at start (28 overs left, 0 wicket lost)			**R2** =	**71.8%**

✓ **18**. **R1** = 81.6%; **R2** = 66.4%.

Following Scenario 17. *Team 2's innings (continued):*

Resource remaining at suspension	(18 overs left, 3 wkts lost)		45.9%		
Resource remaining at resumption	(15 overs left, 3 wkts lost)		40.5%		
Resource lost due to suspension		45.9 - 40.5	=		5.4%
Updated resource available for the innings		71.8 - 5.4	=	**R2** =	**66.4%**

In Scenario 17, a revised target would have been set at the start of Team 2's innings. In Scenario 18 the further interruption again alters the relative resources so a further revised target would be set when play is resumed.

✓ **19**. **R1** = 71.7%; **R2** = 75.1%.

Team 1:

Resource available at start (45 overs left, 0 wicket lost)				95.0%
Resource remaining at 1st suspension	(35.2 overs left, 1 wkt lost)		78.9%	
Resource remaining at resumption	(30.2 overs left, 1 wkt lost)		72.2%	
Resource lost due to suspension		78.9 - 72.2 =	6.7%	
Resource remaining at 2nd suspension	(19.4 overs left, 4 wkts lost)		44.2%	
Resource remaining at resumption	(9.4 overs left, 4 wkts lost)		27.6%	
Resource lost due to suspension		44.2 - 27.6 =	16.6%	
Total resource lost due to the two suspensions		6.7 + 16.6 =		23.3%
Resource available for the innings		95.0 - 23.3 =	**R1 = 71.7%**	

Team 2:

Resource available at start (30 overs left, 0 wicket lost) **R2 = 75.1%**

Alternatively, the resource available to Team 1 could have been updated after each stoppage. After the first stoppage it would have been 95.0 - 6.7 = 88.3% and after the second stoppage 88.3 - 16.6 = 71.7%.

Note that it is irrelevant that Team 1 had not used up their full entitlement of 30 overs. They were all out and so had used up all their available resource.

Photo: Western Province Cricket Association

A waterlogged Newlands ground

Setting revised targets

Background

In an uninterrupted game of limited-overs cricket, both sides have the same resources available for their innings and no adjustment is required. If Team 1 score **S** runs in their overs allocation (or are all out for this number of runs before receiving their full entitlement of overs), the target for Team 2, which we call **T**, is merely **S** + 1. If Team 2 make exactly **S** runs the match is tied.

If overs are lost after the match has started it is almost certain that the two sides will now have different resources available for their innings and Team 2's target will no longer be one more than Team 1's score. The target needs to be adjusted to reflect the difference in the resources available to the two teams.

Lower targets

Let us take a simple situation as an illustration.

Suppose Team 1 scored 250 in 50 overs and then rain during the interval reduced Team 2's innings to 25 overs. Setting a target of 126 by average run rate would give an unfair advantage to Team 2. You should now able to calculate (or, in this case, just look up!) the resources available to the two teams as 100% and 66.5% respectively.

What the D/L method does is to set the target not in proportion to the overs available but in proportion to the *resources* available to the two teams. And so the target is obtained by reducing the score Team 2 have to beat by the calculation 250 x 66.5/100, which gives 166.25. In order to win the match Team 2 would need to score 167, since fractions of runs are impossible.

Current regulations for one-day matches mean that a score of 166 in 25 overs would result in a tie. In other words the decimal fraction (the figures after the decimal point) of the calculated figure is ignored. [In mathematical parlance this is called "rounding down".] The next lower whole number to that calculated represents the score to tie. One more than this is the score needed to win, which is universally referred to as the "target".

[Note that in the regulations in use prior to April 1999 the decimal fraction was not ignored so that a tie was usually impossible following a rain interruption.]

Enhanced targets

A feature of the D/L method is that it makes a fair allowance for the situation when *Team 1's* innings has been interrupted.

Suppose that Team 1 have scored 180/5 in 40 of their 50 overs when there is extended rain. Allowing for the break between innings suppose also that there is just time, when the rain relents, for 40 more overs of play. Playing conditions of most competitions require match officials, where possible, to equalise the lost overs between the two teams, and so they would terminate Team 1's innings and allocate 40 overs to Team 2. What should be the target?

Most of the methods we described in Chapter 1 keep the target of 181 simply because both teams have had the opportunity to receive the same number of overs. This is clearly unfair to Team 1. They were pacing their innings for 50 overs whereas Team 2 have the advantage of knowing in advance of the shortening of their innings.

We mentioned this issue in the answers to some of the scenarios in *Exercise 2*. Now we shall see how the D/L method redresses the balance of advantage. It does so using the resources available to the two teams. You should now be able to calculate for this example that **R1** = 73.9% (= 100 - 26.1, for 10 overs left and 5 wkts lost) and **R2** = 89.3% (start of innings with 40 overs left and 0 wicket lost).

For very good reasons, which we shall not go into in this booklet (but see the response to Q3 of the frequently asked questions in Appendix 1), we do not set the revised target by scaling up Team 1's score in the ratio of the resources available. What we do instead is to work out the *extra* resource that Team 2 have over Team 1 and convert this into extra runs required by using the average total for a 50-over innings scored in the appropriate class of cricket. We call this average total **G50**. Later in this chapter we will describe how to go about calculating it, but the value to use is really a matter for the cricketing authority concerned.

The current value of **G50** recommended for all matches involving a team that plays first class cricket is 235. This is the value that has been used for all one-day internationals between test playing nations. For the ICC Trophy competition, which includes only ICC associate member nations, the lower value of 190 has been recommended. For under-15 international matches, we have recommended 200 and for women's ODIs 175.

To complete our 40-over example, Team 2 have 15.4% (= 89.3 - 73.9) *more* resource than Team 1. Assuming that it is a match played between first class teams, the extra runs required by Team 2 are 15.4% of 235. This is 36.19 and is rounded down to 36. So Team 2's requirement is 180 + 36 = 216 to tie and 217 to win, thereby neutralising their advantage of knowing in advance of their shorter innings.

Note that an interruption in Team 1's innings does not necessarily mean that Team 2 will have more resource than Team 1 and consequently require a higher target. Scenario 16 of *Exercise 2* provided an example of this. See also FAQ 4 in Appendix 1.

* * *

Now that we have seen the general ideas in the process of resetting the target, we shall summarise the steps involved.

The target-resetting process

If overs are lost after the match has started a revised target must be set. This must be calculated whenever Team 2 are about to start or resume their innings. Interruptions during Team 1's innings are noted but no calculation is needed until it is Team 2's turn to bat. [However, it is possible to calculate how Team 2's eventual target will be affected as soon as it is known how many overs have been lost - see, for instance, the solution to Case exercise 9 (page 36)]. And every further interruption to Team 2's innings requires a further target revision.

To set a revised target for Team 2, we need to know

- Team 1's total score, which we denote by **S**
- the resources available for the two teams' innings, **R1** and **R2**

The way we do it depends on which is the bigger, **R1** or **R2**.

If Team 2 have less resource available than Team 1 (**R2** is less than **R1)**:

- scale Team 1's score *downwards* in the ratio **R2** to **R1,** rounding down as necessary; this is the score to tie
- add one to give the target

As a mathematical formula, the target **T** is

T = S x R2/R1 + 1 (rounding down as necessary).

If Team 2 have more resource available than Team 1 (**R2** is greater than **R1)**:

- work out the extra resource that Team 2 have over Team 1
- convert this into runs using the average total, **G50**, for a 50-over innings scored in the appropriate class of cricket, rounding down as necessary
- add this to Team 1's final score to give the score to tie
- add one to give the target

As a mathematical formula, the target **T** is

T = S + (R2 - R1) x G50/100 + 1 (rounding down as necessary).

Finding a value for G50

If you feel that a different average value for a 50-over innings is appropriate, then remember these four things.

- Whatever value you choose, make sure all the scorers and match officials are aware of it and that you stick with that value for all games in the competition.

- If it is calculated from typical scores, remember only to use those from the innings of the side batting first (Team 2 scores do not give an unbiased average for what can be obtained in the full 50 overs).

- **G50** is the average score for innings where a maximum of 50 overs were available to be received. If you wish to calculate a value based on the average for innings of different numbers of overs, you will need to convert each score into an "equivalent for 50 overs" by scaling using the resource percentages given in the column for 0 wicket lost of the table. This is explained fully in §1 of Appendix 2.

- Don't be unduly concerned about the value of **G50**. In most cases, the target will not vary by more than one or two runs for different values. The important thing is that everybody knows the value and understands what the revised target is before the innings commences.

Some examples

Before you try some exercises here are a couple of examples that illustrate the D/L target resetting process.

Example 2

50 overs per side. Team 1 scored 253. Team 2 have reached 47/0 in 6 overs when rain washes out 24 overs. What is the revised target?

Team 1:

Resource available at start (50 overs left, 0 wicket lost) **R1 = 100.0%**

Team 2:

Resource available at start (50 overs left, 0 wicket lost)				100.0%
Resource remaining at suspension	(44 overs left, 0 wkt lost)		93.9%	
Resource remaining at resumption	(20 overs left, 0 wkt lost)		56.6%	
Resource lost due to suspension		93.9 - 56.6 =		37.3%
Resource available for the innings		100.0 - 37.3 =	**R2 =**	**62.7%**

R2 is *less* than **R1**: **T = S x R2/R1 + 1**

T = 253 x 62.7/100.0 + 1 = 158.63 + 1

The score to tie is 158 and the target is 159.

[Note: readers may recognise these match details from the one-day international, New Zealand v England, Auckland, 23/2/97. The average-run-rate method was in use giving a revised target of 132, which England achieved with more than 6 overs in hand.]

Example 3

In Example 1 (page 12) Team 1 scored 114/5 in 27 out of 40 overs when rain deducted 7 overs from each team. We calculated **R1** as 76.3% and **R2** as 79.8%. Let us suppose that the teams are first class and that Team 1 resume their innings to reach 170/7 in their reduced total of 33 overs.

To calculate the target we see that **R2** is greater than **R1** and, being first class teams, the average 50-over total, **G50**, is taken as 235. So we calculate the target by the formula

T = S + (R2 - R1) x G50/100 + 1

T = 170 + (79.8 - 76.3) x 235/100 + 1 =170 + 8.225 + 1

T = 178.225 + 1

So Team 2 need 178 to tie and 179 to win.

Try some yourself

Exercise 3

In the nine scenarios of *Exercise 2*, in which you calculated **R1** and **R2**, now calculate the score to tie and Team 2's revised target. (Use the value 235 for **G50** throughout.)

The answers follow, but try not to look at them until you have completed all the exercises.

Answers to Exercise 3

✓ **Scenario 11:**
S = 240; **R1** = 100; **R2** = 94.6
R2 is *less* than **R1**
T = S x R2/R1 + 1
T = 240 x 94.6/100 + 1 = 227.04 + 1
Removing the figures after the decimal point gives 227 as the score to tie and so the target is 228.

✓ **Scenario 12:**
S = 220; **R1** = 95.0; **R2** = 75.1
R2 is *less* than **R1**
T = S x R2/R1 + 1
T = 220 x 75.1/95.0 + 1 = 173.91 + 1
Removing the figures after the decimal point gives 173 as the score to tie and so the target is 174.

✓ **Scenario 13:**
S = 197; **R1** = 100; **R2** = 91.3
R2 is *less* than **R1**
T = S x R2/R1 + 1
T = 197 x 91.3/100 + 1 = 179.86 + 1
giving 179 as the score to tie, and the target is 180.

✓ **Scenario 14:**
S = 155; **R1** = 66.8; **R2** = 68.3
R2 is *greater* than **R1**
T = S + (R2 - R1) x G50/100 + 1
T = 155 + (68.3 - 66.8) x 235/100 + 1
T = 155 + 3.52 + 1 = 158.52 + 1
158 to tie; target is 159.

✓ **Scenario 15:**
S = 200; **R1** = 69.2; **R2** = 89.3
R2 is *greater* than **R1**
T = S + (R2 - R1) x G50/100 + 1
T = 200 + (89.3 - 69.2) x 235/100 + 1
T = 200 + 47.23 + 1 = 247.23 + 1
247 to tie; target is 248.

✓ **Scenario 16:**
S = 200; **R1** = 95.3; **R2** = 89.3
R2 is *less* than **R1**
T = S x R2/R1 + 1
T = 200 x 89.3/95.3 + 1 = 187.08 + 1
187 to tie; target is 188.

✓ **Scenario 17:**
S = 125; **R1** = 81.6; **R2** = 71.8
R2 is *less* than **R1**
T = S x R2/R1 + 1
T = 125 x 71.8/81.6 + 1 = 109.98 + 1
109 to tie; target is 110.

✓ **Scenario 18:**
S = 125; **R1** = 81.6; **R2** = 66.4
R2 is *less* than **R1**
T = S x R2/R1 + 1
T = 125 x 66.4/81.6 + 1 = 101.71 + 1
101 to tie; target is 102.

✓ **Scenario 19:**
S = 113; **R1** = 71.7; **R2** =75.1
R2 is *greater* than **R1**
T = S + (R2 - R1) x G50/100 + 1
T = 113 + (75.1 - 71.7) x 235/100 + 1
T = 113 + 7.99 + 1 = 120.99 + 1
120 to tie; target is 121.

Premature termination of match

Let us take another look at Scenario 13. Team 1 made 197 and in reply Team 2 have reached 186/7 in 47 overs, but then rain causes the match to be abandoned. What is the result?

We have already calculated (page 21) that the score to tie is 179 with 180 needed to win. As the match is abandoned the winner must be decided based on these calculations. At 186/7 Team 2 are 7 runs ahead of the score to tie and so are declared the winners by 7 runs. Had Team 2's score been 176/7 then Team 2 would lose by 3 runs as they would be 3 runs short of the score to tie. And at 179/7 in 47 overs, the result would be a tie.

Par score

The score of 179 in Scenario 13 is the score against which the result is decided if the match is terminated prematurely. This is called the "par score".

*The **par score** is defined as the score that would tie the match, under the D/L method, if the match were abandoned at that point.*

There does not need to have been an interruption in play for there to be a par score. Nor does there even need to be a single cloud in the sky. The par score tells you whether or not Team 2 are on course for their target. It depends on Team 2's target and on how much of their resource they have used.

The bowling side should be aiming to keep the batting side below the par score. The batting side need to keep ahead of par to stay on course for their target in case rain falls and the match is abandoned. This also prevents their task becoming more difficult if there is an interruption in play and a subsequent reduction in overs.

Once a target or revised target has been set a par score can be calculated in advance for any stage of Team 2's innings. The computer program **CODA** enables a complete schedule of par scores to be printed out once a target has been set for Team 2. If that target has to be revised, the par scores change and a new print-out is needed. In many games a print-out of par scores for the end of each over is supplied to captains and match officials whenever a target or revised target is set.

Team 2's score may be compared with their par score at any stage of their innings. The par score for the end of each over is often displayed on scoreboards under the label 'D/L' and gives an indication of how Team 2 are progressing towards their target. It also tells them what the result would be if the game were to be abandoned.

* * *

Let us now get some practice at measuring par scores. To do this we shall go back to Scenarios 1-10 earlier in the chapter and assume that they now refer to situations during Team 2's innings in response to scores listed for each Team 1.

For Scenario 1, for example, **R1** = 100% and **R2** = 100 - 89.3 = 10.7%. With **S =** 250 and **R2** less than **R1,** the par score is 250 x 10.7/100 = 26.75, rounded down to 26. At 25/0 Team 2 are one run behind par and are just "losing" at this point. This has been entered into the table on page 25.

Try the rest for yourself. If you can, avoid looking at the answers, which are on page 26, until you've finished all the par score calculations.

Photo: Western Province Cricket Association

The Newlands crowd patiently wait for the rain to stop

Exercise 4

scen. no.	overs per innings at start	Team 1's score, **S**	**R1** %	scenario	overs left	wkts lost	resource % remaining	resource % available, **R2**	par score	score compared with par
1	50	250	100	25/0 after 10 overs	40	0	89.3	10.7	26	-1
2	50	250	100	75/0 after 20 overs	30	0	75.1			
3	50	250	100	75/2 after 20 overs	30	2	67.3			
4	50	250	100	120/2 after 31 overs	19	2	50.5			
5	50	250	100	134/4 after 28.4 overs	21.2	4	46.2			
6	45	220	95.0	150/6 after 35 overs	10	6	22.8			
7	40	200	89.3	150/7 after 35 overs	5	7	12.5			
8	25	170	66.5	35/0 after 6.1 overs	18.5	0	54.1			
9	50	250	100	110/5 after 25 overs	25	5	42.2			
10	50	250	100	110/5 after 35 overs	15	5	33.5			

✓ Now check your answers.

scen. no.	overs per innings at start	Team 1's score, **S**	**R1** %	scenario	overs left	wkts lost	resource % remaining	resource % available, **R2**	par score	score compared with par
1	50	250	100	25/0 after 10 overs	40	0	89.3	10.7	26	-1
2	50	250	100	75/0 after 20 overs	30	0	75.1	24.9	62	+13
3	50	250	100	75/2 after 20 overs	30	2	67.3	32.7	81	-6
4	50	250	100	120/2 after 31 overs	19	2	50.5	49.5	123	-3
5	50	250	100	134/4 after 28.4 overs	21.2	4	46.2	53.8	134	level
6	45	220	95.0	150/6 after 35 overs	10	6	22.8	72.2	167	-17
7	40	200	89.3	150/7 after 35 overs	5	7	12.5	76.8	172	-22
8	25	170	66.5	35/0 after 6.1 overs	18.5	0	54.1	12.4	31	+4
9	50	250	100	110/5 after 25 overs	25	5	42.2	57.8	144	-34
10	50	250	100	110/5 after 35 overs	15	5	33.5	66.5	166	-56

Some comments on the par scores

In Scenario 1, Team 2 have made a steady start and have not lost any wickets. They are just one run behind par.

In Scenario 2, Team 2 are 13 runs ahead of par because they have scored steadily and not lost any wickets, whereas in Scenario 3, where they have lost 2 wickets, they are losing. The loss of 2 wickets at that stage of their innings is a significant loss of resource.

In Scenario 5 they are exactly level with par and if the match were abandoned at that point the result would be a tie.

Scenarios 9 and 10 have here been treated as independent matches. If Scenario 10 represented a restart following a loss of 10 overs at Scenario 9, then the par score would still be 144.

Maintaining the margin of advantage

Look again at Scenario 7 in which, in response to Team 1's 200 in 40 overs, Team 2 are 150/7 after 35 overs. At this point in their innings they still need 51 runs off 5 overs with 7 wickets down. Clearly they have a very difficult task ahead of them and are likely to lose. This is reflected in the fact that they are 22 runs behind their par score.

If the match were abandoned at this point, they would, quite fairly, be declared the losers, by 22 runs. But supposing that the weather relents and there is time for just one more over. The table tells us that, with 1 over left and 7 wickets lost, they now have 3.4% resource remaining so the total resource available for their innings will now be 76.8 + 3.4 = 80.2%. The revised target will be 200 x 80.2/89.3 + 1 = 180 (rounding down). So they have the virtually impossible task of making 30 runs off their final over.

The reason Team 2's task is harder after the stoppage with the loss of 4 overs than it was before is that they had allowed themselves to fall too far behind par. The D/L method maintains the *margin* of advantage. It does not maintain the *probability* of winning or losing. Team 2 had fallen behind par by 22 runs and when play was resumed they were still 22 runs behind par.

Clearly the fewer overs that remain the lower are the chances of them making up their deficit. In the extreme case of the match being abandoned, they have *no* chance of making it up and they would lose by 22 runs. It is the responsibility of Team 2 to ensure that they keep up with par so that an interruption in play will not make their task harder. For further discussion on the reasons for not adopting a method that maintains the probability of winning across a stoppage, see Q7 of Appendix 1.

Conversely, if Team 2 are well ahead of par, as in Scenario 2 for instance, a loss of overs will make their task easier. And if sufficient overs are lost it may not even be necessary for them to resume their innings as they may already have achieved the revised target.

For instance, in Scenario 2, if the weather relents just in time to allow one more over, then their revised target is 72 (you should check this for yourself). At 75/0 they have already achieved this and so they have already won. This is not an inconsistency. It happens with every other method of target revision that has been used.

It would be quite possible to adjust the D/L method so that the probability of reaching the score to beat would be maintained. However, this would present insurmountable anomalies (see Q7 of Appendix 1).

Penalties for slow over rates

(Note: from 2003 the ICC, and several countries prior to this date, changed their playing conditions so that slow over rates during Team 1's innings were not penalised by reducing the overs allocated to Team 2's innings. This section does not therefore apply to matches played under changed regulations.)

Playing conditions sometimes require that umpires impose a penalty on Team 2 for taking more than the allotted time to bowl the requisite number of overs. This penalty takes the form of having fewer overs to face for their own innings than otherwise.

If a revised target has to be set, penalties for slow over rates add a complication to the D/L calculation. What happens is that the overs penalty is converted into an equivalent resource penalty and then Team 1's score is assumed to have been made from this much less resource.

Penalties and revised targets are both relatively rare occurrences and to find them in combination is exceedingly rare, so we are not going to take you through the procedure step by step. It is set out in §4 of Appendix 2 and is illustrated with an example (Example A7). There have only been eight instances in the first seven years of operation of the D/L system. The first of these is given as Case 19 of Chapter 4. Case 20 provides another, though hypothetical, example.

* * *

Now it's time for you to try your hand at target revision. The exercises of Chapter 4, which follows, are mostly actual cases of the application of the Duckworth/Lewis method.

Photographer: Colin Whelan

The super-sopper at work on the Sydney Cricket Ground

Chapter 4: Case exercises

Most of the cases that follow are taken from actual matches over recent years of usage of the D/L method in competitions and tournaments in various parts of the world. These competitions (with their abbreviations used) have the following lengths of innings unless otherwise shortened by a stated delayed start.

ICC	One-day internationals (ODI)	50 overs
	World Cup 1992	50 overs
	Trophy	50 overs
ECB	Axa League (to 1998) (Axa)	40 overs
BCCSL	Premier Limited Overs Tournament (PLOT)	50 overs
WICB	Red Stripe Bowl (RSB)	50 overs
UCBSA	Standard Bank Cup (SBC)	45 overs
ACB	Mercantile Mutual Cup (MMC)	50 overs
ZCU	1st National League (Nat)	50 overs

There have been small changes in playing conditions since D/L was first used in 1997. One of these is the elimination of fractions of runs when targets are set. In addition, the D/L tables were changed with effect from 1 Sept 2002. As a consequence, in undertaking target calculations in the cases to follow it may turn out that your target is different by the odd run here and there when compared with the actual match target and/or margin of victory. But there is no difference to the result of any actual match in these case exercises.

Some cases involve matches of interest in which D/L was not used. Where this arises we make it quite clear. The actual match target and/or result are stated in the solutions - which you will find starting on page 33.

Good luck!

Case 1: Tour match **(**ODI conditions), South Africa 'A' v Sri Lankans, Potchefstroom, 23/11/02. SA 'A' 221 in their 50 overs. Sri Lankans' reply delayed, innings reduced by 8 overs. What was the target?

Case 2: Carlton & United Breweries ODI series, Australia v England, Brisbane, 8/1/99.
England 178/8 in full 50 overs. Rain before restart deducted 14 overs from Australia's innings. What would have been the target under the D/L method?

Case 3: World Cup 1992, South Africa v Pakistan, Brisbane, 8/3/92.
South Africa 211 in 50 overs, Pakistan 74/2 in 21 overs, 14 overs lost. By the D/L method what would have been the revised target?

Case 4: BCCSL, PLOT, Nondescripts Cricket Club v Colts, Colombo, 9/11/02.
Match reduced to 48 overs per side. Colts 238/6 in their 48 overs. NCC, 184/4 in 40 overs when rain caused the match to be abandoned. At the abandonment of play what was the par score and who won?

Case 5: ACB MMC, Victoria v Western Australia, Melbourne, 7/2/98.
Victoria scored 223 in their 50 overs. Western Australia were 188/1 in 43.2 overs when rain caused the match to be abandoned. Who would win by the D/L method?

Case 6: WICB RSB semi-final, Leeward Islands v Trinidad and Tobago, Jamaica, 17/10/98.
Early morning rain shortened the match to 41 overs per side. Leeward Islands scored 172/9 in their 41 overs. T & T were 137/5 in 31.3 overs when match abandoned. What was the par score at the termination and what would have been the result by the D/L method?

Case 7: ODI, Zimbabwe v Pakistan, Bulawayo, 24/11/02
Pakistan 344/5 in 50 overs. Zimbabwe 133/6 in 32 overs. Rain deducted 4 overs. What was the revised target? Zimbabwe advanced to 140/6 in 33 overs when further rain caused the match to be abandoned. What was the result?

Case 8: World Cup 1992 semi-final, South Africa v England, Sydney, 22/3/92.
England 252/6 in the 45 overs allowed. South Africa were 231/6 in 42.5 overs, 2 overs lost, 1 ball left. Assuming that South Africa would still have been set an original target of 253 off 45 overs, what would have been the revised target under D/L?

Case 9: ZCU Nat, Mutare Sports Club v Universals, Mutare, 3/11/02.
Mutare were 221/3 in 39 overs (of 50) when rain deducted 6 overs from each side. They resumed to score 257/5 in their 44 overs. What was the target for Universals?

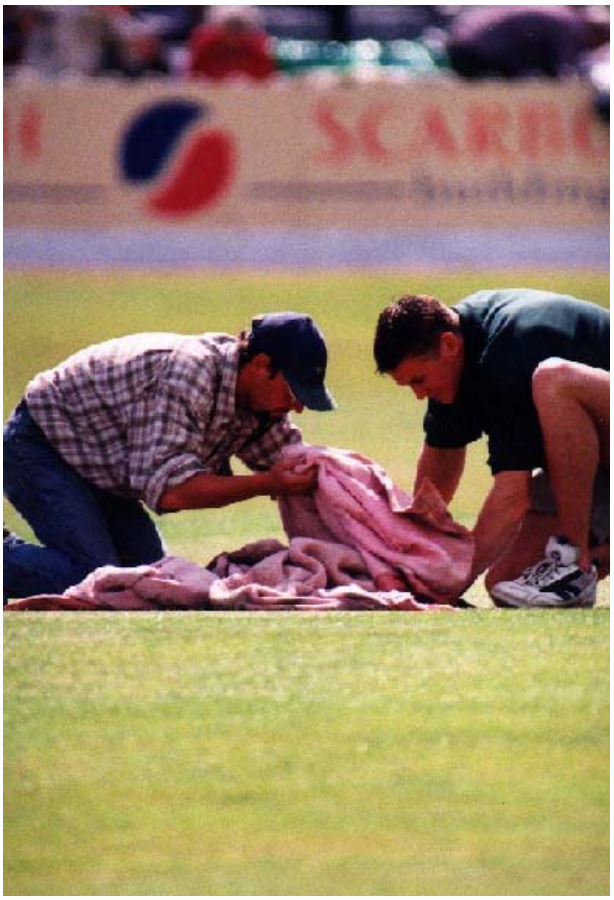
Case 10: ECB Axa, Sussex v Middlesex, Hove, 20/7/98.
Middlesex were 69/3 in 22 (of 40) overs when rain deducted 5 overs from each side. Middlesex resumed and were all out for 125 in 33.2. What would be the Sussex target?

Case 11: UCBSA SBC, KwaZulu Natal v Border, Durban, 13/11/02
Border were 116/4 in 29.3 of their 45 overs when rain deducted 9 overs each. They finished on 177/5 in 36 overs. What was the KZN target for 36 overs?

After 27.1 overs KZN were 134/7 when further rain caused the match to be abandoned. Who won?

Case 12: UCBSA SBC, Western Province v Free State, Capetown, 21/12/02
FS were 9/1 in 2.2 (of 45) when rain deducted 12 overs per side. FS had reached 26/3 in 7.4 (of 33) when a delay due to a partial floodlight failure deducted one more over per side. They finished on 125/7 in 32 overs. What was the target for WP?

Case 13: BCCSL PLOT, Sebastianites v Colts, Moratuwa, 23/11/02
Match reduced to 46 overs. Sebs were 108/6 in 37.1 overs (of 46) when rain terminated their innings and Colts were permitted 37 overs. What was their target?



Photographer: Paul McGregor

Ground-staff finish the mopping up at Scarborough

Case 14: ECB Axa, Warwickshire v Middlesex, Edgbaston, 7/7/95.
Match reduced to 37 overs per side before start. Middlesex were 100/4 in 24.3 overs when further rain terminated their innings. Warwickshire were allocated 20 overs. What would have been Warwickshire's target by D/L?

Case 15: Hypothetical U15 International (ODI conditions in use)
Team 1 were 66/1 in 16 overs when rain caused the loss of 5 overs per side. Team 1 resumed to be 87/1 in 21.2 overs when further rain caused the loss of 10 more overs each. They scored 195/7 in 35 overs. Taking **G50** as 200 (see page 53) what would be the target for Team 1's 35 overs?

Case 16: ICC Trophy, Scotland v Ireland, Kuala Lumpur, 11/4/97. (Note: **G50** for this competition was 190.)
Scotland were 56/1 in 19 overs when 5 overs were lost from each team. Scotland resumed to score 187/8 in 45 overs. What now would be Ireland's target for their 45 overs?

Case 17: ECB Axa, Nottinghamshire v Yorkshire, Trent Bridge, 22/6/97.
Nottinghamshire had reached 27/2 in 8.4 of their scheduled 40 overs when there was a stoppage, which resulted in a 4 over loss reducing their innings to 36 overs. They had reached 37/3 in 12 overs when a further 6 overs were lost. They finished on 169/4 in 30 overs. Yorkshire were allocated 30 overs. What now would be their target when their innings started?

After 0.4 overs they had scored 2 runs for 0 wicket lost when further rain took off 7 of their overs (reduced to 23 total). What would be the revised target at this stage?

They had reached 78/5 in 15 overs when the match was abandoned. Who would win?

Case 18: ECB Axa, Hampshire v Northamptonshire, Southampton, 22/6/97.
Hampshire were 6/0 after 2 of their scheduled 40 overs when there was an 11 over loss to each side reducing their innings to 29 overs. They had reached 136/2 after 20.3 overs when 5 further overs were lost from their innings reducing it to 24 overs. After 23 overs they were 159/2 when their innings was terminated and Northamptonshire's innings was allocated 23 overs. What now would be the target?

Case 19: ODI, South Africa v West Indies, Johannesburg, 22/1/99.
The match was shortened to 46 overs per side before it commenced. WI had scored 3 runs for no wicket after 3 overs when further rain reduced the match to 28 overs per side. They resumed to reach 154/4. Due to their slow over rate South Africa were penalised 1 over leaving 27 overs to score the revised target? Assuming that the 1 over penalty were still applicable, what now would be the target? [See §4 of Appendix 2.]

Case 20: England v Districts XI, (ODI conditions), Harare, 1/12/96
Districts XI: 197/9 in 45.3 overs, innings (and match) abandoned. Suppose that the match could have been resumed for the minimum 25-over second innings. What would have been England's target, allowing for the understanding that England were going to be penalised 4 overs for bowling their overs too slowly? [See §4 of Appendix 2.]

Photo: Western Province Cricket Association

Match officials discuss the restart of play

Worked solutions

Case 1:
South Africa 'A':
Resource available at start (50 overs left, 0 wicket lost) **R1 = 100.0%**
Sri Lankans:
Resource available at start (42 overs left, 0 wicket lost) **R2 = 91.7%**

R2 is *less* than **R1**: **T = S x R2/R1 + 1**
T = 200 x 91.7/100.0 + 1 = 202.65 + 1
Sri Lankans required 202 runs to tie and 203 to win.
[Note: More rain later in the match reduced the Sri Lankans' target even further.]

Case 2:

England:

Resource available at start (50 overs left, 0 wicket lost) **R1 = 100.0%**

Australia:

Resource available at start (36 overs left, 0 wicket lost) **R2 = 84.1%**

R2 is *less* than **R1**: **T = S x R2/R1 +** 1

T = 178 x 84.1/100.0 + 1 = 149.69 + 1

Australia would require 149 to tie and 150 runs to win.

[Note: the target in the match from using the discounted-total-runs method was 153. Australia scored 145/9 and lost by 7 runs.]

Case 3:

South Africa:

Resource available at start (50 overs left, 0 wicket lost) **R1 = 100.0%**

Pakistan:

Resource available at start	(50 overs left, 0 wicket lost)		100.0%
Resource remaining at suspension	(29 overs left, 2 wkts lost)	66.1%	
Resource remaining at resumption	(15 overs left, 2 wkts lost)	42.6%	
Resource lost due to suspension	66.1 - 42.6 =		23.5%
Resource available for the innings	100.0 - 23.5 =	**R2 =**	**76.5%**

R2 is *less* than **R1**: **T = S x R2/R1 +** 1

T = 211 x 76.5/100.0 + 1 = 161.41 + 1

By D/L the score to tie would be 161 with a target of 162.

[Note: using the most-productive-overs method Pakistan's target was 193. They made only 173.]

Case 4:

Nondescripts CC:

Resource available at start (48 overs left, 0 wicket lost) **R1 = 98.1%**

Colts CC:

Resource available at start	(48 overs left, 0 wicket lost)	98.1%
Resource remaining at abandonment	(8 overs left, 4 wkts lost)	23.8%
Resource available for innings		**R2 = 74.3%**

R2 is *less* than **R1**: **T = S x R2/R1 +** 1

T = 238 x 74.3/98.1 + 1 = 180.25 + 1

The par score was 180. At this point NCC were 4 runs ahead of par and this was their margin of victory.

Case 5:

Victoria:

Resource available at start (50 overs left, 0 wicket lost) **R1 = 100.0%**

Western Australia:

Resource available at start (50 overs left, 0 wicket lost) 100.0%

Resource remaining at termination (6.4 overs left, 1 wkt lost) 22.1%

Resource available for innings 100.0 - 22.1 = **R2 = 77.9%**

R2 is *less* than **R1**: **T = S x R2/R1 + 1**

T = 223 x 77.9/100.0 + 1 = 173.71 + 1

The par score would have been 173. At 188/1 Western Australia would have won by 15 runs. [Note: using the discounted-total-runs method, WA needed to have made 211 in 43 overs and so Victoria were declared the winners.]

Case 6:

Leeward Islands:

Resource available at start (41 overs left, 0 wicket lost) **R1 = 90.5%**

Trinidad & Tobago:

Resource available at start (41 overs left, 0 wicket lost) 90.5%

Resource remaining at termination (9.3 overs left, 5 wkts lost) 25.2%

Resource available for innings 90.5 - 25.2 = **R2 = 65.3%**

R2 is *less* than **R1**: **T = S x R2/R1 + 1**

T = 172 x 65.3/90.5 + 1 = 124.10 + 1

The par score would have been 124. At 137/5 T & T would have won by 13 runs. [Note: using the parabola method, T & T needed 144 in 31 overs and so Leeward Islands were declared the winners.]

Case 7:

Pakistan:

Resource available at start (50 overs left, 0 wicket lost) **R1 = 100.0%**

Zimbabwe:

Resource available at start (50 overs left, 0 wicket lost) R2 = 100.0%

Resource remaining at suspension (18 overs left, 6 wkts lost) 29.8%

Resource remaining at resumption (14 overs left, 6 wkts lost) 27.0%

Resource lost due to suspension 29.8 - 7.0 = 2.8%

Resource available for the innings 100.0 - 2.8 = **R2 = 97.2%**

R2 is *less* than **R1**: **T = S x R2/R1 + 1**

T = 344 x 97.2/100.0 + 1 = 334.36 + 1

The score to tie is 334 with a target of 335.

Resource remaining at abandonment (13 overs left, 6 wkts lost) 26.1%

Resource available for the innings 97.2 - 26.1 = **R2 = 71.1%**

R2 is *less* than **R1**: **T = S x R2/R1 + 1**

T = 344 x 71.1/100.0 + 1 = 244.58 + 1

The par score is 244. Pakistan won by 104 runs.

Case 8:

England:

Resource available at start (45 overs left, 0 wicket lost)			**R1 = 95.0%**
South Africa:			
Resource available at start (45 overs left, 0 wicket lost)			95.0%
Resource remaining at suspension	(2.1 overs left, 6 wkts lost)	7.1%	
Resource remaining at resumption	(0.1 overs left, 6 wkts lost)	0.6%	
Resource lost due to suspension	7.1 - 0.6 =		6.5%
Resource available for the innings	95.0 - 6.5 =		**R2 = 88.5%**

R2 is *less* than **R1**: **T = S x R2/R1 + 1**

T = 252 x 88.5/95.0 + 1 = 234.75 + 1

The score to tie would have been 234 with a target of 235 leaving 4 runs needed off the last ball. [Note: using the most-productive-overs method South Africa's revised target was 21 from the one ball.]

Case 9:

Mutare:

Resource available at start (50 overs left, 0 wicket lost)			100.0%
Resource remaining at suspension	(11 overs left, 3 wkts lost)	32.1%	
Resource remaining at resumption	(5 overs left, 3 wkts lost)	16.5%	
Resource lost due to suspension	32.1 - 16.5 =		15.6%
Resource available for the innings	100.0 - 15.6 =		**R1 = 84.4%**
Universals:			
Resource available at start (44 overs left, 0 wicket lost)			**R2 = 93.9%**

R2 is *greater* than **R1**: **T = S + (R2 - R1) x G50/100 + 1**

T = 257 + (93.9 - 84.4) x 235/100 + 1

T = 257 + 22.33 + 1 = 279.32 + 1

[Note: The above calculation could have been performed as soon as play was due to restart after the 6-over interruption. At this stage it could therefore have been announced that whatever Mutare's eventual score (assuming no further interruptions), the Universals would be required to score 23 more runs to win. This comment is equally applicable to other examples following where Team 1's innings has been interrupted and Team 2 have an enhanced target.]

The score to tie is 279 with a target of 280 from 44 overs. [Note: Universals scored 142/10 in 35.4 overs. Mutare won by 137 runs.]

Case 10:

Middlesex:

Resource available at start (40 overs left, 0 wicket lost)				89.3%
Resource remaining at suspension	(18 overs left, 3 wkts lost)		45.9%	
Resource remaining at resumption	(13 overs left, 3 wkts lost)		36.5%	
Resource lost due to suspension		45.9 - 36.5 =		9.4%
Resource available for the innings		89.3 - 9.4 =	**R1 =**	**79.9%**

Sussex:

Resource available at start (35 overs left, 0 wicket lost) **R2 = 82.7%**

R2 is *greater* than **R1**: **T = S + (R2 - R1) x G50/100 + 1**

T = 125 + (82.7 - 79.9) x 235/100 + 1

T = 125 + 6.58 + 1 = 131.58 + 1

The score to tie would be 131 with a target of 132 from 35 overs.

[Note: that Middlesex were all out within their revised overs allocation is irrelevant. Sussex made 134/4 in 34 overs and won by 6 wickets.]

Case 11:

Border:

Resource available at start (45 overs left, 0 wicket lost)				95.0%
Resource remaining at suspension	(15.3 overs left, 4 wkts lost)		38.4%	
Resource remaining at resumption	(6.3 overs left, 4 wkts lost)		20.1%	
Resource lost due to suspension		38.4 - 20.1 =		18.3%
Resource available for the innings		95.0 - 18.3 =	**R1 =**	**76.7%**

KwaZulu Natal:

Resource available at start (36 overs left, 0 wicket lost) **R2 = 84.1%**

R2 is *greater* than **R1**: **T = S + (R2 - R1) x G50/100 + 1**

T = 177 + (84.1 - 76.7) x 235/100 + 1

T = 177 + 17.39 + 1 = 194.39 + 1

The score to tie was 194 with a target of 195 from 36 overs.

Resource remaining and lost at abandonment (8.5 overs left, 7 wkts lost)			17.0%
Updated resource available for the innings	84.1 - 17.0 =	**R2 =**	**67.1%**

R2 is *less* than **R1**: **T = S x R2/R1 + 1**

T = 177 x 67.1/76.7 + 1 = 154.84 + 1

The par score was 154. Border won by 20 runs

Case 12:

Free State:

Resource available at start	(45 overs left, 0 wicket lost)			95.0%
Resource remaining at 1st suspension	(42.4 overs left, 1 wkt lost)		86.9%	
Resource remaining at resumption	(30.4 overs left, 1 wkt lost)		72.7%	
Resource lost due to suspension		86.9 - 72.7 =	14.2%	
Resource remaining at 2nd suspension	(25.2 overs left, 3 wkts lost)		56.4%	
Resource remaining at resumption	(24.2 overs left, 3 wkts lost)		55.2%	
Resource lost due to suspension		56.4 - 55.2 =	1.2%	
Resource lost by the two suspensions		14.2 + 1.2		15.4%
Resource available for the innings		95.0 - 15.4 =	**R1 =**	**79.6%**

Westerns:

Resource available at start (32 overs left, 0 wicket lost) **R2 = 78.3%**

R2 is *less* than **R1**: **T = S x R2/R1 + 1**

T = 125 x 78.3/79.6 + 1 = 122.95 + 1

The score to tie is 122 with a target of 123 from 32 overs. [Note: Westerns made 124/4 in 29.0 overs and won by 6 wkts.]

Case 13:

Sebastianites:

Resource available at start	(46 overs left, 0 wicket lost)			96.1%
Resource remaining and lost at termination	(8.5 overs left, 6 wkts lost)			21.2%
Resource available for the innings		96.1 - 21.2 =	**R1 =**	**74.9%**

Colts:

Resource available at start (37 overs left, 0 wicket lost) **R2 = 85.4%**

R2 is *greater* than **R1**: **T = S + (R2 - R1) x G50/100 + 1**

T = 108 + (85.4 - 74.9) x 235/100 + 1

T = 108 + 24.68 + 1 = 132.67 + 1

The score to tie is 132 with a target of 133 from 37 overs. [Note: Colts made 133/2 in 21.2 overs and won by 8 wkts.]

Case 14:

Middlesex:

Resource available at start	(37 overs left, 0 wicket lost)			85.4%
Resource remaining and lost at termination	(12.3 overs left, 4 wkts lost)			33.2%
Resource available for the innings		85.4 - 33.2 =	**R1 =**	**52.2%**

Warwickshire:

Resource available at start (20 overs left, 0 wicket lost) **R2 = 56.6%**

R2 is *greater* than **R1**: **T = S + (R2 - R1) x G50/100 + 1**

T = 100 + (56.6 - 52.2) x 235/100 + 1

T = 100 + 10.34 + 1 = 110.34 + 1

The Warwickshire score to tie would have been 110 with a target of 111 from 20 overs. [Note: the average-run-rate target was 82 in 20 overs, which they achieved with 23 balls to spare.]

Case 15:

Team 1:

Resource available at start	(50 overs left, 0 wicket lost)		100.0%
Resource remaining at 1st suspension	(34 overs left, 1 wkt lost)	77.2%	
Resource remaining at resumption	(29 overs left, 1 wkt lost)	70.3%	
Resource lost due to suspension	77.2 – 70.3 =	6.9%	
Resource remaining at 2nd suspension	(23.4 overs left, 1 wkt lost)	61.6%	
Resource remaining at resumption	(13.4 overs left, 1 wkt lost)	40.9%	
Resource lost due to suspension	61.6 - 40.9 =	20.7%	
Resource lost by the two suspensions	6.9 + 20.7 =		27.6%
Resource available for the innings	100.0 – 27.6 =	**R1 =**	**72.4%**

Team 2:

Resource available at start (35 overs left, 0 wicket lost) **R2 = 82.7%**

R2 is *greater* than **R1**: **T = S + (R2 - R1) x G50/100 + 1**

T = 195 + (82.7 – 72.4) x 200/100 + 1

T = 195 + 15.60 + 1 = 215.60 + 1

The score to tie would be 215 with a target of 216 from 35 overs.

Case 16:

Scotland:

Resource available at start	(50 overs left, 0 wicket lost)		100.0%
Resource remaining at suspension	(31 overs left, 1 wkt lost)	73.2%	
Resource remaining at resumption	(26 overs left, 1 wkt lost)	65.6%	
Resource lost due to suspension	73.2 - 65.6 =		7.6%
Resource available for the innings	100.0 - 7.6 =	**R1 =**	**92.4%**

Ireland:

Resource available at start (45 overs left, 0 wicket lost) **R2 = 95.0%**

R2 is *greater* than **R1**: **T = S + (R2 - R1) x G50/100 + 1**

T = 187 + (95.0 - 92.4) x 190/100 + 1

T = 187 + 4.94 + 1 = 191.94 + 1

The score to tie is 191 with a target of 192 from 45 overs.

[Note: Ireland were all-out for 141 in 39 overs.]

Case 17:

Nottinghamshire:

Resource available at start (40 overs left, 0 wicket lost)				89.3%
Resource remaining at 1st suspension	(31.2 overs left, 2 wkts lost)		69.0%	
Resource remaining at resumption	(27.2 overs left, 2 wkts lost)		63.9%	
Resource lost due to suspension		69.0 - 63.9 =	5.1%	
Resource remaining at 2nd suspension	(24 overs left, 3 wkts lost)		54.7%	
Resource remaining at resumption	(18 overs left, 3 wkts lost)		45.9%	
Resource lost due to suspension		54.7 - 45.9 =	8.8%	
Resource lost by the two suspensions		5.1 + 8.8 =		13.9%
Resource available for the innings		89.3 - 13.9 =	**R1 =**	**75.4%**

Yorkshire:

Resource available at start (30 overs left, 0 wicket lost) **R2 = 75.1%**

R2 is *less* than **R1**: **T = S x R2/R1 + 1**

T = 169 x 75.1/75.4 + 1 = 168.32 + 1

The score to tie would be 168 with a target of 169 from 23 overs..

Resource remaining at 1st suspension	(29.2 overs left, 0 wkt lost)		74.1%	
Resource remaining at resumption	(22.2 overs left, 0 wkt lost)		61.4%	
Resource lost due to suspension		74.1 - 61.4 =		12.7%
Updated resource available for the innings		75.1 - 12.7 =	**R2 =**	**62.4%**

R2 is *less* than **R1**: **T = S x R2/R1 + 1**

T = 169 x 62.4/75.4 + 1 = 139.86 + 1

The revised score to tie would be 139 with a target of 140 from 23 overs.

Resource remaining at 2nd suspension and lost	(8 overs left, 5 wkts lost)			22.3%
Updated resource available for the innings		62.4 - 22.3 =	**R2 =**	**40.1%**

R2 is *less* than **R1**: **T = S x R2/R1 + 1**

T = 169 x 40.1/75.4 + 1 = 89.87 + 1

The par score would be 89. At 78/5 Yorkshire would lose by 11 runs..

Case 18:

Hampshire:

Resource available at start (40 overs left, 0 wicket lost)				89.3%
Resource remaining at 1st suspension	(38 overs left, 0 wkts lost)		86.7%	
Resource remaining at resumption	(27 overs left, 0 wkts lost)		70.1%	
Resource lost due to suspension		86.7 - 70.1 =	16.6%	
Resource remaining at 2nd suspension	(8.3 overs left, 2 wkts lost)		26.9%	
Resource remaining at resumption	(3.3 overs left, 2 wkts lost)		12.1%	
Resource lost due to suspension		26.9 - 12.1 =	14.8%	
Resource remaining and lost on termination	(1 over left, 2 wkts lost)		3.6%	
Resource lost by all the suspensions		16.6 + 14.8 + 3.6 =		35.0%
Resource available for the innings		89.3 - 35.0 =	**R1 =**	**54.3%**

Northamptonshire:

Resource available at start (23 overs left, 0 wicket lost) **R2 = 62.7%**

R2 is *greater* than **R1**: **T = S + (R2 - R1) x G50/100 + 1**

T = 159 + (62.7 - 54.3) x 235/100 + 1

T = 159 + 19.74 + 1 = 178.74 + 1

The score to tie would be 178 with a target of 179 from 23 overs.

Case 19: (refer to §4 of Appendix 2)

West Indies:

Resource available at start (46 overs left, 0 wicket lost)				96.1%
Resource remaining at suspension	(43 overs left, 0 wkt lost)		92.8%	
Resource remaining at resumption	(25 overs left, 0 wkt lost)		66.5%	
Resource lost by suspension		92.8 - 66.5 =		26.3%
Resource available for the innings		96.1 - 26.3 =	R1 =	69.8%

South Africa penalty: they suffer a 1 over penalty converted to resources:

WI were able to receive 28 overs. .

Resource remaining for 28 overs left, 0 wicket lost			71.8%	
Resource remaining for 27 overs left, 0 wicket lost			70.1%	
Resource penalty		71.8 - 70.1 =		1.7%
Updated resource available for the innings		69.8 - 1.7 =	**R1 =**	**68.1%**

South Africa:

Resource available at start (27 overs left, 0 wicket lost) **R2 = 70.1%**

R2 is *greater* than **R1**: **T = S + (R2 - R1) x G50/100 + 1**

T = 154 + (70.1 - 68.1) x 235/100 + 1

T = 154 + 4.70 + 1 = 158.70 + 1

South Africa's target would be 159 in 27 overs with 158 to tie. [Note: in the actual match the target was 160, which SA achieved off the last ball of the 27th over.]

Case 20: (refer to §4 of Appendix 2)

Districts XI:

Resource available at start (50 overs left, 0 wicket lost)				100.0%
Resource remaining and lost at termination (4.3 overs left, 9 wkts lost)				4.6%
Resource available for the innings	100.0 - 4.6	=	R1 =	95.4%

England penalty: they suffer a 4 overs penalty converted to resources:

Dist. XI were able to receive 45.3 overs.

Resource remaining for 45.3 overs left, 0 wicket lost			95.5%	
Resource remaining for 41.3 overs left, 0 wicket lost			91.1%	
Resource penalty	95.5 - 91.1	=		4.4%
Updated resource available for the innings	95.4 - 4.4	=	**R1 =**	**91.0%**

England:

Resource available at start (25 overs left, 0 wicket lost) **R2 = 66.5%**

R2 is *less* than **R1**: **T = S x R2/R1 + 1**

T = 197 x 66.5/91.0 + 1 = 143.96 + 1

England's score to tie would have been 143 with a target of 144 from 25 overs.

Photographer: David Livermore

Play gets under way again at Lord's after the rain

Chapter 5: Some further options

The way the method should be applied, as described in this booklet, is based on the assumption that current standard playing conditions are in force. There are, however, a few areas where playing conditions might differ slightly at the discretion of the appropriate governing cricket authority. In these cases it may be necessary to make some slight changes to the procedures stated herein. Three such instances are described here.

The tie-break

If Team 2 fall one run short of their target, the result of the match is a tie, as in the case of an uninterrupted match. If the match were part of a league competition, then the points would normally be divided equally between the two teams.

If the match is part of a knockout competition, a winner must be chosen and the usual way of doing this is to take account of the number of wickets that each side has lost. If these are the same, then the result is decided by comparing scores after a certain number of overs.

When a match has been interrupted and subjected to a D/L adjustment, neither the number of wickets nor the score at a pre-specified stage of the match are valid measures for deciding the result. In these circumstances, an alternative rule for deciding the winner is required. This is a matter for the governing authority, but our own recommendation would be that unless Team 2 reach the D/L revised target, then Team 1 are the winners. The justification for this apparent bias in favour of Team 1 is that in the great majority of cases a revised target has been rounded down.

It is important that whatever rule is adopted is clearly understood by all players and match officials before the game commences and that it would be invoked if there were any interruption at all, no matter how short, which caused a match to be shortened after it had started.

Division of lost overs

When a suspension in play occurs during Team 1's innings, this usually results in Team 2's target being revised *upwards*. The consequence of this is that Team 2 are set the task of making more runs than Team 1 actually scored merely to tie. Depending on the timing and length of the stoppage this can be as many as 80 extra runs. Several administrators of the game have felt uncomfortable with this and alternative regulations that would prevent it have been given detailed consideration.

The upward revision arises as a consequence of the regulation that lost overs are divided equally, where possible, between the two sides. Thus if Team 1 had batted for 30 of their 50 overs and rain caused the match to be reduced by a total of 30 overs, these would be divided 15 each between the two sides. So the match would be reduced to 35 overs per innings and Team 1 would resume their innings for a further 5 overs.

In these circumstances it is quite clear that Team 1 should be compensated for their otherwise severe disadvantage caused by the timing of their lost overs. The only question is how this compensation should be achieved. If playing conditions dictate that the lost overs are shared, wherever possible, equally between the two sides then there is no alternative to Team 2's target being revised upwards. However, it would also be possible, in the majority of cases, to compensate Team 1 by giving them more overs.

It would seldom be possible to divide the lost overs so that the two sides had exactly equal resources, so the best one could do would be to allocate overs so that Team 2's target had to be revised as little as possible. An easier alternative would be to let Team 1 complete their innings (where there would still be sufficient time to complete a viable match.)

Both these options have the considerable disadvantage that they reduce the scope for accommodating further suspensions in play and so they reduce the chances of the match being able to be completed. The first option also has the major disadvantage that a series of calculations have to be carried out for which the computer is a virtual necessity (an option within CODA is available for this purpose), to determine how the lost overs are allocated between the two sides, and this must be done before Team 1's innings can be resumed. In view of this, we do not recommend any alternative to an upward revision in Team 2's target. All cricket authorities have so far also rejected the alternatives.

Margin of victory

In league competitions it is desirable to have a way of ranking teams who have equal numbers of points. In limited-overs cricket average run rate has generally been used but it is now realised that this may not be a valid measure of the average margin of victory; in a rain-interrupted match a team may have a faster run rate but may lose under the D/L method. It would clearly be preferable for ranking to be based on the actual net margins of victories/defeats, such as in football where “goal difference” has proved satisfactory.

This is not straightforward in one-day cricket as the margin of victory is described differently depending on which side wins, just like in “normal” cricket. If Team 1 win, the margin is expressed in runs, whereas a victory for Team 2 is given in terms of the wickets they had in hand. The only exception to this is when Team 2's innings has to be terminated prematurely due to rain (see §7 of Appendix 2). In this case Team 2's revised target is compared with the par score, calculated as that which would give a tied match if the match were abandoned at that instant (see Chapter 3). This gives the winner and the margin of victory expressed in runs.

In fact the D/L methodology allows a match result to be expressed in runs whichever side wins. If Team 1 win there is no problem as the margin is in runs anyway. But if Team 2 win, then all we need to do is to note how much their score at the point of victory exceeds the par score.

So whether a game has been interrupted or not, it is still an easy matter to compare Team 2's score with the par score after the final delivery and express the winning margin as this difference. (The computer program **CODA** gives this margin even if Team 2 win.)

An even better approach would be to share 100 secondary points between the two sides in every game. These would be allocated in proportion to the relative runs scored per resource consumed. In a match abandoned with no result, the points would be divided 50/50. This approach would not unfairly prejudice teams forced to play more shorter games due to bad weather, and also wouldn't allow an unscrupulous strategy to qualify, for instance by restricting a side's margin of victory by deliberately being all out for a low score.

Photographer: Paul McGregor

The sun shines again, on John Carr at Trent Bridge

Appendix 1: Answers to frequently asked questions

(Note: the side batting first is called Team 1 and the side batting second is called Team 2.)

1. Why should Team 2 sometimes be set the task of scoring more runs than were made by Team 1 when they have the same number of overs to face?

When the interruption occurs during the first innings, so that the match is shortened to one of fewer overs per side than it was at its start, Team 1 are usually more disadvantaged than Team 2. Before the stoppage they had been pacing their innings in the expectation of receiving say 50 overs and would not have taken the risks of scoring as fast as they would have done had they known their innings was to be shortened. Team 2, on the other hand, know from the start of their innings that they have the reduced number of overs and can pace their entire innings accordingly. Team 2 are set a higher target to compensate Team 1 for this disadvantage.

Consider, for example, when Team 1 have batted for 40 of an intended 50-over innings and then rain washes out the rest of their innings and there is just time for Team 2 to receive 40 overs. If they had wickets in hand, Team 1 might have expected to make around 60 or 70 in those final 10 overs. But Team 2 know they have only 40 overs to receive from the moment they start their innings. The average score in a 40-over innings is only 20 to 25 less than that made in 50 overs, so Team 1's loss is typically 40-45 runs greater than Team 2's and the target is raised by about this amount.

The necessity to set a higher target for Team 2 arises from the regulations for most competitions that require that lost overs, where possible, be divided equally between the two sides. It would be possible to compensate Team 1 for their disadvantage by allowing them to face more overs than Team 2 and in this way the latter need not be set an enhanced target, but this would require a complicated calculation and would reduce the scope for accommodating further stoppages. Because of these disadvantages, cricket authorities have preferred to stay with the present regulations.

2. Why should this apply when Team 1 have been bowled out?

In limited-overs cricket no distinction is made between the two ways in which an innings is closed, using up all the overs or losing all ten wickets. In both cases the team have used up all the resources of their innings. In an uninterrupted innings, there is no difference between Team 1's score of 250, for instance, whether it were 250 for 3 wickets in 50 overs or whether it were 250 all out in 47 overs. Similarly in an interrupted innings, the method of target revision cannot and should not distinguish between whether Team 1's innings were terminated by being all out or by using up their allocation of overs.

3. When Team 2 have more resources than Team 1, why do you not simply scale up the target by the ratio of resources?

Cricket is an unpredictable game and how an innings starts may be no guide at all as to how it will continue. To scale up a target by the ratio of resources would be to assume that Team 1 would have batted as well, or as badly, in the overs they have lost as they had done in those that they actually faced. This could lead to some excessively high targets if Team 1 had achieved an early high rate of scoring and rain caused a drastic reduction in the overs for the match (see Q9, for instance). We have preferred so far, therefore, to assume *average* performance for Team 1's additional loss of resource over Team 2. In the Professional Edition, however, the problem of early high scoring rates producing anomalously high targets has been overcome, and so direct scaling is employed with this Edition.

4. But why should the target score sometimes go <u>down</u> if there is an interruption in the first innings and teams have the same number of overs?

In interruptions to the first innings the D/L method makes appropriate allowance for the comparative resources lost by the stoppage.

Consider the following situation. Suppose Team 1 started well in the style of the renowned Sri Lankan 1996 World Cup winning team but the wheels fell off and they were 150/9 in 30 of the 50 overs. On average Team 1 would be all out shortly, leaving Team 2 to score at the rate of around 3 per over for their full 50 overs. If rain interrupted play at this point and 19 overs were lost per side, then on the resumption Team 1 would have only one over to survive and their run rate would then be close to 5 per over. By all the 'old' methods, for 31 overs also, Team 2 would have to score around 150, around 5 per over, to win - in other words Team 1 would have been greatly advantaged by the rain interruption changing a required scoring rate of 3 per over to 5 per over for Team 2. By the D/L method this advantage to Team 1 would be neutralised so that the target for Team 2 would be well below 150 in this circumstance, and fairly so, which maintains the advantage Team 2 had earned before the stoppage. In other words, and quite logically, Team 2 have to get fewer runs than Team 1 scored to win in the same number of overs.

5. When Team 2 have the more resource, you increase the target by applying the excess resource to the quantity known as G50, which is the average score for a 50-over innings. Why do you not use a different value of G50 according to ground conditions on the day?

The key is simplicity. We accept that the value of G50 should, perhaps, be different for each country, or even for each ground, and there is no reason why any cricket authority may not choose the value it believes to be the most appropriate. In fact it would be possible for the two captains to agree a value of G50 before the start of each match, taking account of all relevant factors.

However, we not believe that something that is only invoked if rain interferes with the game should impose itself on every game in this way. In any case, it should be realised that the value of G50 usually has very little effect on the revised target. If 250 were used, for instance, instead of 235, it is unlikely that the target would be more than two or three runs different.

6. Why don't you take away wickets as well as overs to balance up teams' resources?

This is a simple idea but unfortunately it creates many difficulties and problems over implementation . First is how to apportion wickets deducted for overs lost bearing in mind not only the rate of deduction (which might result in a fraction of a wicket!) but also the fact that the earlier wickets are usually more valuable than the later wickets. Second is the problem of deciding which batsmen shall not be allowed to bat. This could cause dissatisfaction not only to the batsmen excluded but also to the spectators who may have come to see particular players bat.

Because of such problems cricketing authorities have always regarded the idea of deducting wickets as an unacceptable option.

7. When Team 2's innings is interrupted, why do you not set a target that maintains the probability of achieving the target across the stoppage?

The problem with maintaining Team 2's probability of achieving their target across a stoppage is that it would mean that the target depended upon how many runs they had scored at the point of interruption. The more runs they had scored the more they would need, and the less they had scored the less they would need.

For instance, suppose that in three parallel matches, Team 1 score 250 in their 50 overs and Team 2's innings is interrupted after 20 overs with 10 overs lost in each case but with the scores at 60/2, 100/2 and 140/2. In all three cases the resources remaining were reduced from 67.3% to 52.4%, a loss of 14.9%, and so the target would be reduced by 14.9% of 250 to 213. If one set the revised target by scaling the runs still required by the resources remaining after and before the stoppage, which would maintain an equal probability of achieving the target, the targets would be different in the three cases, at 208, 217 and 226 respectively. It is surely unjust for a team to have to face a higher target because they had scored more runs. And an absurdity in the comparative results would be quite possible. Suppose, for instance, that the final scores of Team 2 in the three matches above are respectively 210, 216 and 224. The team scoring the most (224) have lost the match and the team scoring the least (210) have won.

The perceived problem with the way the revised target is set only arises when Team 2 are well ahead, or well behind, their par score. For instance, if they were 30 runs behind par at a stoppage and afterwards there was only time for a very few overs, they would still be 30 runs behind par and would have these few overs to make up the deficit, so their task may become virtually impossible. (If the match were washed out completely, they would have lost by 30 runs; nobody would dispute this.) It is Team 2's obligation to remain close to par to avoid losing if the match were terminated or their task being made more difficult if the innings were to be shortened.

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8. How can Team 2 win by a number of runs?

When Team 2's innings is prematurely terminated by the weather the result is decided by comparing their score with their 'par score', this being the revised target, less one run, based on the loss of resource caused by the termination. Whether Team 2 have won or lost, the difference of their score from the par score is the best measure available of the margin of victory and so it has been decided that the result should be given in terms of this margin in all such cases.

Even when a game is not prematurely terminated it is still possible to describe a victory for Team 2 in terms of a margin of runs. When they hit the winning run their score will be ahead of par by a certain margin and there is a good case for expressing the result in terms of this margin of runs in all cases. For instance, if Team 2 score the winning run off the last ball available, to describe their victory in terms of the wickets they had in hand gives no indication of its narrowness.

9. Suppose we are playing a 50-overs-per-side game where only 10 overs per side are needed for the match to count. Team 1 send in pinch hitters and get off to a wonderful start making 100 for no wicket after 10 overs. There is then a prolonged stoppage and when play can resume Team 1's innings is closed and there is only just time for Team 2 to face the minimum 10 overs. The D/L calculation gives Team 2's target as 151 in 10 overs. How can this practically impossible target be justified?

10. Same playing regulations as in Q9. Team 1 make the excellent score of 350 in their 50 overs and Team 2 start their reply cautiously and reach 40/0 in 10 overs. The heavens now open (or the floodlights fail) and further play is ruled impossible. Under the D/L system Team 2 are declared the winners by 3 runs. They were clearly already falling behind the run rate they needed even allowing for the fact that they had all their wickets intact, so how can this result be justified?

The above represent the two worst-case scenarios for treatment by the Standard Edition of the D/L method. They could only give such extreme consequences with playing regulations that allow a minimum of 10 overs per side for the match to count, and Q9 would not arise if the alternative regulation discussed in answer to Q1 were adopted. But a similar, though less exaggerated, injustice could still arise even with a minimum of 25 overs per side being required.

The Standard D/L method was devised so that anyone could perform the calculations with nothing more than the single table of resource percentages and a pocket calculator. This was regarded as an essential requirement for the method. It was considered that to be totally dependent on a computer would mean that the method could not be used universally, it would be vulnerable to computer failure and it would be virtually impossible to explain how the targets were calculated.

The use of the simplifying single table of resource percentages meant that actual performance must necessarily be assumed to be proportional to average performance. In 95% of cases this assumption is valid, but the assumption breaks down when an actual performance is far above the average, as is the case in the scenarios of Q9 and Q10.

This problem may now be overcome by use of the Professional Edition and this has been in use for all ODIs from 1 October 2003. It can only be operated by using a computer program, which will eventually be available for purchase from the ICC (keep watch on www.icc.cricket.org).

11. How do the results of the Professional Edition differ from those of the previous (Standard) edition?

For innings when the side batting first (Team 1) score at or below the average for top level cricket (which would be 235 for an uninterrupted 50-over innings), the results of applying the Professional Edition are identical to those from the Standard Edition and the single table of resource percentages can be used for the calculations with the small exception in the case of enhanced targets mentioned in Q3. For higher scoring matches, the results start to diverge and the difference increases the higher the first innings total. In effect there is now a different table of resource percentages for every total score in the Team 1 innings, and so a computer is essential to operate the system.

12. How do we know whether to use the Professional Edition or the Standard Edition?

The decision on which edition should be used is for the cricket authority which runs the particular competition. At present (October 2003) the Professional Edition is only used in one-day international matches, run under the ICC playing regulations. This edition can only be operated by running the computer software CODA 6.0. This is not yet available for sale to the general public; when it is details will be available on the ICC website (www.icc.cricket.org).

13. Will it be possible to explain the calculations when the Professional Edition is in use?

Yes. The calculations are identical in process to the Standard Edition (except that in the Professional Edition, an enhanced target is obtained by scaling up of the resources rather than by applying Team 2's excess resource to the quantity G50). All you need is the table of resource percentages appropriate for the particular match. These resources are fixed for the match once the first innings has been completed and the table may be obtained from the computer program CODA (versions 6.1 or later). This table may be used to calculate any revised target 'by hand' as was possible under the Standard Edition. Note that if Team 1's score has not been above the equivalent of 235 for an uninterrupted 50-over innings, the full tables published for the Standard Edition will still be applicable.

14. Shouldn't the revised target take account of the quality of the players at the crease when play is stopped and of those who still have to bat? And should not account also be taken of the number of overs the top line bowlers will still have to bowl when play is resumed?

Although it is quite true that the extent to which the effective resources of the batting and bowling sides are depleted by a stoppage depends on the identities of the individual players affected, there is no way in which such factors could be incorporated into an objective rule for revising targets. It would require both teams to identify, before every match, the way the total quality of their sides, in respect of both batting and bowling, is divided between the individual team members. Furthermore, it would be necessary to input details of who was still to bowl and to bat and perform the calculation based on this before a revised target can be computed. As well as leading to contention, such a procedure would be quite impractical to implement.

Appendix 2: – formal description of the Standard Edition of the D/L method based on the official regulations published by the ICC and other cricket authorities

1. Introduction

The D/L method sets revised targets in rain-interrupted limited-overs matches in accordance with the relative run scoring resources which are at the disposal of the two sides.

These are not in direct proportion to the number of overs available to be faced, as with the average run rate method of correction. Instead they depend on how many overs are to go and how many wickets are down when the interruptions occur.

To calculate the revised targets, you need to know the resources available at the stage of the match when suspensions and resumption of play occur. All possible values of resources have been pre-calculated and these are listed in the accompanying table.

The table covers each individual ball in a game of up to 50-overs per side. The figures given in the table are percentages of the resources available for a complete 50-over innings.

For matches with less than 50-overs per innings before they start, the resource percentages available at the start of an innings will be less than 100%. But the same table and the same method of calculation are used whatever the number of overs per innings.

The single sheet over-by-over version of the table can be used for cases when play is suspended before the start of a new over.

When Team 2 (the side batting second) have less run scoring resources at their disposal than had Team 1 (the side batting first), their target is adjusted downwards using the ratio of the resources available to the two sides.

But when Team 1's innings has been interrupted, it often happens than Team 2 have more resources at their disposal than had Team 1 and it is now necessary to adjust Team 2's target upwards. In this case the adjustment is based on the runs that would be expected to be scored on average from the extra resources at their disposal. The number of these extra runs required is calculated by applying the excess resource percentage to the average total score in a 50-over innings, referred to here as **G50**.

For matches involving ICC full member nations, including under-19 international matches, or for matches between teams that play first class cricket, the value of **G50** to be used at present (at least until 2004) is 235. For matches between associate ICC member nations, the recommended value of **G50** is 190; for women's ODIs, the recommended value is 175. For U15 internationals, the recommended value is 200. For other levels of the game, **G50** should be chosen to represent the average score expected from the team batting first in an uninterrupted 50-overs-per-innings match. If the data for a particular class of game come predominantly from matches with other than 50 overs per innings, the **G50** value is obtained by scaling in proportion to the resources taken from the first column (0 wicket lost) of the table and rounding to the nearest whole number of runs.

Example:
A competition in a local league is played with 30 overs per innings and the average score of the team batting first, based on experience over many matches played under the same rules, is 145. The table tells us that 75.1% of the runs made in a 50-over innings are on average made in a 30-over innings. Therefore, the value of **G50** is obtained by scaling up the average score of 145 by the ratio 100/75.1, which gives 193.07 (rounding to 193) runs.

2. Definitions

- The team batting first are referred to as 'Team 1' and the team batting second are referred to as 'Team 2'.
- In the table decimal fractions of an over are expressed in standard cricket notation; i.e. 4.3 overs means 4 overs plus 3 balls.
- The terms 'target' and 'revised target' are reserved exclusively for the minimum score Team 2 need to win.
- As with an uninterrupted match, if Team 2 make a score that is one run short of the target, the match is tied.

The following symbols are used throughout:

N is the number of overs per innings for the match as decided at the moment of delivery of the first ball of the match.
N1 is the number of overs Team 1 have had the opportunity of facing during their innings (which may not be a whole number).
S is Team 1's total score.
R1 is the resource percentage (relative to a full 50-over innings) available to Team 1.
R2 is the resource percentage (relative to a full 50-over innings) available to Team 2.
RP is the resource percentage (relative to a full 50-over innings) lost by Team 2 as a penalty for slow bowling (where applicable).
T is Team 2's target score.

3. Calculation of the percentage resource lost by a suspension in play

To compensate for any loss of overs due to a suspension in play during either Team 1's or Team 2's innings, it is necessary first to calculate the resource percentage that has been lost on account of this suspension.

If the suspension occurs between overs, use the sheet of the table that gives the figures for whole numbers of overs. If it occurs mid-over, use the sheets of the table that provide the figures for each individual ball.

3.1 For the start of the suspension in play, from the table note the resource percentage that remained for the appropriate number of overs/balls left and wickets lost.

3.2 For the resumption of play after the suspension, from the table note the resource percentage now remaining for the revised number of overs/balls left and for the same number of wickets lost.

3.3 Subtract the resource percentage in **§3.2** from that in **§3.1** to give the resource percentage lost.

3.4 If a suspension in play causes the innings to be terminated, the resource percentage on resumption (**§3.2**) is zero and the percentage lost is the resource percentage that was remaining when the suspension occurred (**§3.1**).

3.5 If more than one suspension in play occurs, the resource percentages lost are calculated as described in **§3.1** to **§3.4** and are accumulated to give updated values for the total resource percentage lost or resource available for the innings. This is done after each suspension as described in **§5.2** and **§5.5**.

4. Penalties for slow over rates

(This section should be ignored if overs penalties for slow over rates are not applicable.)

If Team 1's innings takes longer than the time allocated and the umpires decide that Team 2's slow over rate has been responsible, at least in part, then they may penalise Team 2 by reducing their allocation of overs from which to make their required target. If overs are additionally lost due to a suspension in play, this penalty has to be allowed for in the calculation of revised targets.

The way this is done is by attributing Team 1's score to a lower resource percentage than was actually used. Thus Team 1's resource percentage **R1** is reduced by the loss of run scoring resources, **RP**, suffered by Team 2 as a result of the penalty, and this reduced value of **R1** is the value that is used in the calculation of revised targets as described in **§5** below. **RP** is calculated by the following procedure.

4.1 Note the number of balls/overs which Team 1 faced, or had the opportunity of facing, during their innings, **N1**, and the number of overs penalty, **P**.

4.2 From the table, note the resource percentage for **N1** overs remaining and 0 wicket lost.

4.3 From the table, note the resource percentage for **N1 – P** overs remaining and 0 wicket lost.

4.4 Subtract the resource percentage in **§4.3** from that in **§4.2** to give the resource penalty, **RP**.

5. Calculation of revised targets

5.1 Note the number of overs per innings decided at the start of the game, **N**. From the table note the resource percentage available to Team 1 at the start of their innings. (For **N** = 50 this is 100%.)

5.2 For all suspensions and any premature termination of Team 1's innings, calculate the total resource percentage lost using the procedure described in **§3**. Subtract this from the starting resource percentage (**§5.1**) to give **R1**, the resource, which was available to Team 1 for their innings. Note Team 1's total score, **S**.

5.3 If there is no overs penalty for slow over rates by either side, go to **§5.4**. Otherwise, if Team 2 have been penalised for a slow over rate, calculate the loss of resource, **RP**, equivalent to the overs penalty, as described in **§4** and subtract this from the value of **R1** calculated in **§5.2** to give an updated value of **R1**. This replaces the value from **§5.2**.

5.4 Note the number of overs allocated to Team 2 at the start of their innings and from the table note the resource percentage for this number of overs remaining and 0 wicket lost. This is **R2**, the resource percentage available to Team 2. If **R2** differs from **R1**, which will happen if Team 1's innings was interrupted and/or Team 2's was delayed, a revised target must be set. Calculate this revised target, **T**, as described in **§5.6** below.

5.5 For each suspension of play during Team 2's innings or for premature termination of the match, update the resource percentage available, **R2**, by subtracting the resource percentage lost calculated as in **§3**. Calculate the revised target, **T**, after each suspension as described in **§5.6** below. If the match has to be terminated, the result is decided by comparing Team 2's score at the time with the 'par score', this being the revised target, calculated as in **§5.6** below, less one run. If it is greater, Team 2 win. If it is equal, the match is tied. If it is less, Team 1 win.

5.6 If **R2** is less than **R1**, Team 2's revised target is obtained by reducing Team 1's score **S** in the ratio of **R2** to **R1**, ignoring any figures after the decimal point, and adding one run,

i.e. **T** = **(S** x **R2/R1)** + **1** (rounded down to a whole number, as necessary).

If **R2** is equal to **R1**, no revision is needed and Team 2's target is one more run than Team 1's score.

i.e. **T** = **S** + **1**

If **R2** is greater than **R1**, calculate the amount of excess **R2** – **R1**, and take this percentage of the average 50-over total, **G50**, to give the extra runs needed, ignoring any figures after the decimal point.

i.e. **T** = **S** + (**R2** – **R1**) x **G50/100** + **1** (rounded down to a whole number, as necessary)

6. Penalty runs

6.1 During Team 1's innings

If penalty runs are awarded to the batting side, then their score shall advance accordingly and be taken into account when performing any future D/L calculation.

If penalty runs are awarded to the fielding side, then any D/L calculation in between innings will be performed as normal, and their innings will commence with the score equivalent to the number of penalty runs that they have been awarded.

6.2 During Team 2's innings

If penalty runs are awarded to the batting side, then their score shall advance accordingly. These penalty runs do not affect any subsequent D/L calculation.

If penalty runs are awarded to the fielding side, then there will be no recalculation of any D/L target. Instead, the target score and the entire schedule of par scores will advance by the appropriate number of penalty runs. If a loss of overs occurs after such a penalty has been awarded, then the D/L target will be calculated based upon the original score of the side batting first, and this target, and all par scores, will then be raised by the appropriate number of penalty runs.

7. The result and its description

When a revised target has been calculated and the match has been played out to its completion, the result is described exactly as in the case of an uninterrupted match; if Team 2 achieve their revised target they win by the number of wickets they have in hand when they reach this score; if they fall short of their revised target by exactly one run the result is a tie, and if they make a lower score Team 1 win by the margin of runs by which Team 2 fall short of the score needed to achieve a tie.

When a match has to be abandoned with Team 2's innings in progress (provided sufficient overs have been bowled to constitute a viable match), the result is decided by comparing Team 2's score with the 'par score' as defined in **§5.5** and the winning margin is described in terms of the number of runs by which their score differs from the 'par score', regardless of whether Team 1 or Team 2 are the victors.

Whenever a completed game has involved the use of the D/L method, the description should be qualified by appending '(D/L method)'.

7.1 Examples of result description:

(i) Team 2 are set a revised target of 186. But they only succeed in making 180 in their allocation of overs. They thus fall 5 runs short of the 185 runs needed to tie the match and the result is described as 'Team 1 win by 5 runs (D/L method)'.

(ii) Team 2 are chasing a target of 201 in a 50-over per innings match and reach 115/4 after 30 overs when rain causes the match to be abandoned. At this point the 'par score' is 110. Team 2 have exceeded this by 5 runs and so the result is described as 'Team 2 win by 5 runs (D/L method)'.

Worked examples

Example A1 (suspension during Team 1's innings)

In a one-day international match (50 overs per innings), Team 1 reach 79/3 after 20 overs and then there is a suspension in play. It is decided that 20 overs of the match should be lost, 10 of these by each team. Team 1 resume to reach a final total of 180 in its revised allocation of 40 overs.

Number of overs per innings at the start of match, **N** = 50.
Resource percentage available to Team 1 at start of innings = 100% (**§5.1**).
Resource percentage remaining at suspension (30 overs left, 3 wkts lost = 61.6% (**§3.1**).
Resource percentage remaining at resumption (20 overs left, 3 wkts lost) = 49.1% (**§3.2**).
Resource percentage lost due to suspension = 61.6 – 49.1 = 12.5% (**§3.3**).
Resource percentage available to Team 1, **R1** = 100 – 12.5 = **87.5%** (**§5.2**).

Number of overs available to Team 2 at the start of its innings = 40.
Resource percentage available (40 overs left, 0 wkt lost), **R2 = 89.3%** (**§5.4**).

R2 is greater than **R1**, i.e. Team 2 have more resource available than had Team 1, so their target should be increased. **S** = 180; **G50** = 235.
Team 2's revised target (**§5.6**) is

T = **S** + **G50** x (**R2 – R1**)/100 + 1 = 180 + 235 x (89.3 – 87.5)/100 + 1
= **185** (rounded down).

Example A2 (delay to start of Team 2's innings)

In an English National League match (45 overs per innings), Team 1 score 212 in their allocated 45 overs. Rain then causes Team 2's response to be delayed and it is decided that it should be shortened to 35 overs.

Number of overs at start of match, **N** = 45.
Resource percentage available to Team 1 at start of its innings (45 overs left, 0 wkt lost) = 95.0% (**§5.1**).
The innings was not interrupted, so **R1 = 95.0%**.

Number of overs available to Team 2 at start of their innings = 35.
Resource percentage available to Team 2 at start of innings (35 overs left, 0 wkt lost) **R2 = 82.7%** (**§5.4**).

R2 is less than **R1; S** = 212.

Team 2's revised target (**§5.6**) is

T = S x R2/R1 + 1 = 212 x 82.7/95.0 + 1

= **185** (rounded down).

Example A3 (suspension during Team 2's innings)

In a one-day international match (50 overs per innings), Team 1 have scored 250 from their allocation of 50 overs in an uninterrupted innings. Team 2 have received 12 overs and have scored 40/1. Then play is suspended and 10 overs are lost.

Number of overs at start of match, **N** = 50.
Team 1's innings was uninterrupted, so their resource percentage available, **R1 = 100%** (**§5.1**).

Resource percentage available to Team 2 at start of innings = 100% (**§5.4**).
Resource percentage remaining at suspension (38 overs left, 1 wkt lost) = 82.0% (**§3.1**).
Resource percentage remaining at resumption (28 overs left, 1 wkt lost) = 68.8% (**§3.2**).
Resource percentage lost due to suspension = 82.0 – 68.8 = 13.2% (**§3.3**).
Resource percentage available to Team 2, **R2** = 100 – 13.2 = **86.8%** (**§5.5**).

R2 is less than **R1; S** = 250.
Team 2's revised target (**§5.6**) is

T = S x R2/R1 + 1 = 250 x 86.8/100 + 1

= **218**, and they need a further 178 runs from 28 overs.

Example A4 (multiple suspensions and abandonment)

Suppose that in Example A3, play continues for a further 10 overs during which Team 2 take their score on to 98/3, whereupon there is another suspension in play and 2 more overs are lost. A further 8.2 overs are bowled and Team 2 are 154/6 when rain washes out the match.

Team 1's resource percentage is still **R1 = 100%.**

Team 2's resource percentage has been reduced further.
Resource percentage remaining at start of second suspension (18 overs left, 3 wkts lost) = 45.9% (**§3.1**).
Resource percentage remaining at end of second suspension (16 overs left, 3 wkts lost) = 42.3% (**§3.2**).
Resource percentage lost due to second suspension = 45.9 – 42.3 = 3.6% (**§3.3**).
Resource percentage available to Team 2, **R2** = 86.8 – 3.6 = **83.2%** (**§5.5**).

R2 is less than **R1; S** = 250.
Team 2's revised target (**§5.6**) is

T = S x R2/R1 + 1 = 250 x 83.2/100 + 1

= **209** and they need a further 111 runs from 16 overs.

When the innings had to be terminated, there were 7.4 overs remaining.
Resource percentage remaining at termination of Team 2's innings (7.4 overs left, 6 wkts lost) = 19.4%.
This remaining resource is lost by the termination.
Resource percentage available to Team 2, **R2** = 83.2 – 19.4 = **63.8%** (**§5.5**).

R2 is less than **R1; S** = 250.
Team 2's revised target (**§5.6**) is
T = S x R2/R1 + 1 = 250 x 63.8/100 + 1
= **160** (rounded down); the par score at the instant of the abandonment is 159 and with a score of 154 they have lost by 5 runs.
Team 1 win by 5 runs (D/L method) (**§7**).

Example A5 (suspension and termination of Team 1's innings mid-over and delay to Team 2's innings)

This is taken form an actual ODI: India (Team 1) versus Pakistan (Team 2), Singapore, April 1996. Team 1 score 226/8 in 47.1 of a scheduled 50 overs. Rain then terminates Team 1's innings and delays that of Team 2, which is given a reduced allocation of 33 overs.

Number of overs per innings at start of match, **N** = 50.

Team 1's innings:
Resource percentage at start of innings is 100% (**§5.1**).
Resource percentage remaining at termination (2.5 overs left, 8 wkts lost) = 6.9% (**§3.1**).
Resource percentage lost due to termination = 6.9% (**§3.4**).
Resource percentage available, **R1** = 100 – 8.1 = **93.1%** (**§5.2**).

Team 2's innings (allocated 33 overs):
Resource percentage available at start of innings (33 overs left, 0 wkts lost), **R2 = 79.8%** (**§5.4**).

R2 is less than **R1; S** = 226.
Team 2's revised target (**§5.6**) is
T = S x R2/R1 + 1 = 226 x 79.8/93.1 + 1
= **194** (rounded down).

Example A6 (as Example A5 but with a further interruption during Team 2's innings)

In the match of the previous example, Team 2 have scored 140 for 2 after 25 overs when a further 5 overs are lost to the weather.

Team 1's resource percentage is still **R1 = 93.1%.**

Team 2's innings:
Resource percentage at start of innings (33 overs left, 0 wkt lost) = **79.8%** (**§5.4**).
Resource percentage remaining at suspension (8 overs left, 2 wkts lost) = 25.5% (**§3.1**).
Resource percentage remaining at resumption (3 overs left, 2 wkts lost) = 10.4 % (**§3.2**).
Resource percentage lost due to suspension = 25.5 – 10.4 = 15.1% (**§3.3**).
Resource percentage available, **R2** = 79.8 – 15.1 = **64.7%** (**§5.2**).

R2 is less than **R1; S** = 226.
Team 2's revised target (**§5.6**) is
T = S x R2/R1 + 1 = 226 x 64.7/93.1 + 1
= **158** (rounded down) and they need a further 18 runs from 3 overs.

Example A7 (Combination of several stoppages, with penalty for slow over rate)

A 50 overs-per-innings match played between teams who play first class cricket is reduced to 31 overs per innings due to rain delaying its start. Team 1 have scored 185/5 in 29.2 overs when rain terminates their innings and reduces Team 2's allotment to 27 overs, which includes a penalty of 1 over due to Team 2's slow over rate. At 42 for 1 after 8 overs, rain further reduces Team 2's quota of overs from 27 to 25.

Team 1's innings:
Resource percentage at start of innings (31 overs left, 0 wkts lost), **R1** = 76.7% (**§5.1**).
Resource percentage remaining at termination (1.4 overs left, 5 wkts lost) = 5.8%.
Resource percentage lost = 5.8% (**§3.4**).
Resource percentage available, **R1** = 76.7 – 5.8 = **70.9%** (**§5.2**).

Team 2 are to be penalised 1 over; this is done by crediting Team 1 as having scored their runs off a lower percentage resource.
Team 1 received **N1** = 29.2 overs; **P** = 1 (**§4.1**).
Resource percentage for **N1** overs and 0 wkt lost = 74.1% (**§4.2**).
Resource percentage for **N1 – P** = 28.2 overs left and 0 wkt lost = 72.4% (**§4.3**).
Resource penalty for Team 2, **RP** = 74.1 – 72.4 = 1.7% (**§4.4**).
Team 1's updated resource percentage, **R1** = 70.9 – 1.7 = **69.2%** (**§5.3**).

Team 2's innings:
Team 2 are to receive 27 overs.
Resource percentage at start of innings (27 overs left, 0 wkt lost), **R2 = 70.1%** (**§5.4**).

R2 is greater than **R1; S** = 185; **G50** = 235.
Team 2's revised target (**§5.6**) is
T = S + **G50** x (**R2 – R1**)/100 + 1 = 185 + 235 x (70.1 – 69.2)/100 + 1 = **188** (rounded down).

Resource percentage remaining at suspension (19 overs left, 1 wkt lost) = 52.8 % (**§3.1**).
Resource percentage remaining at resumption (17 overs left, 1 wkt lost) = 48.5% (**§3.2**).
Resource percentage lost due to suspension = 52.8 – 48.5 = 4.3% (**§3.3**).
Resource percentage available, **R2** = 70.1 – 4.3 = **65.8%** (**§5.5**).

R2 is less than **R1; S** = 185.
Team 2's revised target (**§5.6**) is
T = S x R2/R1 + 1 = 185 x 65.8/69.2 + 1 = **176** (rounded down), and they need a further 134 runs from 17 overs.

The D/L tables

The D/L (Duckworth/Lewis) method of adjusting target scores in interrupted one-day cricket matches

Table of resource percentages remaining - over by over

2002 update

Overs left 50 to 0

	wickets lost										
overs left	0	1	2	3	4	5	6	7	8	9	overs left
50	100.0	93.4	85.1	74.9	62.7	49.0	34.9	22.0	11.9	4.7	50
49	99.1	92.6	84.5	74.4	62.5	48.9	34.9	22.0	11.9	4.7	49
48	98.1	91.7	83.8	74.0	62.2	48.8	34.9	22.0	11.9	4.7	48
47	97.1	90.9	83.2	73.5	61.9	48.6	34.9	22.0	11.9	4.7	47
46	96.1	90.0	82.5	73.0	61.6	48.5	34.8	22.0	11.9	4.7	46
45	95.0	89.1	81.8	72.5	61.3	48.4	34.8	22.0	11.9	4.7	45
44	93.9	88.2	81.0	72.0	61.0	48.3	34.8	22.0	11.9	4.7	44
43	92.8	87.3	80.3	71.4	60.7	48.1	34.7	22.0	11.9	4.7	43
42	91.7	86.3	79.5	70.9	60.3	47.9	34.7	22.0	11.9	4.7	42
41	90.5	85.3	78.7	70.3	59.9	47.8	34.6	22.0	11.9	4.7	41
40	89.3	84.2	77.8	69.6	59.5	47.6	34.6	22.0	11.9	4.7	40
39	88.0	83.1	76.9	69.0	59.1	47.4	34.5	22.0	11.9	4.7	39
38	86.7	82.0	76.0	68.3	58.7	47.1	34.5	21.9	11.9	4.7	38
37	85.4	80.9	75.0	67.6	58.2	46.9	34.4	21.9	11.9	4.7	37
36	84.1	79.7	74.1	66.8	57.7	46.6	34.3	21.9	11.9	4.7	36
35	82.7	78.5	73.0	66.0	57.2	46.4	34.2	21.9	11.9	4.7	35
34	81.3	77.2	72.0	65.2	56.6	46.1	34.1	21.9	11.9	4.7	34
33	79.8	75.9	70.9	64.4	56.0	45.8	34.0	21.9	11.9	4.7	33
32	78.3	74.6	69.7	63.5	55.4	45.4	33.9	21.9	11.9	4.7	32
31	76.7	73.2	68.6	62.5	54.8	45.1	33.7	21.9	11.9	4.7	31
30	75.1	71.8	67.3	61.6	54.1	44.7	33.6	21.8	11.9	4.7	30
29	73.5	70.3	66.1	60.5	53.4	44.2	33.4	21.8	11.9	4.7	29
28	71.8	68.8	64.8	59.5	52.6	43.8	33.2	21.8	11.9	4.7	28
27	70.1	67.2	63.4	58.4	51.8	43.3	33.0	21.7	11.9	4.7	27
26	68.3	65.6	62.0	57.2	50.9	42.8	32.8	21.7	11.9	4.7	26
25	66.5	63.9	60.5	56.0	50.0	42.2	32.6	21.6	11.9	4.7	25
24	64.6	62.2	59.0	54.7	49.0	41.6	32.3	21.6	11.9	4.7	24
23	62.7	60.4	57.4	53.4	48.0	40.9	32.0	21.5	11.9	4.7	23
22	60.7	58.6	55.8	52.0	47.0	40.2	31.6	21.4	11.9	4.7	22
21	58.7	56.7	54.1	50.6	45.8	39.4	31.2	21.3	11.9	4.7	21
20	56.6	54.8	52.4	49.1	44.6	38.6	30.8	21.2	11.9	4.7	20
19	54.4	52.8	50.5	47.5	43.4	37.7	30.3	21.1	11.9	4.7	19
18	52.2	50.7	48.6	45.9	42.0	36.8	29.8	20.9	11.9	4.7	18
17	49.9	48.5	46.7	44.1	40.6	35.8	29.2	20.7	11.9	4.7	17
16	47.6	46.3	44.7	42.3	39.1	34.7	28.5	20.5	11.8	4.7	16
15	45.2	44.1	42.6	40.5	37.6	33.5	27.8	20.2	11.8	4.7	15
14	42.7	41.7	40.4	38.5	35.9	32.2	27.0	19.9	11.8	4.7	14
13	40.2	39.3	38.1	36.5	34.2	30.8	26.1	19.5	11.7	4.7	13
12	37.6	36.8	35.8	34.3	32.3	29.4	25.1	19.0	11.6	4.7	12
11	34.9	34.2	33.4	32.1	30.4	27.8	24.0	18.5	11.5	4.7	11
10	32.1	31.6	30.8	29.8	28.3	26.1	22.8	17.9	11.4	4.7	10
9	29.3	28.9	28.2	27.4	26.1	24.2	21.4	17.1	11.2	4.7	9
8	26.4	26.0	25.5	24.8	23.8	22.3	19.9	16.2	10.9	4.7	8
7	23.4	23.1	22.7	22.2	21.4	20.1	18.2	15.2	10.5	4.7	7
6	20.3	20.1	19.8	19.4	18.8	17.8	16.4	13.9	10.1	4.6	6
5	17.2	17.0	16.8	16.5	16.1	15.4	14.3	12.5	9.4	4.6	5
4	13.9	13.8	13.7	13.5	13.2	12.7	12.0	10.7	8.4	4.5	4
3	10.6	10.5	10.4	10.3	10.2	9.9	9.5	8.7	7.2	4.2	3
2	7.2	7.1	7.1	7.0	7.0	6.8	6.6	6.2	5.5	3.7	2
1	3.6	3.6	3.6	3.6	3.6	3.5	3.5	3.4	3.2	2.5	1
0	0	0	0	0	0	0	0	0	0	0	0
overs left	0	1	2	3	4	5	6	7	8	9	overs left
	wickets lost										

Overs left 50 to 0

The D/L (Duckworth/Lewis) method of adjusting target scores in interrupted one-day cricket matches

Table of resource percentages remaining - ball by ball

2002 update

	Overs left		
	50	to	40

	wickets lost										
overs left	0	1	2	3	4	5	6	7	8	9	overs left
50	100.0	93.4	85.1	74.9	62.7	49.0	34.9	22.0	11.9	4.7	50
49.5	99.8	93.2	85.0	74.8	62.7	49.0	34.9	22.0	11.9	4.7	49.5
49.4	99.7	93.1	84.9	74.7	62.6	48.9	34.9	22.0	11.9	4.7	49.4
49.3	99.5	93.0	84.8	74.6	62.6	48.9	34.9	22.0	11.9	4.7	49.3
49.2	99.4	92.8	84.7	74.6	62.5	48.9	34.9	22.0	11.9	4.7	49.2
49.1	99.2	92.7	84.6	74.5	62.5	48.9	34.9	22.0	11.9	4.7	49.1
49	99.1	92.6	84.5	74.4	62.5	48.9	34.9	22.0	11.9	4.7	49
48.5	98.9	92.4	84.4	74.4	62.4	48.9	34.9	22.0	11.9	4.7	48.5
48.4	98.7	92.3	84.3	74.3	62.4	48.8	34.9	22.0	11.9	4.7	48.4
48.3	98.6	92.2	84.2	74.2	62.3	48.8	34.9	22.0	11.9	4.7	48.3
48.2	98.4	92.0	84.0	74.1	62.3	48.8	34.9	22.0	11.9	4.7	48.2
48.1	98.2	91.9	83.9	74.1	62.2	48.8	34.9	22.0	11.9	4.7	48.1
48	98.1	91.7	83.8	74.0	62.2	48.8	34.9	22.0	11.9	4.7	48
47.5	97.9	91.6	83.7	73.9	62.2	48.7	34.9	22.0	11.9	4.7	47.5
47.4	97.8	91.5	83.6	73.8	62.1	48.7	34.9	22.0	11.9	4.7	47.4
47.3	97.6	91.3	83.5	73.8	62.1	48.7	34.9	22.0	11.9	4.7	47.3
47.2	97.4	91.2	83.4	73.7	62.0	48.7	34.9	22.0	11.9	4.7	47.2
47.1	97.3	91.0	83.3	73.6	62.0	48.7	34.9	22.0	11.9	4.7	47.1
47	97.1	90.9	83.2	73.5	61.9	48.6	34.9	22.0	11.9	4.7	47
46.5	96.9	90.8	83.1	73.4	61.9	48.6	34.9	22.0	11.9	4.7	46.5
46.4	96.7	90.6	82.9	73.4	61.8	48.6	34.9	22.0	11.9	4.7	46.4
46.3	96.6	90.5	82.8	73.3	61.8	48.6	34.8	22.0	11.9	4.7	46.3
46.2	96.4	90.3	82.7	73.2	61.7	48.6	34.8	22.0	11.9	4.7	46.2
46.1	96.2	90.2	82.6	73.1	61.7	48.5	34.8	22.0	11.9	4.7	46.1
46	96.1	90.0	82.5	73.0	61.6	48.5	34.8	22.0	11.9	4.7	46
45.5	95.9	89.9	82.4	73.0	61.6	48.5	34.8	22.0	11.9	4.7	45.5
45.4	95.7	89.7	82.3	72.9	61.5	48.5	34.8	22.0	11.9	4.7	45.4
45.3	95.5	89.6	82.1	72.8	61.5	48.5	34.8	22.0	11.9	4.7	45.3
45.2	95.4	89.4	82.0	72.7	61.4	48.4	34.8	22.0	11.9	4.7	45.2
45.1	95.2	89.3	81.9	72.6	61.4	48.4	34.8	22.0	11.9	4.7	45.1
45	95.0	89.1	81.8	72.5	61.3	48.4	34.8	22.0	11.9	4.7	45
44.5	94.8	89.0	81.7	72.4	61.3	48.4	34.8	22.0	11.9	4.7	44.5
44.4	94.6	88.8	81.5	72.4	61.2	48.3	34.8	22.0	11.9	4.7	44.4
44.3	94.5	88.7	81.4	72.3	61.2	48.3	34.8	22.0	11.9	4.7	44.3
44.2	94.3	88.5	81.3	72.2	61.1	48.3	34.8	22.0	11.9	4.7	44.2
44.1	94.1	88.4	81.2	72.1	61.1	48.3	34.8	22.0	11.9	4.7	44.1
44	93.9	88.2	81.0	72.0	61.0	48.3	34.8	22.0	11.9	4.7	44
43.5	93.7	88.1	80.9	71.9	61.0	48.2	34.8	22.0	11.9	4.7	43.5
43.4	93.5	87.9	80.8	71.8	60.9	48.2	34.8	22.0	11.9	4.7	43.4
43.3	93.4	87.7	80.7	71.7	60.8	48.2	34.7	22.0	11.9	4.7	43.3
43.2	93.2	87.6	80.5	71.6	60.8	48.1	34.7	22.0	11.9	4.7	43.2
43.1	93.0	87.4	80.4	71.5	60.7	48.1	34.7	22.0	11.9	4.7	43.1
43	92.8	87.3	80.3	71.4	60.7	48.1	34.7	22.0	11.9	4.7	43
42.5	92.6	87.1	80.1	71.3	60.6	48.1	34.7	22.0	11.9	4.7	42.5
42.4	92.4	86.9	80.0	71.3	60.6	48.0	34.7	22.0	11.9	4.7	42.4
42.3	92.2	86.8	79.9	71.2	60.5	48.0	34.7	22.0	11.9	4.7	42.3
42.2	92.0	86.6	79.7	71.1	60.4	48.0	34.7	22.0	11.9	4.7	42.2
42.1	91.8	86.4	79.6	71.0	60.4	48.0	34.7	22.0	11.9	4.7	42.1
42	91.7	86.3	79.5	70.9	60.3	47.9	34.7	22.0	11.9	4.7	42
41.5	91.5	86.1	79.3	70.8	60.3	47.9	34.7	22.0	11.9	4.7	41.5
41.4	91.3	85.9	79.2	70.7	60.2	47.9	34.7	22.0	11.9	4.7	41.4
41.3	91.1	85.8	79.1	70.6	60.1	47.8	34.7	22.0	11.9	4.7	41.3
41.2	90.9	85.6	78.9	70.5	60.1	47.8	34.7	22.0	11.9	4.7	41.2
41.1	90.7	85.4	78.8	70.4	60.0	47.8	34.6	22.0	11.9	4.7	41.1
41	90.5	85.3	78.7	70.3	59.9	47.8	34.6	22.0	11.9	4.7	41
40.5	90.3	85.1	78.5	70.2	59.9	47.7	34.6	22.0	11.9	4.7	40.5
40.4	90.1	84.9	78.4	70.1	59.8	47.7	34.6	22.0	11.9	4.7	40.4
40.3	89.9	84.7	78.2	69.9	59.7	47.7	34.6	22.0	11.9	4.7	40.3
40.2	89.7	84.6	78.1	69.8	59.7	47.6	34.6	22.0	11.9	4.7	40.2
40.1	89.5	84.4	77.9	69.7	59.6	47.6	34.6	22.0	11.9	4.7	40.1
40	89.3	84.2	77.8	69.6	59.5	47.6	34.6	22.0	11.9	4.7	40
overs left	0	1	2	3	4	5	6	7	8	9	overs left
	wickets lost										

	Overs left		
	50	to	40

The D/L (Duckworth/Lewis) method of adjusting target scores in interrupted one-day cricket matches

Table of resource percentages remaining - ball by ball

2002 update

Overs left 40 to 30

	wickets lost										
overs left	0	1	2	3	4	5	6	7	8	9	overs left
40	89.3	84.2	77.8	69.6	59.5	47.6	34.6	22.0	11.9	4.7	40
39.5	89.1	84.0	77.7	69.5	59.5	47.5	34.6	22.0	11.9	4.7	39.5
39.4	88.9	83.9	77.5	69.4	59.4	47.5	34.6	22.0	11.9	4.7	39.4
39.3	88.6	83.7	77.4	69.3	59.3	47.5	34.6	22.0	11.9	4.7	39.3
39.2	88.4	83.5	77.2	69.2	59.3	47.4	34.5	22.0	11.9	4.7	39.2
39.1	88.2	83.3	77.1	69.1	59.2	47.4	34.5	22.0	11.9	4.7	39.1
39	88.0	83.1	76.9	69.0	59.1	47.4	34.5	22.0	11.9	4.7	39
38.5	87.8	83.0	76.8	68.9	59.0	47.3	34.5	21.9	11.9	4.7	38.5
38.4	87.6	82.8	76.6	68.7	59.0	47.3	34.5	21.9	11.9	4.7	38.4
38.3	87.4	82.6	76.5	68.6	58.9	47.3	34.5	21.9	11.9	4.7	38.3
38.2	87.2	82.4	76.3	68.5	58.8	47.2	34.5	21.9	11.9	4.7	38.2
38.1	87.0	82.2	76.2	68.4	58.8	47.2	34.5	21.9	11.9	4.7	38.1
38	86.7	82.0	76.0	68.3	58.7	47.1	34.5	21.9	11.9	4.7	38
37.5	86.5	81.8	75.8	68.2	58.6	47.1	34.4	21.9	11.9	4.7	37.5
37.4	86.3	81.6	75.7	68.0	58.5	47.1	34.4	21.9	11.9	4.7	37.4
37.3	86.1	81.5	75.5	67.9	58.4	47.0	34.4	21.9	11.9	4.7	37.3
37.2	85.9	81.3	75.4	67.8	58.4	47.0	34.4	21.9	11.9	4.7	37.2
37.1	85.6	81.1	75.2	67.7	58.3	46.9	34.4	21.9	11.9	4.7	37.1
37	85.4	80.9	75.0	67.6	58.2	46.9	34.4	21.9	11.9	4.7	37
36.5	85.2	80.7	74.9	67.4	58.1	46.9	34.4	21.9	11.9	4.7	36.5
36.4	85.0	80.5	74.7	67.3	58.0	46.8	34.4	21.9	11.9	4.7	36.4
36.3	84.8	80.3	74.6	67.2	58.0	46.8	34.3	21.9	11.9	4.7	36.3
36.2	84.5	80.1	74.4	67.1	57.9	46.7	34.3	21.9	11.9	4.7	36.2
36.1	84.3	79.9	74.2	66.9	57.8	46.7	34.3	21.9	11.9	4.7	36.1
36	84.1	79.7	74.1	66.8	57.7	46.6	34.3	21.9	11.9	4.7	36
35.5	83.8	79.5	73.9	66.7	57.6	46.6	34.3	21.9	11.9	4.7	35.5
35.4	83.6	79.3	73.7	66.6	57.5	46.6	34.3	21.9	11.9	4.7	35.4
35.3	83.4	79.1	73.6	66.4	57.4	46.5	34.3	21.9	11.9	4.7	35.3
35.2	83.2	78.9	73.4	66.3	57.4	46.5	34.2	21.9	11.9	4.7	35.2
35.1	82.9	78.7	73.2	66.2	57.3	46.4	34.2	21.9	11.9	4.7	35.1
35	82.7	78.5	73.0	66.0	57.2	46.4	34.2	21.9	11.9	4.7	35
34.5	82.5	78.3	72.9	65.9	57.1	46.3	34.2	21.9	11.9	4.7	34.5
34.4	82.2	78.0	72.7	65.8	57.0	46.3	34.2	21.9	11.9	4.7	34.4
34.3	82.0	77.8	72.5	65.6	56.9	46.2	34.2	21.9	11.9	4.7	34.3
34.2	81.7	77.6	72.3	65.5	56.8	46.2	34.2	21.9	11.9	4.7	34.2
34.1	81.5	77.4	72.2	65.3	56.7	46.1	34.1	21.9	11.9	4.7	34.1
34	81.3	77.2	72.0	65.2	56.6	46.1	34.1	21.9	11.9	4.7	34
33.5	81.0	77.0	71.8	65.1	56.5	46.0	34.1	21.9	11.9	4.7	33.5
33.4	80.8	76.8	71.6	64.9	56.4	46.0	34.1	21.9	11.9	4.7	33.4
33.3	80.5	76.6	71.4	64.8	56.3	45.9	34.1	21.9	11.9	4.7	33.3
33.2	80.3	76.3	71.3	64.6	56.2	45.9	34.0	21.9	11.9	4.7	33.2
33.1	80.0	76.1	71.1	64.5	56.1	45.8	34.0	21.9	11.9	4.7	33.1
33	79.8	75.9	70.9	64.4	56.0	45.8	34.0	21.9	11.9	4.7	33
32.5	79.5	75.7	70.7	64.2	55.9	45.7	34.0	21.9	11.9	4.7	32.5
32.4	79.3	75.5	70.5	64.1	55.8	45.7	34.0	21.9	11.9	4.7	32.4
32.3	79.0	75.2	70.3	63.9	55.7	45.6	33.9	21.9	11.9	4.7	32.3
32.2	78.8	75.0	70.1	63.8	55.6	45.5	33.9	21.9	11.9	4.7	32.2
32.1	78.5	74.8	69.9	63.6	55.5	45.5	33.9	21.9	11.9	4.7	32.1
32	78.3	74.6	69.7	63.5	55.4	45.4	33.9	21.9	11.9	4.7	32
31.5	78.0	74.3	69.6	63.3	55.3	45.4	33.9	21.9	11.9	4.7	31.5
31.4	77.8	74.1	69.4	63.2	55.2	45.3	33.8	21.9	11.9	4.7	31.4
31.3	77.5	73.9	69.2	63.0	55.1	45.2	33.8	21.9	11.9	4.7	31.3
31.2	77.3	73.6	69.0	62.8	55.0	45.2	33.8	21.9	11.9	4.7	31.2
31.1	77.0	73.4	68.8	62.7	54.9	45.1	33.8	21.9	11.9	4.7	31.1
31	76.7	73.2	68.6	62.5	54.8	45.1	33.7	21.9	11.9	4.7	31
30.5	76.5	72.9	68.4	62.4	54.7	45.0	33.7	21.9	11.9	4.7	30.5
30.4	76.2	72.7	68.2	62.2	54.5	44.9	33.7	21.9	11.9	4.7	30.4
30.3	75.9	72.5	68.0	62.0	54.4	44.9	33.7	21.8	11.9	4.7	30.3
30.2	75.7	72.2	67.8	61.9	54.3	44.8	33.6	21.8	11.9	4.7	30.2
30.1	75.4	72.0	67.6	61.7	54.2	44.7	33.6	21.8	11.9	4.7	30.1
30	75.1	71.8	67.3	61.6	54.1	44.7	33.6	21.8	11.9	4.7	30
overs left	0	1	2	3	4	5	6	7	8	9	overs left
	wickets lost										

Overs left 40 to 30

The D/L (Duckworth/Lewis) method of adjusting target scores in interrupted one-day cricket matches

Table of resource percentages remaining - ball by ball

2002 update

									Overs left 30	to	20
	wickets lost										
overs left	0	1	2	3	4	5	6	7	8	9	overs left
30	75.1	71.8	67.3	61.6	54.1	44.7	33.6	21.8	11.9	4.7	30
29.5	74.9	71.5	67.1	61.4	54.0	44.6	33.6	21.8	11.9	4.7	29.5
29.4	74.6	71.3	66.9	61.2	53.8	44.5	33.5	21.8	11.9	4.7	29.4
29.3	74.3	71.0	66.7	61.1	53.7	44.4	33.5	21.8	11.9	4.7	29.3
29.2	74.1	70.8	66.5	60.9	53.6	44.4	33.5	21.8	11.9	4.7	29.2
29.1	73.8	70.5	66.3	60.7	53.5	44.3	33.5	21.8	11.9	4.7	29.1
29	73.5	70.3	66.1	60.5	53.4	44.2	33.4	21.8	11.9	4.7	29
28.5	73.2	70.0	65.9	60.4	53.2	44.2	33.4	21.8	11.9	4.7	28.5
28.4	73.0	69.8	65.6	60.2	53.1	44.1	33.4	21.8	11.9	4.7	28.4
28.3	72.7	69.5	65.4	60.0	53.0	44.0	33.3	21.8	11.9	4.7	28.3
28.2	72.4	69.3	65.2	59.8	52.8	43.9	33.3	21.8	11.9	4.7	28.2
28.1	72.1	69.0	65.0	59.7	52.7	43.9	33.3	21.8	11.9	4.7	28.1
28	71.8	68.8	64.8	59.5	52.6	43.8	33.2	21.8	11.9	4.7	28
27.5	71.5	68.5	64.5	59.3	52.4	43.7	33.2	21.8	11.9	4.7	27.5
27.4	71.3	68.2	64.3	59.1	52.3	43.6	33.2	21.8	11.9	4.7	27.4
27.3	71.0	68.0	64.1	58.9	52.2	43.5	33.1	21.8	11.9	4.7	27.3
27.2	70.7	67.7	63.9	58.7	52.0	43.4	33.1	21.8	11.9	4.7	27.2
27.1	70.4	67.5	63.6	58.5	51.9	43.4	33.1	21.7	11.9	4.7	27.1
27	70.1	67.2	63.4	58.4	51.8	43.3	33.0	21.7	11.9	4.7	27
26.5	69.8	66.9	63.2	58.2	51.6	43.2	33.0	21.7	11.9	4.7	26.5
26.4	69.5	66.7	62.9	58.0	51.5	43.1	33.0	21.7	11.9	4.7	26.4
26.3	69.2	66.4	62.7	57.8	51.3	43.0	32.9	21.7	11.9	4.7	26.3
26.2	68.9	66.1	62.5	57.6	51.2	42.9	32.9	21.7	11.9	4.7	26.2
26.1	68.6	65.9	62.2	57.4	51.1	42.8	32.8	21.7	11.9	4.7	26.1
26	68.3	65.6	62.0	57.2	50.9	42.8	32.8	21.7	11.9	4.7	26
25.5	68.0	65.3	61.7	57.0	50.8	42.7	32.8	21.7	11.9	4.7	25.5
25.4	67.7	65.0	61.5	56.8	50.6	42.6	32.7	21.7	11.9	4.7	25.4
25.3	67.4	64.8	61.3	56.6	50.5	42.5	32.7	21.7	11.9	4.7	25.3
25.2	67.1	64.5	61.0	56.4	50.3	42.4	32.6	21.7	11.9	4.7	25.2
25.1	66.8	64.2	60.8	56.2	50.2	42.3	32.6	21.7	11.9	4.7	25.1
25	66.5	63.9	60.5	56.0	50.0	42.2	32.6	21.6	11.9	4.7	25
24.5	66.2	63.6	60.3	55.8	49.8	42.1	32.5	21.6	11.9	4.7	24.5
24.4	65.9	63.3	60.0	55.6	49.7	42.0	32.5	21.6	11.9	4.7	24.4
24.3	65.6	63.1	59.8	55.4	49.5	41.9	32.4	21.6	11.9	4.7	24.3
24.2	65.2	62.8	59.5	55.2	49.4	41.8	32.4	21.6	11.9	4.7	24.2
24.1	64.9	62.5	59.3	54.9	49.2	41.7	32.3	21.6	11.9	4.7	24.1
24	64.6	62.2	59.0	54.7	49.0	41.6	32.3	21.6	11.9	4.7	24
23.5	64.3	61.9	58.7	54.5	48.9	41.5	32.2	21.6	11.9	4.7	23.5
23.4	64.0	61.6	58.5	54.3	48.7	41.4	32.2	21.6	11.9	4.7	23.4
23.3	63.7	61.3	58.2	54.1	48.5	41.2	32.1	21.6	11.9	4.7	23.3
23.2	63.3	61.0	58.0	53.8	48.4	41.1	32.1	21.5	11.9	4.7	23.2
23.1	63.0	60.7	57.7	53.6	48.2	41.0	32.0	21.5	11.9	4.7	23.1
23	62.7	60.4	57.4	53.4	48.0	40.9	32.0	21.5	11.9	4.7	23
22.5	62.4	60.1	57.2	53.2	47.9	40.8	31.9	21.5	11.9	4.7	22.5
22.4	62.0	59.8	56.9	52.9	47.7	40.7	31.8	21.5	11.9	4.7	22.4
22.3	61.7	59.5	56.6	52.7	47.5	40.6	31.8	21.5	11.9	4.7	22.3
22.2	61.4	59.2	56.3	52.5	47.3	40.4	31.7	21.5	11.9	4.7	22.2
22.1	61.0	58.9	56.1	52.3	47.1	40.3	31.7	21.4	11.9	4.7	22.1
22	60.7	58.6	55.8	52.0	47.0	40.2	31.6	21.4	11.9	4.7	22
21.5	60.4	58.3	55.5	51.8	46.8	40.1	31.5	21.4	11.9	4.7	21.5
21.4	60.0	58.0	55.2	51.5	46.6	40.0	31.5	21.4	11.9	4.7	21.4
21.3	59.7	57.7	55.0	51.3	46.4	39.8	31.4	21.4	11.9	4.7	21.3
21.2	59.3	57.3	54.7	51.1	46.2	39.7	31.4	21.4	11.9	4.7	21.2
21.1	59.0	57.0	54.4	50.8	46.0	39.6	31.3	21.3	11.9	4.7	21.1
21	58.7	56.7	54.1	50.6	45.8	39.4	31.2	21.3	11.9	4.7	21
20.5	58.3	56.4	53.8	50.3	45.6	39.3	31.1	21.3	11.9	4.7	20.5
20.4	58.0	56.1	53.5	50.1	45.4	39.2	31.1	21.3	11.9	4.7	20.4
20.3	57.6	55.7	53.2	49.8	45.2	39.0	31.0	21.3	11.9	4.7	20.3
20.2	57.3	55.4	52.9	49.6	45.0	38.9	30.9	21.2	11.9	4.7	20.2
20.1	56.9	55.1	52.6	49.3	44.8	38.8	30.9	21.2	11.9	4.7	20.1
20	56.6	54.8	52.4	49.1	44.6	38.6	30.8	21.2	11.9	4.7	20
overs left	0	1	2	3	4	5	6	7	8	9	overs left
	wickets lost										

			Overs left 30	to	20

The D/L (Duckworth/Lewis) method of adjusting target scores in interrupted one-day cricket matches

Table of resource percentages remaining - ball by ball

2002 update

Overs left 20 to 10

	wickets lost										
overs left	0	1	2	3	4	5	6	7	8	9	overs left
20	56.6	54.8	52.4	49.1	44.6	38.6	30.8	21.2	11.9	4.7	20
19.5	56.2	54.4	52.1	48.8	44.4	38.5	30.7	21.2	11.9	4.7	19.5
19.4	55.9	54.1	51.8	48.6	44.2	38.3	30.6	21.2	11.9	4.7	19.4
19.3	55.5	53.8	51.5	48.3	44.0	38.2	30.6	21.1	11.9	4.7	19.3
19.2	55.1	53.4	51.1	48.0	43.8	38.0	30.5	21.1	11.9	4.7	19.2
19.1	54.8	53.1	50.8	47.8	43.6	37.9	30.4	21.1	11.9	4.7	19.1
19	54.4	52.8	50.5	47.5	43.4	37.7	30.3	21.1	11.9	4.7	19
18.5	54.1	52.4	50.2	47.2	43.2	37.6	30.2	21.0	11.9	4.7	18.5
18.4	53.7	52.1	49.9	47.0	42.9	37.4	30.1	21.0	11.9	4.7	18.4
18.3	53.3	51.7	49.6	46.7	42.7	37.3	30.0	21.0	11.9	4.7	18.3
18.2	52.9	51.4	49.3	46.4	42.5	37.1	30.0	21.0	11.9	4.7	18.2
18.1	52.6	51.0	49.0	46.1	42.3	36.9	29.9	20.9	11.9	4.7	18.1
18	52.2	50.7	48.6	45.9	42.0	36.8	29.8	20.9	11.9	4.7	18
17.5	51.8	50.3	48.3	45.6	41.8	36.6	29.7	20.9	11.9	4.7	17.5
17.4	51.5	50.0	48.0	45.3	41.6	36.4	29.6	20.8	11.9	4.7	17.4
17.3	51.1	49.6	47.7	45.0	41.3	36.3	29.5	20.8	11.9	4.7	17.3
17.2	50.7	49.3	47.4	44.7	41.1	36.1	29.4	20.8	11.9	4.7	17.2
17.1	50.3	48.9	47.0	44.4	40.9	35.9	29.3	20.7	11.9	4.7	17.1
17	49.9	48.5	46.7	44.1	40.6	35.8	29.2	20.7	11.9	4.7	17
16.5	49.5	48.2	46.4	43.8	40.4	35.6	29.1	20.7	11.9	4.7	16.5
16.4	49.2	47.8	46.0	43.6	40.1	35.4	29.0	20.6	11.9	4.7	16.4
16.3	48.8	47.5	45.7	43.3	39.9	35.2	28.9	20.6	11.9	4.7	16.3
16.2	48.4	47.1	45.4	43.0	39.6	35.0	28.8	20.5	11.9	4.7	16.2
16.1	48.0	46.7	45.0	42.7	39.4	34.8	28.6	20.5	11.8	4.7	16.1
16	47.6	46.3	44.7	42.3	39.1	34.7	28.5	20.5	11.8	4.7	16
15.5	47.2	46.0	44.3	42.0	38.9	34.5	28.4	20.4	11.8	4.7	15.5
15.4	46.8	45.6	44.0	41.7	38.6	34.3	28.3	20.4	11.8	4.7	15.4
15.3	46.4	45.2	43.6	41.4	38.4	34.1	28.2	20.3	11.8	4.7	15.3
15.2	46.0	44.8	43.3	41.1	38.1	33.9	28.1	20.3	11.8	4.7	15.2
15.1	45.6	44.5	42.9	40.8	37.8	33.7	27.9	20.2	11.8	4.7	15.1
15	45.2	44.1	42.6	40.5	37.6	33.5	27.8	20.2	11.8	4.7	15
14.5	44.8	43.7	42.2	40.2	37.3	33.3	27.7	20.1	11.8	4.7	14.5
14.4	44.4	43.3	41.8	39.8	37.0	33.1	27.5	20.1	11.8	4.7	14.4
14.3	44.0	42.9	41.5	39.5	36.8	32.8	27.4	20.0	11.8	4.7	14.3
14.2	43.5	42.5	41.1	39.2	36.5	32.6	27.3	20.0	11.8	4.7	14.2
14.1	43.1	42.1	40.8	38.9	36.2	32.4	27.1	19.9	11.8	4.7	14.1
14	42.7	41.7	40.4	38.5	35.9	32.2	27.0	19.9	11.8	4.7	14
13.5	42.3	41.3	40.0	38.2	35.6	32.0	26.9	19.8	11.8	4.7	13.5
13.4	41.9	40.9	39.6	37.9	35.3	31.8	26.7	19.7	11.8	4.7	13.4
13.3	41.5	40.5	39.3	37.5	35.0	31.5	26.6	19.7	11.7	4.7	13.3
13.2	41.0	40.1	38.9	37.2	34.8	31.3	26.4	19.6	11.7	4.7	13.2
13.1	40.6	39.7	38.5	36.8	34.5	31.1	26.3	19.5	11.7	4.7	13.1
13	40.2	39.3	38.1	36.5	34.2	30.8	26.1	19.5	11.7	4.7	13
12.5	39.8	38.9	37.7	36.1	33.9	30.6	25.9	19.4	11.7	4.7	12.5
12.4	39.3	38.5	37.4	35.8	33.6	30.4	25.8	19.3	11.7	4.7	12.4
12.3	38.9	38.1	37.0	35.4	33.2	30.1	25.6	19.3	11.7	4.7	12.3
12.2	38.5	37.7	36.6	35.1	32.9	29.9	25.5	19.2	11.7	4.7	12.2
12.1	38.0	37.2	36.2	34.7	32.6	29.6	25.3	19.1	11.6	4.7	12.1
12	37.6	36.8	35.8	34.3	32.3	29.4	25.1	19.0	11.6	4.7	12
11.5	37.1	36.4	35.4	34.0	32.0	29.1	24.9	18.9	11.6	4.7	11.5
11.4	36.7	36.0	35.0	33.6	31.7	28.8	24.8	18.9	11.6	4.7	11.4
11.3	36.2	35.5	34.6	33.2	31.3	28.6	24.6	18.8	11.6	4.7	11.3
11.2	35.8	35.1	34.2	32.9	31.0	28.3	24.4	18.7	11.6	4.7	11.2
11.1	35.3	34.7	33.8	32.5	30.7	28.0	24.2	18.6	11.5	4.7	11.1
11	34.9	34.2	33.4	32.1	30.4	27.8	24.0	18.5	11.5	4.7	11
10.5	34.4	33.8	32.9	31.7	30.0	27.5	23.8	18.4	11.5	4.7	10.5
10.4	34.0	33.4	32.5	31.4	29.7	27.2	23.6	18.3	11.5	4.7	10.4
10.3	33.5	32.9	32.1	31.0	29.3	26.9	23.4	18.2	11.5	4.7	10.3
10.2	33.1	32.5	31.7	30.6	29.0	26.6	23.2	18.1	11.4	4.7	10.2
10.1	32.6	32.0	31.3	30.2	28.6	26.4	23.0	18.0	11.4	4.7	10.1
10	32.1	31.6	30.8	29.8	28.3	26.1	22.8	17.9	11.4	4.7	10
overs left	0	1	2	3	4	5	6	7	8	9	overs left
	wickets lost										

Overs left 20 to 10

The D/L (Duckworth/Lewis) method of adjusting target scores in interrupted one-day cricket matches

Table of resource percentages remaining - ball by ball

2002 update

Overs left 10 to 0

	wickets lost										
overs left	0	1	2	3	4	5	6	7	8	9	overs left
10	32.1	31.6	30.8	29.8	28.3	26.1	22.8	17.9	11.4	4.7	10
9.5	31.7	31.1	30.4	29.4	27.9	25.8	22.6	17.7	11.4	4.7	9.5
9.4	31.2	30.7	30.0	29.0	27.6	25.5	22.3	17.6	11.3	4.7	9.4
9.3	30.7	30.2	29.6	28.6	27.2	25.2	22.1	17.5	11.3	4.7	9.3
9.2	30.3	29.8	29.1	28.2	26.8	24.9	21.9	17.4	11.3	4.7	9.2
9.1	29.8	29.3	28.7	27.8	26.5	24.5	21.7	17.2	11.2	4.7	9.1
9	29.3	28.9	28.2	27.4	26.1	24.2	21.4	17.1	11.2	4.7	9
8.5	28.8	28.4	27.8	26.9	25.7	23.9	21.2	17.0	11.1	4.7	8.5
8.4	28.3	27.9	27.3	26.5	25.3	23.6	20.9	16.8	11.1	4.7	8.4
8.3	27.9	27.5	26.9	26.1	25.0	23.3	20.7	16.7	11.1	4.7	8.3
8.2	27.4	27.0	26.4	25.7	24.6	22.9	20.4	16.5	11.0	4.7	8.2
8.1	26.9	26.5	26.0	25.3	24.2	22.6	20.2	16.4	11.0	4.7	8.1
8	26.4	26.0	25.5	24.8	23.8	22.3	19.9	16.2	10.9	4.7	8
7.5	25.9	25.6	25.1	24.4	23.4	21.9	19.6	16.0	10.9	4.7	7.5
7.4	25.4	25.1	24.6	24.0	23.0	21.6	19.4	15.9	10.8	4.7	7.4
7.3	24.9	24.6	24.1	23.5	22.6	21.2	19.1	15.7	10.7	4.7	7.3
7.2	24.4	24.1	23.7	23.1	22.2	20.9	18.8	15.5	10.7	4.7	7.2
7.1	23.9	23.6	23.2	22.6	21.8	20.5	18.5	15.3	10.6	4.7	7.1
7	23.4	23.1	22.7	22.2	21.4	20.1	18.2	15.2	10.5	4.7	7
6.5	22.9	22.6	22.3	21.7	20.9	19.8	17.9	15.0	10.5	4.7	6.5
6.4	22.4	22.1	21.8	21.3	20.5	19.4	17.6	14.8	10.4	4.7	6.4
6.3	21.9	21.6	21.3	20.8	20.1	19.0	17.3	14.6	10.3	4.7	6.3
6.2	21.4	21.1	20.8	20.3	19.7	18.6	17.0	14.4	10.2	4.7	6.2
6.1	20.8	20.6	20.3	19.9	19.2	18.2	16.7	14.1	10.1	4.7	6.1
6	20.3	20.1	19.8	19.4	18.8	17.8	16.4	13.9	10.1	4.6	6
5.5	19.8	19.6	19.3	18.9	18.3	17.4	16.0	13.7	10.0	4.6	5.5
5.4	19.3	19.1	18.8	18.5	17.9	17.0	15.7	13.5	9.8	4.6	5.4
5.3	18.8	18.6	18.3	18.0	17.4	16.6	15.4	13.2	9.7	4.6	5.3
5.2	18.2	18.1	17.8	17.5	17.0	16.2	15.0	13.0	9.6	4.6	5.2
5.1	17.7	17.5	17.3	17.0	16.5	15.8	14.7	12.7	9.5	4.6	5.1
5	17.2	17.0	16.8	16.5	16.1	15.4	14.3	12.5	9.4	4.6	5
4.5	16.6	16.5	16.3	16.0	15.6	15.0	13.9	12.2	9.2	4.6	4.5
4.4	16.1	16.0	15.8	15.5	15.1	14.5	13.6	11.9	9.1	4.6	4.4
4.3	15.6	15.4	15.3	15.0	14.7	14.1	13.2	11.6	8.9	4.6	4.3
4.2	15.0	14.9	14.7	14.5	14.2	13.6	12.8	11.3	8.8	4.5	4.2
4.1	14.5	14.4	14.2	14.0	13.7	13.2	12.4	11.0	8.6	4.5	4.1
4	13.9	13.8	13.7	13.5	13.2	12.7	12.0	10.7	8.4	4.5	4
3.5	13.4	13.3	13.2	13.0	12.7	12.3	11.6	10.4	8.3	4.5	3.5
3.4	12.8	12.7	12.6	12.5	12.2	11.8	11.2	10.1	8.1	4.4	3.4
3.3	12.3	12.2	12.1	11.9	11.7	11.3	10.8	9.7	7.9	4.4	3.3
3.2	11.7	11.6	11.5	11.4	11.2	10.9	10.3	9.4	7.7	4.3	3.2
3.1	11.1	11.1	11.0	10.9	10.7	10.4	9.9	9.0	7.4	4.3	3.1
3	10.6	10.5	10.4	10.3	10.2	9.9	9.5	8.7	7.2	4.2	3
2.5	10.0	10.0	9.9	9.8	9.6	9.4	9.0	8.3	6.9	4.2	2.5
2.4	9.4	9.4	9.3	9.3	9.1	8.9	8.5	7.9	6.7	4.1	2.4
2.3	8.9	8.8	8.8	8.7	8.6	8.4	8.1	7.5	6.4	4.0	2.3
2.2	8.3	8.3	8.2	8.2	8.0	7.9	7.6	7.1	6.1	3.9	2.2
2.1	7.7	7.7	7.7	7.6	7.5	7.4	7.1	6.7	5.8	3.8	2.1
2	7.2	7.1	7.1	7.0	7.0	6.8	6.6	6.2	5.5	3.7	2
1.5	6.6	6.5	6.5	6.5	6.4	6.3	6.1	5.8	5.1	3.6	1.5
1.4	6.0	6.0	5.9	5.9	5.9	5.8	5.6	5.3	4.8	3.4	1.4
1.3	5.4	5.4	5.4	5.3	5.3	5.2	5.1	4.9	4.4	3.2	1.3
1.2	4.8	4.8	4.8	4.8	4.7	4.7	4.6	4.4	4.0	3.0	1.2
1.1	4.2	4.2	4.2	4.2	4.2	4.1	4.0	3.9	3.6	2.8	1.1
1	3.6	3.6	3.6	3.6	3.6	3.5	3.5	3.4	3.2	2.5	1
0.5	3.0	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.7	2.2	0.5
0.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.2	1.9	0.4
0.3	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.5	0.3
0.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	0.2
0.1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.1
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
overs left	0	1	2	3	4	5	6	7	8	9	overs left
	wickets lost										

Overs left 10 to 0

The D/L (Duckworth/Lewis) method of adjusting target scores in interrupted one-day cricket matches

Table of resource percentages remaining - over by over

2002 update

Overs left 50 to 0

overs left	wickets lost 0	1	2	3	4	5	6	7	8	9	overs left
50	100.0	93.4	85.1	74.9	62.7	49.0	34.9	22.0	11.9	4.7	50
49	99.1	92.6	84.5	74.4	62.5	48.9	34.9	22.0	11.9	4.7	49
48	98.1	91.7	83.8	74.0	62.2	48.8	34.9	22.0	11.9	4.7	48
47	97.1	90.9	83.2	73.5	61.9	48.6	34.9	22.0	11.9	4.7	47
46	96.1	90.0	82.5	73.0	61.6	48.5	34.8	22.0	11.9	4.7	46
45	95.0	89.1	81.8	72.5	61.3	48.4	34.8	22.0	11.9	4.7	45
44	93.9	88.2	81.0	72.0	61.0	48.3	34.8	22.0	11.9	4.7	44
43	92.8	87.3	80.3	71.4	60.7	48.1	34.7	22.0	11.9	4.7	43
42	91.7	86.3	79.5	70.9	60.3	47.9	34.7	22.0	11.9	4.7	42
41	90.5	85.3	78.7	70.3	59.9	47.8	34.6	22.0	11.9	4.7	41
40	89.3	84.2	77.8	69.6	59.5	47.6	34.6	22.0	11.9	4.7	40
39	88.0	83.1	76.9	69.0	59.1	47.4	34.5	22.0	11.9	4.7	39
38	86.7	82.0	76.0	68.3	58.7	47.1	34.5	21.9	11.9	4.7	38
37	85.4	80.9	75.0	67.6	58.2	46.9	34.4	21.9	11.9	4.7	37
36	84.1	79.7	74.1	66.8	57.7	46.6	34.3	21.9	11.9	4.7	36
35	82.7	78.5	73.0	66.0	57.2	46.4	34.2	21.9	11.9	4.7	35
34	81.3	77.2	72.0	65.2	56.6	46.1	34.1	21.9	11.9	4.7	34
33	79.8	75.9	70.9	64.4	56.0	45.8	34.0	21.9	11.9	4.7	33
32	78.3	74.6	69.7	63.5	55.4	45.4	33.9	21.9	11.9	4.7	32
31	76.7	73.2	68.6	62.5	54.8	45.1	33.7	21.9	11.9	4.7	31
30	75.1	71.8	67.3	61.6	54.1	44.7	33.6	21.8	11.9	4.7	30
29	73.5	70.3	66.1	60.5	53.4	44.2	33.4	21.8	11.9	4.7	29
28	71.8	68.8	64.8	59.5	52.6	43.8	33.2	21.8	11.9	4.7	28
27	70.1	67.2	63.4	58.4	51.8	43.3	33.0	21.7	11.9	4.7	27
26	68.3	65.6	62.0	57.2	50.9	42.8	32.8	21.7	11.9	4.7	26
25	66.5	63.9	60.5	56.0	50.0	42.2	32.6	21.6	11.9	4.7	25
24	64.6	62.2	59.0	54.7	49.0	41.6	32.3	21.6	11.9	4.7	24
23	62.7	60.4	57.4	53.4	48.0	40.9	32.0	21.5	11.9	4.7	23
22	60.7	58.6	55.8	52.0	47.0	40.2	31.6	21.4	11.9	4.7	22
21	58.7	56.7	54.1	50.6	45.8	39.4	31.2	21.3	11.9	4.7	21
20	56.6	54.8	52.4	49.1	44.6	38.6	30.8	21.2	11.9	4.7	20
19	54.4	52.8	50.5	47.5	43.4	37.7	30.3	21.1	11.9	4.7	19
18	52.2	50.7	48.6	45.9	42.0	36.8	29.8	20.9	11.9	4.7	18
17	49.9	48.5	46.7	44.1	40.6	35.8	29.2	20.7	11.9	4.7	17
16	47.6	46.3	44.7	42.3	39.1	34.7	28.5	20.5	11.8	4.7	16
15	45.2	44.1	42.6	40.5	37.6	33.5	27.8	20.2	11.8	4.7	15
14	42.7	41.7	40.4	38.5	35.9	32.2	27.0	19.9	11.8	4.7	14
13	40.2	39.3	38.1	36.5	34.2	30.8	26.1	19.5	11.7	4.7	13
12	37.6	36.8	35.8	34.3	32.3	29.4	25.1	19.0	11.6	4.7	12
11	34.9	34.2	33.4	32.1	30.4	27.8	24.0	18.5	11.5	4.7	11
10	32.1	31.6	30.8	29.8	28.3	26.1	22.8	17.9	11.4	4.7	10
9	29.3	28.9	28.2	27.4	26.1	24.2	21.4	17.1	11.2	4.7	9
8	26.4	26.0	25.5	24.8	23.8	22.3	19.9	16.2	10.9	4.7	8
7	23.4	23.1	22.7	22.2	21.4	20.1	18.2	15.2	10.5	4.7	7
6	20.3	20.1	19.8	19.4	18.8	17.8	16.4	13.9	10.1	4.6	6
5	17.2	17.0	16.8	16.5	16.1	15.4	14.3	12.5	9.4	4.6	5
4	13.9	13.8	13.7	13.5	13.2	12.7	12.0	10.7	8.4	4.5	4
3	10.6	10.5	10.4	10.3	10.2	9.9	9.5	8.7	7.2	4.2	3
2	7.2	7.1	7.1	7.0	7.0	6.8	6.6	6.2	5.5	3.7	2
1	3.6	3.6	3.6	3.6	3.6	3.5	3.5	3.4	3.2	2.5	1
0	0	0	0	0	0	0	0	0	0	0	0
overs left	0	1	2	3	4	5	6	7	8	9	overs left

wickets lost

Overs left 50 to 0