

ITEMAN 3 and Lertap 5

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Document date: 28 January 2012
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*NOTE: Iteaman has undergone a **major** update and, as a result, this document has value only for historical purposes. The new system is called Iteaman 4. For comments on this new version, and Lertap 5, please click [here](#).*

ITEMAN is a true software veteran with an origin dating back to the 1960s. For many years it was the system to use for classical item and test analysis. It has had decades to cement a reputation as a solid, reliable workhorse. Some see its interface as dated, but its use remains widespread.

At a basic level, item and test statistics, ITEMAN and Lertap 5 produce similar results. However, Lertap has several features not found in ITEMAN – among these, graphics stand out as a major difference. Lertap has options which produce graphs, charts, and colourful tables of results; its quintile plots reflect aspects of item quality in a visual manner, sometimes making it easier to detect poorly functioning items.

But Lertap's interface is vastly different to ITEMAN's. Experienced ITEMAN users might be reluctant to go through the steps needed in order to master Lertap. This document is for them. It is now quite an easy matter to go from ITEMAN to Lertap.

The ins and outs of ITEMAN

I want to bedazzle you with Lertap, but the beginning of the dazzle will feature ITEMAN.

ITEMAN input files

```
30 X Y 10           30 items and 10-character ids
23221424144244342322+++++---- keys for the three scales
4444444444444444444444447777777777 numbers of alternatives
111111111122222222223333333333 scale assignment codes
EX9013371D214214123242343423111231243767
EX2024438D312214214242443423224562332565
EX1224466W224212331332443124325462437124
EX2036874U22421112X432443323226556664122
EX2034163S324214242342443443226535467343
```

The lines above will be recognised by ITEMAN users as a typical input file.

The first four lines are what I call "control cards", abbreviated CCs.

The four CCs lines are followed by data records.

In this case, the data records begin with 10 ID characters, followed by responses

for 30 items.

The fourth CCs line indicates that there are three scales (in Lertap scales are usually referred to as "subtests"). A study of the second CCs line reveals that the first two scales are cognitive, while the third is affective (or "multipoint" in common ITEMAN parlance).

Lertap 5 input files

ITEMAN's input file is a text file, saved with an extension of DAT. On Windows computers text files can be created with programs such as Notepad and Wordpad.

Lertap 5 is distinctly different. It's an Excel application. It requires a version of Microsoft Excel in order to run¹. Lertap's input gets recorded in an Excel workbook, one having more than one worksheet.

Lertap separates control lines from data records. The control lines go into an Excel worksheet called "CCs". The data records reside in another worksheet, one called "Data".

The following screen snapshots exemplify these worksheets.

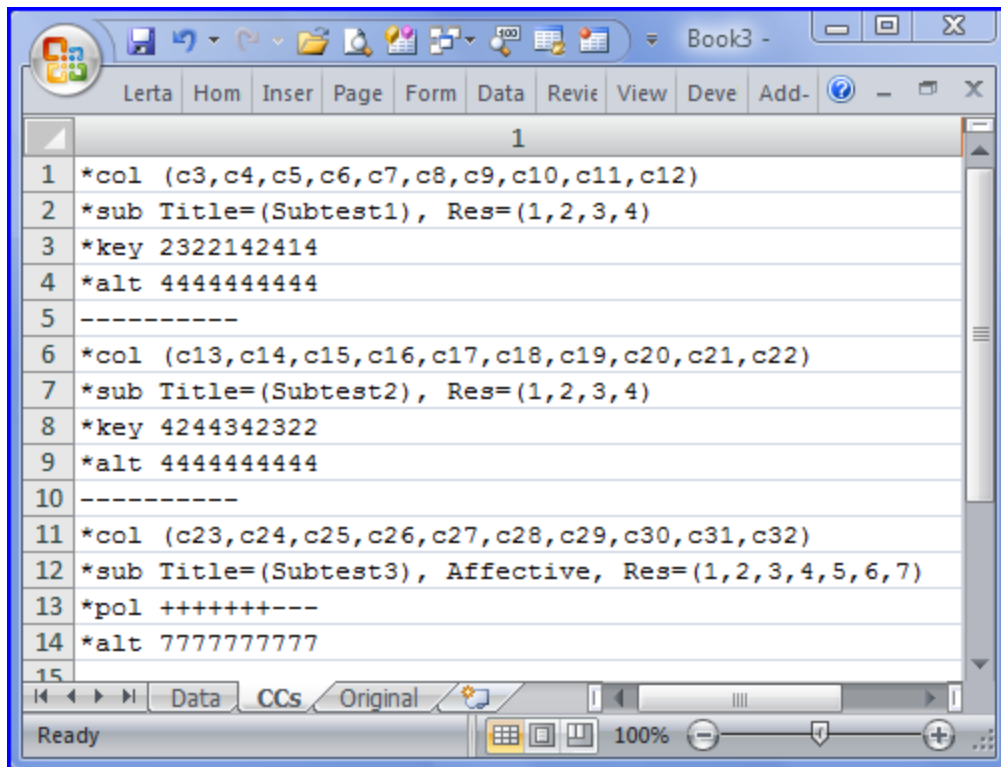


Figure 1

¹ Within a year or so, Lertap may also work with "Calc", the OpenOffice equivalent to Excel. Calc is already an excellent product, but its present support for macros falls a bit short.

	1	2	3	4	5	6	7
1	Data imported from C:\MyStuff\Lertap\Versions\Working20...						
2	Record	ID	Q1	Q2	Q3	Q4	Q5
3	1	EX9013371D	2	1	4	2	1
4	2	EX2024438D	3	1	2	2	1
5	3	EX1224466W	2	2	4	2	1
6	4	EX2036874U	2	2	4	2	1
7	5	EX2034163S	3	2	4	2	1
8	6	EX3021364L	2	1	2	2	1
9	7	EX2041546B	2	4	2	2	3
10	8	EX4028121B	2	3	3	2	1
11	9	EX2015372W	3	2	2	2	4
12	10	EX2041411Q	2	4	1	2	1
13	11	EX2060549D	2	3	2	2	4
14	12	EX3164669S	2	3	1	2	1
15	13	EX3235922D	1	1	4	2	4

Figure 2

Going from A to B (that is, from I to L)

The differences in the ITEMAN and Lertap input files are marked, are they not?

How much work would an earnest ITEMAN user need to do if s/he wanted to go from ITEMAN to Lertap?

The answer depends on which version of Excel you've trained your computer to use, Excel 2002/2003² or Excel 2007.

The answer also depends on you having already parked a copy of Lertap on your computer. If you've got Lertap, then you have access to the ITEMAN importer. It's in a special "macro" called Iteman1³.

Figure 3 indicates how to get to "Iteman1" using Excel 2002/2003. Figure 4 is the corresponding picture for users with Excel 2007.

² The Excel 2002/2003 version also works with Macintosh editions of Excel, except Excel 2008.

³ A macro is a small computer program designed to meet a special need.

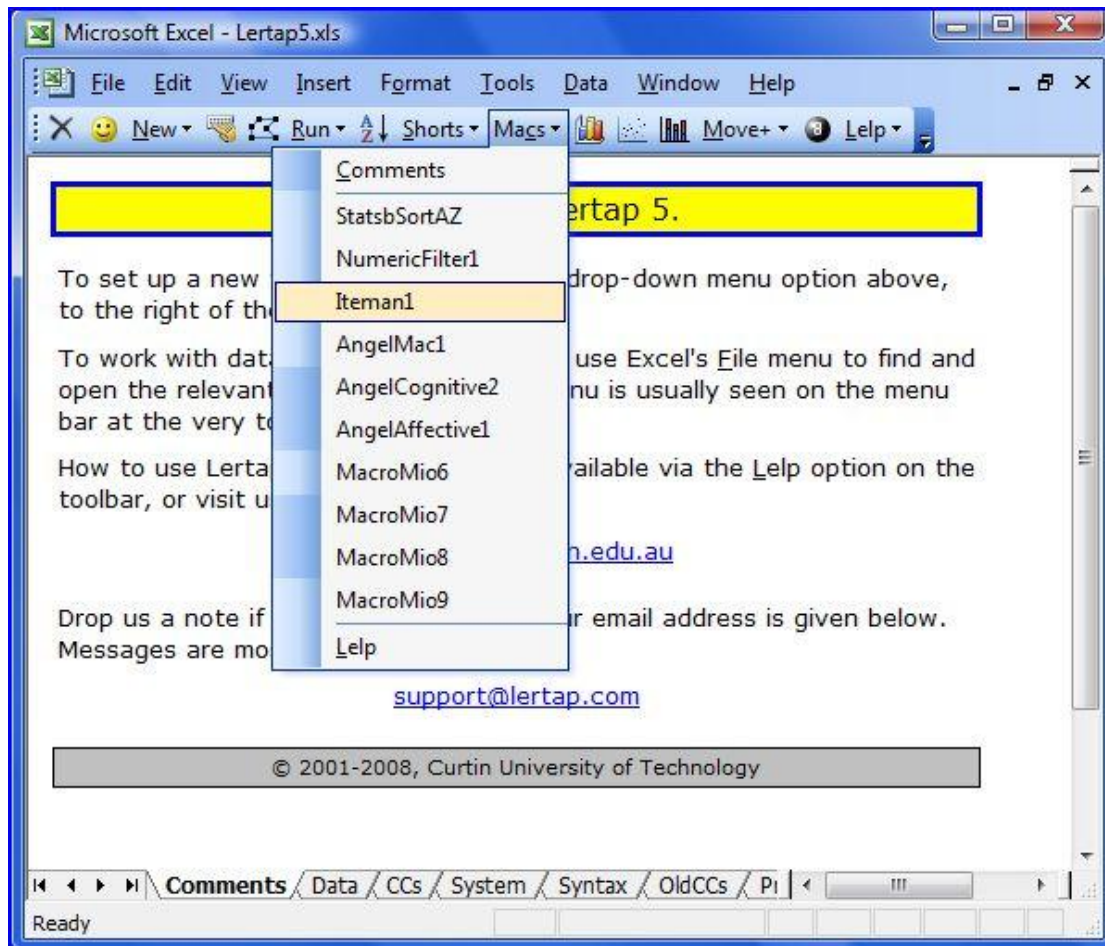


Figure 3

As you can see in Figure 3, with the Excel 2002/2003 version of Lertap, you need to click on the Macrs drop-down menu, and then on "Iteman1".

Not using Excel 2002/2003? You're using Excel 2007? No worries – Figure 4 is for you. In the Excel 2007 version of Lertap, click on the Move+ drop-down menu, then on Macs, and then on Iteman1.

Which ever version you are using, once you've made the big click on Iteman1, away you go. You're asked to use a file browser to select an ITEMAN DAT file, and then, *whoosh!*, faster than you can name all of the capital cities of the countries in the European Union (maybe even faster), Lertap creates a new Excel workbook with appropriate CCs and Data worksheets.

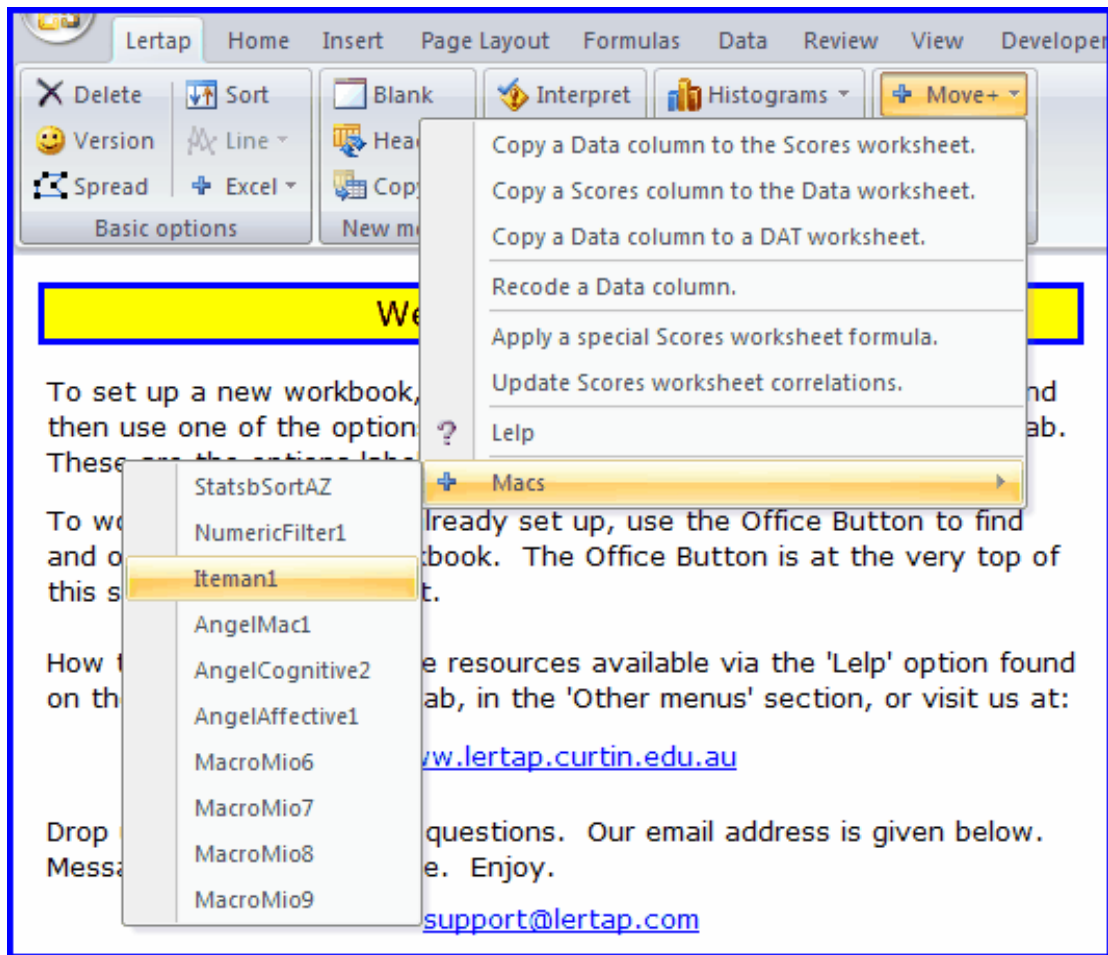


Figure 4

ITEMAN output

ITEMAN writes its results to text files with an extension of OUT. It is possible to vary the format of the item results somewhat – what follows is a typical display:

Item Statistics					Alternative Statistics				
Seq. No.	Scale	Prop. Correct	Disc. Index	Point Biser.	Alt.	Prop. Total	Endorsing Low	High	Point
1	1-1	.58	.63	.55	1	.16	.33	.10	-.32
					2	.58	.22	.85	.55
					3	.08	.06	.00	-.04
					4	.18	.39	.05	-.37
					Other	.00	.00	.00	

Lertap creates no less than three reports with item results. Snippets are shown below.

Q1

option	wt.	n	p	pb(r)	b(r)	avg.	z
1	0.00	8	0.16	-0.32	-0.48	3.13	-0.74
2	1.00	29	0.58	0.37	0.47	5.86	0.47
3	0.00	4	0.08	-0.04	-0.07	4.50	-0.13
4	0.00	9	0.18	-0.37	-0.54	3.00	-0.79

Res =	1	2	3	4	other	diff.	disc.	?
Q1	16%	58%	8%	18%		0.58	0.37	
Q2	26%	14%	38%	22%		0.38	0.38	
Q3	24%	20%	16%	40%		0.20	- 0.13	4

Res =	1	2	3	4	other	U-L diff.	U-L disc.
Q1 upper	0.00	1.00	0.00	0.00	0.00	0.55	0.90
2nd	0.20	0.70	0.00	0.10	0.00		
3rd	0.00	0.60	0.30	0.10	0.00		
4th	0.10	0.50	0.10	0.30	0.00		
lower	0.50	0.10	0.00	0.40	0.00		

I do not suggest that having three Lertap tables to ITEMAN's one is necessarily an advantage. Users choose which Lertap table they want to work with. They can work with just one, or with all three. This is easy to do as the tables are collected and presented by type – one report for each type of table.

Of note here is the difference between ITEMAN's Point-biserial of .55 for Item 1's correct answer, and Lertap's 0.37. Lertap applies ITEMAN's "spuriousness" correction as a matter of course. Had I selected the spuriousness option in ITEMAN, the results would have matched.

The following document has more about some of Lertap's item statistics, particularly its discrimination indices:

<http://www.lertap.curtin.edu.au/Documentation/ItemCriterionCorrelations1.doc>

Lertap's graphics output

Excel has an ability to create a considerable variety of "charts", or graphs. Lertap has been programmed to take advantage of this.

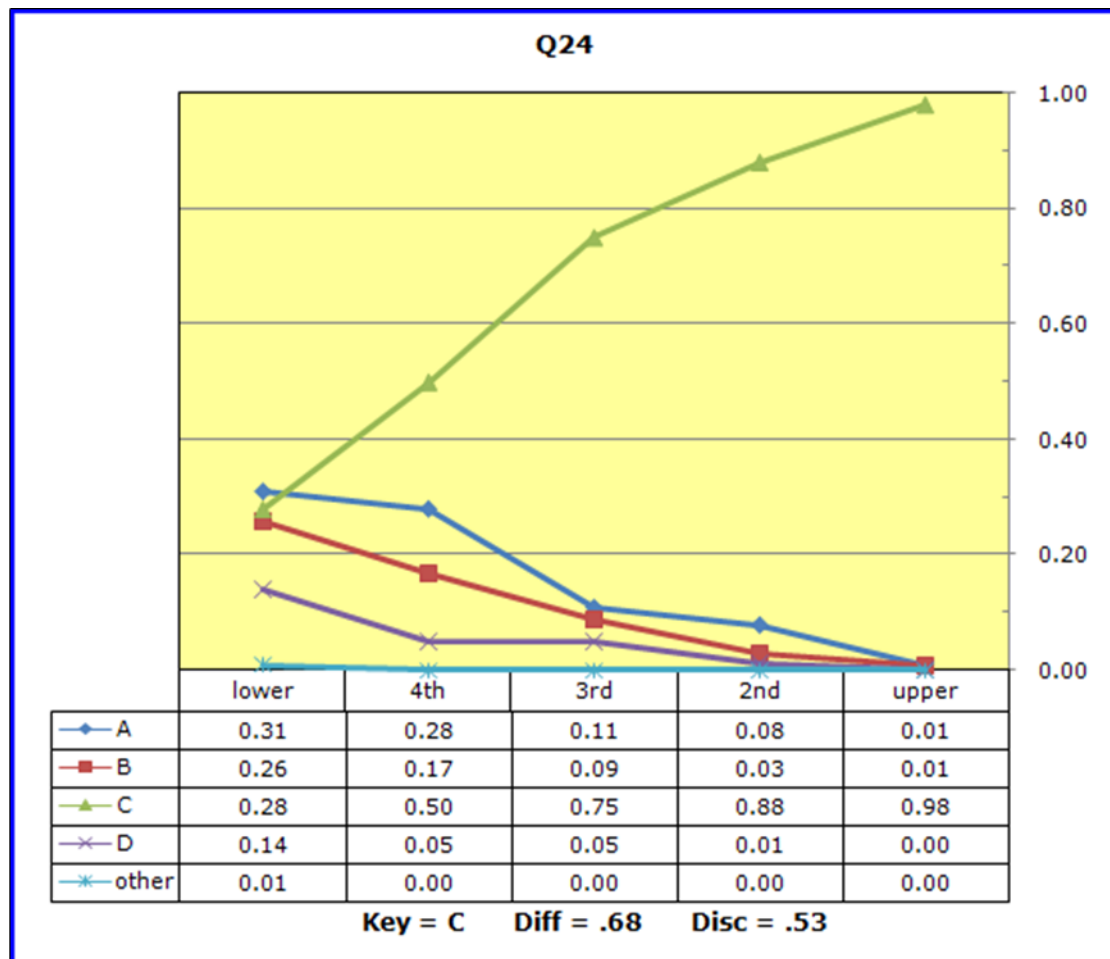


Figure 5

Figure 5 is a quintile plot from Lertap. There are trace lines depicting the endorsement of each item option across five achievement levels, from "lower" to "upper". This item had four options; the fifth trace line is for "other" responses (usually non answers).

The chart indicates that the correct answer, indicated by Key=C at the bottom of the plot's data table, apparently takes some proficiency to identify. Only 28% of the lower achievers selected it, building to 98% in the strongest (upper) group. Endorsements for the three distractors, on the other hand, decrease in an almost steady pattern over the achievement levels, from left to right, finishing at or just short of zero endorsement in the upper group. This is the type of response pattern desired of an item meant to discriminate, to separate the strong students from the weaker ones.

Plots such as this one have proved to be quite useful, and seem to be generally popular. More examples of them, and a comparison of graphics-based vs. statistics-based item analysis, may be found in this document:

<http://www.lertap.curtin.edu.au/Documentation/UsingLertapQuintilePlots.pdf>

This one vs. that one?

Is Lertap better than ITEMAN? No. Both programs do a very decent job of producing classical item analysis reports. However, if one feels that graphics are a useful aid to interpreting results, then Lertap would certainly have an edge.

There are quite a number of optional "control cards" which may be used in Lertap, giving the product a bit more flexibility than that seen in ITEMAN. For example, the *mws card allows items to have more than one right answer; *exc cards make it possible to exclude items from a run, and may be easier for some to use than the "N" required on an ITEMAN control card; *wts cards vary the number of points given for correct answers.

Any subset (scale) may be analysed with multiple scoring patterns in Lertap, with effects readily compared.

Lertap also goes beyond classical item analysis by offering special routines useful in mastery testing situations, and for looking into the possibility of exam cheating. The following papers might be of interest:

<http://www.lertap.curtin.edu.au/Documentation/JERM2007d.doc> (cut scores)

<http://www.lertap.curtin.edu.au/Documentation/JERM2006mod1.doc> (cheating)

Take it for a test drive

Prior to September, 2008, it was possible to import ITEMAN DAT files into Lertap, but it was not at all easy. Now it is. We've created the Iteman1 "Macs" option mentioned above, and now it is a simple matter indeed.

Fully-featured 30-day trial versions of Lertap may be downloaded from www.assess.com. Why not get out some of your favourite test files from ITEMAN, import them into Lertap, and see what the item quintile plots look like?

The steps you'd want to follow are discussed below.

Steps to a test drive

As mentioned above, start by going to www.assess.com. Figure 12 indicates how the ASC home page looked in September, 2008.

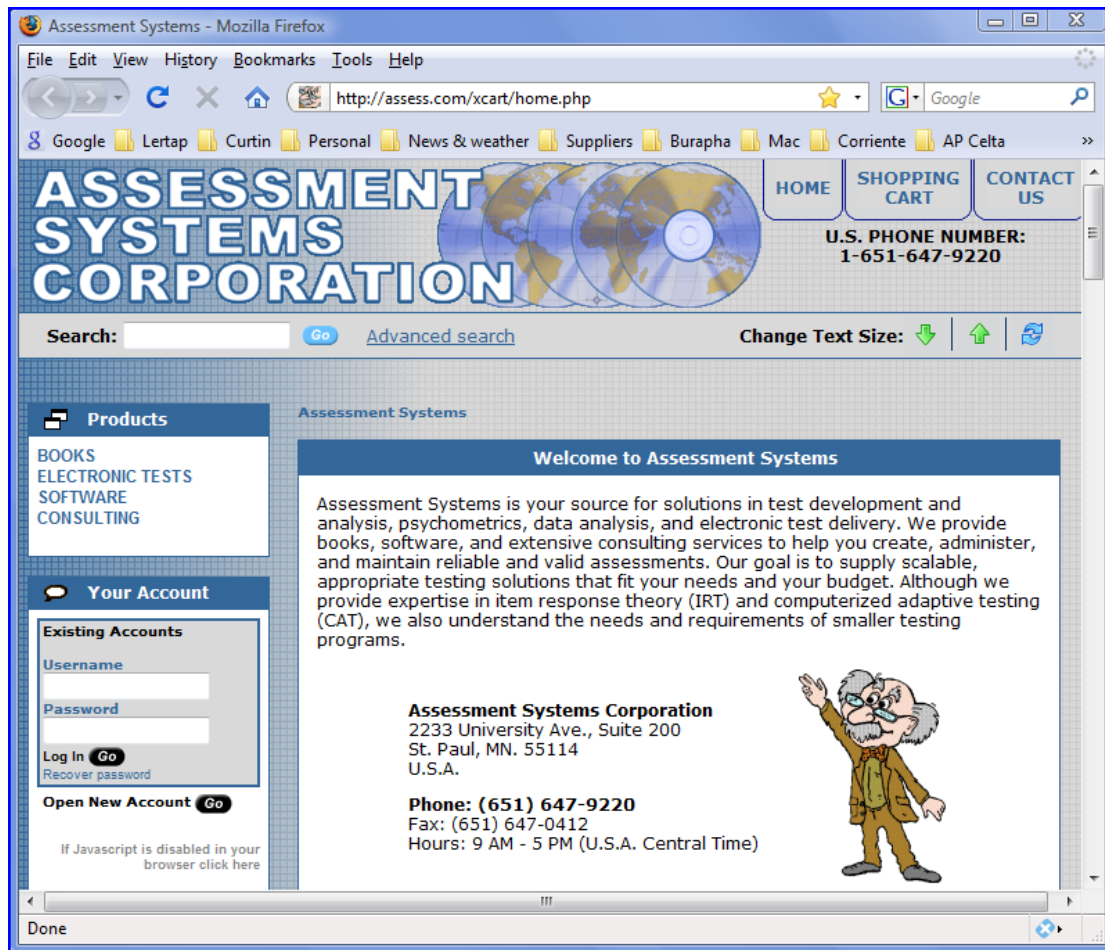


Figure 6

Type Lertap in the Search box and click on Go. You should see something similar to what's shown in Figure 13.

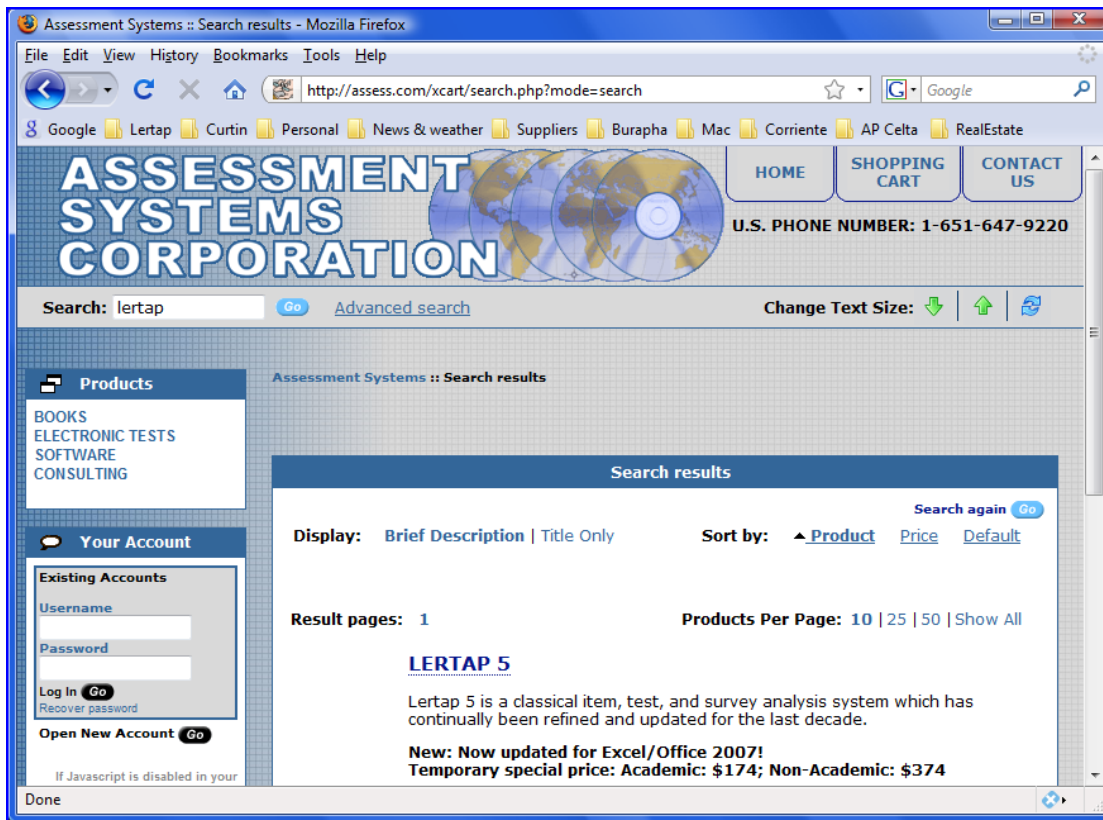


Figure 7

Click on [LERTAP 5](#) (as seen in Figure 13), and the main Lertap section should be available to you: refer to the screen seen in Figure 14.

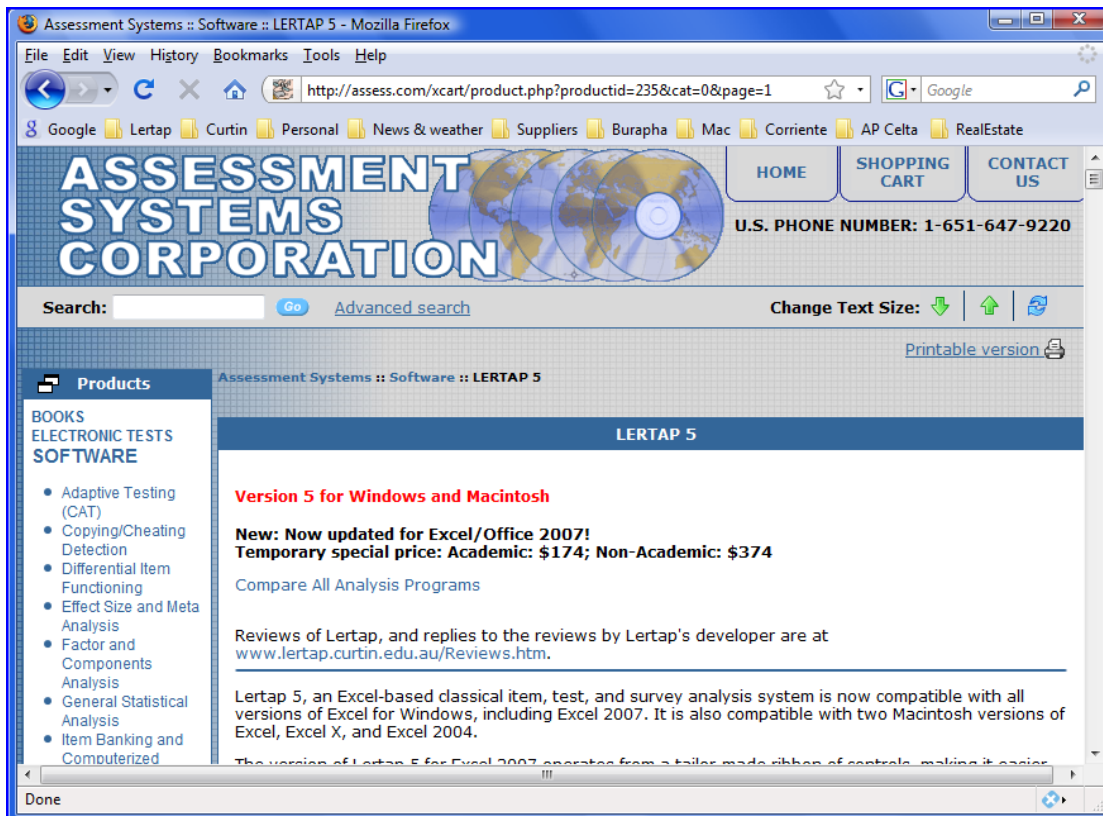


Figure 8

Scroll down, down, down on the main Lertap section (as in Figure 14). Eventually you will arrive at an area which ought to look a lot like Figure 15.

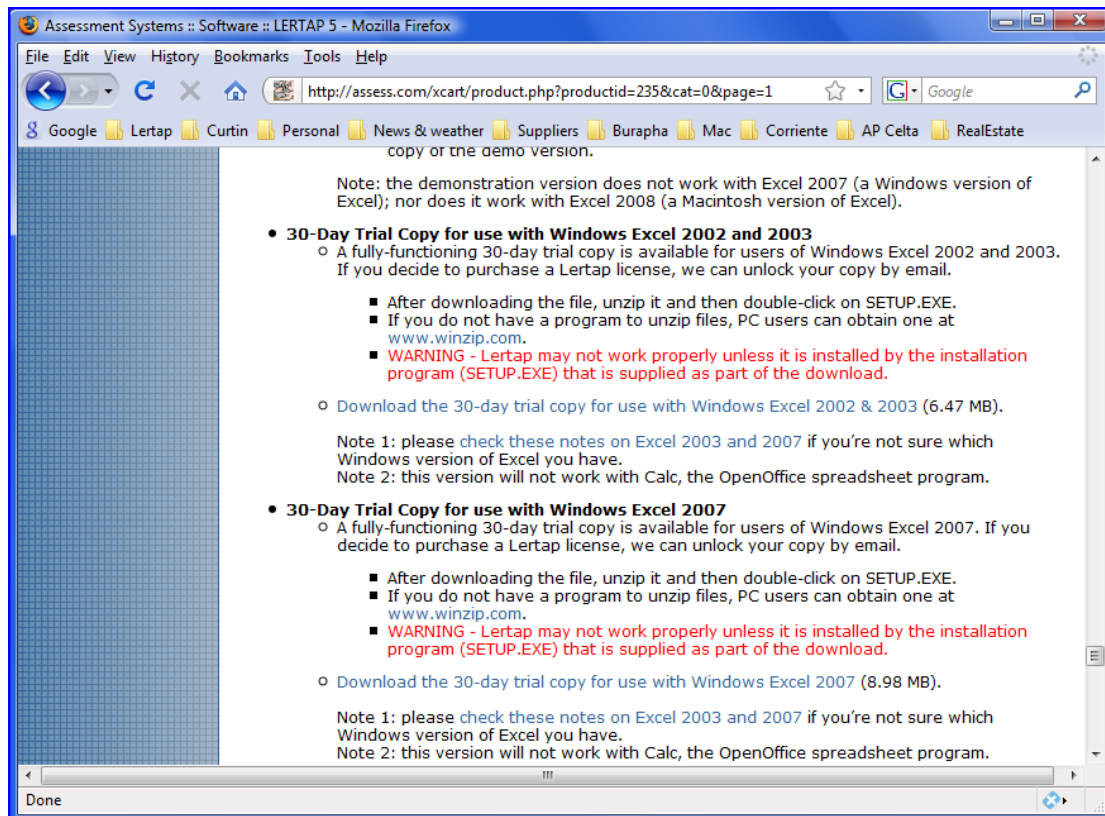


Figure 9

Now what you want to do is download one of the two 30-Day Trial copies. Which one? Depends on whether you have Excel 2002/2003 or Excel 2007. Not sure which version of Excel you have? Well, avail yourself of the hyperlink available next to Note 1, where it says "... please check these notes on Excel 2003 and Excel 2007".

Once you've downloaded and installed Lertap, you will be just about ready to get down to work – you should (however) be aware of a security issue with Excel which may require that you give it, Excel, permission to run Lertap's macros – help on this matter is readily available in the LRTP5HHelp.pdf or LRTP57HHelp.pdf file which will have been installed on your computer with Lertap itself.

The LRTP5HHelp.pdf file is for the Excel 2002/2003 version; LRTP57HHelp.pdf is for the Excel 2007 version. The 'Welcome' and 'Getting started' chapters in these files have comments and suggestions for Lertap beginners. The LRTP5HHelp.chm and LRTP57HHelp.chm files have the same information in a somewhat more interactive format.

The second step.

Okay? Ready? Got a good idea of where you've stored some of your ITEMAN DAT files? You'll need to have Lertap running, and something for it to run with, one of those ITEMAN DAT files.

I start Lertap. In this discussion you'll see me running the Excel 2007 version of Lertap – I have selected Excel 2007 not because it's better than Excel 2003, but because it's (supposedly) where all Windows Excel users will be heading, sooner

or later.

Look back at Figure 4, if you please. That's me at this stage, striking forward, ever onwards, with Lertap.

After clicking on Iteman1 (Figure 4), I see the screen shown in Figure 16.

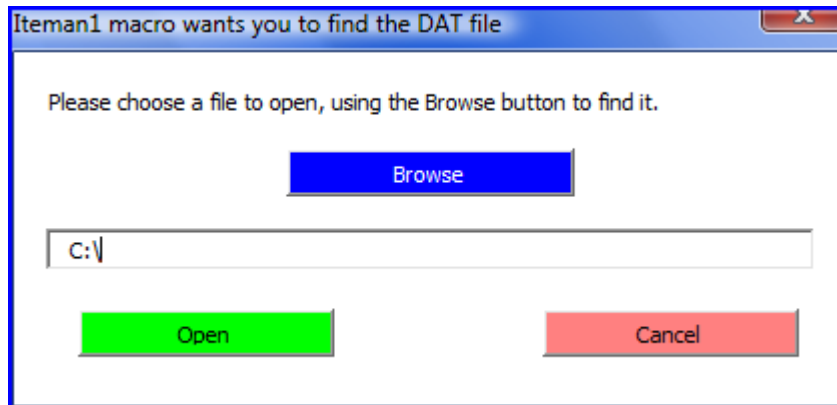


Figure 10

I browse to one of my DAT files, SAMPLE1.DAT, tucked away in the working folder whose path may be seen in Figure 17.

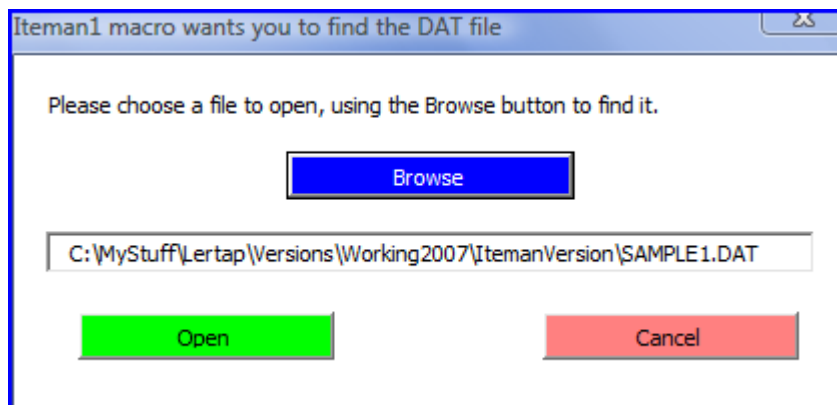


Figure 11

Now, before proceeding to real action, you should know something about SAMPLE1.DAT. Figure 18 will put you in the know, assuming you to be a dinkum ITEMAN user.

The test results in SAMPLE1.DAT are from a 30-item, four-option cognitive exam. The actual data records start in row 5 and have no ID field.

Right. Back to Figure 17. I click on Open. I can then see Excel doing a few things – there's some sort of record counter ticking over down in the Status Bar, and before I can really get a handle of what might be happening I am presented with the screen captured in Figure 19.

```
SAMPLE1.DAT - Notepad
File Edit Format View Help
30 o n 0
423142242113424141324213411334
44444444444444444444444444444444
YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
123123244113424143324213211334
423142243413424141124213111233
423142242113424141324213411334
143142242433434141324413431334
243142242413434141411213211133
423342224113423141421213144331
423142243113424141324213411333
131141242143141141311213141134
433142242433424141313313411234
423142242133424141314213411334
441142243413124114314213311333
413342242433413141114213431333
423142242113424141324213411334
```

Figure 12

The IteMan1 macro has created a new Excel workbook for me, and not only that: it has created three new worksheets. The contents of one of these new sheets, called "CCs", can be glimpsed in the background of Figure 19, behind the message box.

	1	2	3	4	5	6	7	8	9
1	*col (c2-c31)								
2	*sub Title=(Subtest1), Res=(1,2,3,4)								
3	*key 423142242113424141324213411334								
4	*alt 44444444444444444444444444444444								
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Iteman1 macro (23 September 08) says

i Okay, the macro has finished its work.

At this point you have three worksheets. The imported ITEMAN lines are in the worksheet called 'Original'. Here you'll see ICC1 to ICC4, the control lines used by ITEMAN. The macro's translation of these lines is to be seen in the 'CCs' worksheet; the 'Data' worksheet contains the original data records, formatted for Lertap 5.

The macro has done its best to translate ITEMAN's control cards (ICC1 to ICC4), but there is always the chance that the translation may fall just a bit short of purrfect. Find out how things have gone by trying the 'Interpret CCs' option, followed by 'Emillon'. (Fingers crossed (!))

OK

Figure 13

The SAMPLE1.DAT file had four header rows at its top, job definition lines for ITEMAN. In Lertap, the CCs worksheet holds job definition lines. Each line starts with an asterisk.

The first line, *col (c2-c31), says that the 30 item responses are to be found starting from column 2, "c2", in the Data worksheet. Figure 20 shows what the Data worksheet looked like in this case.

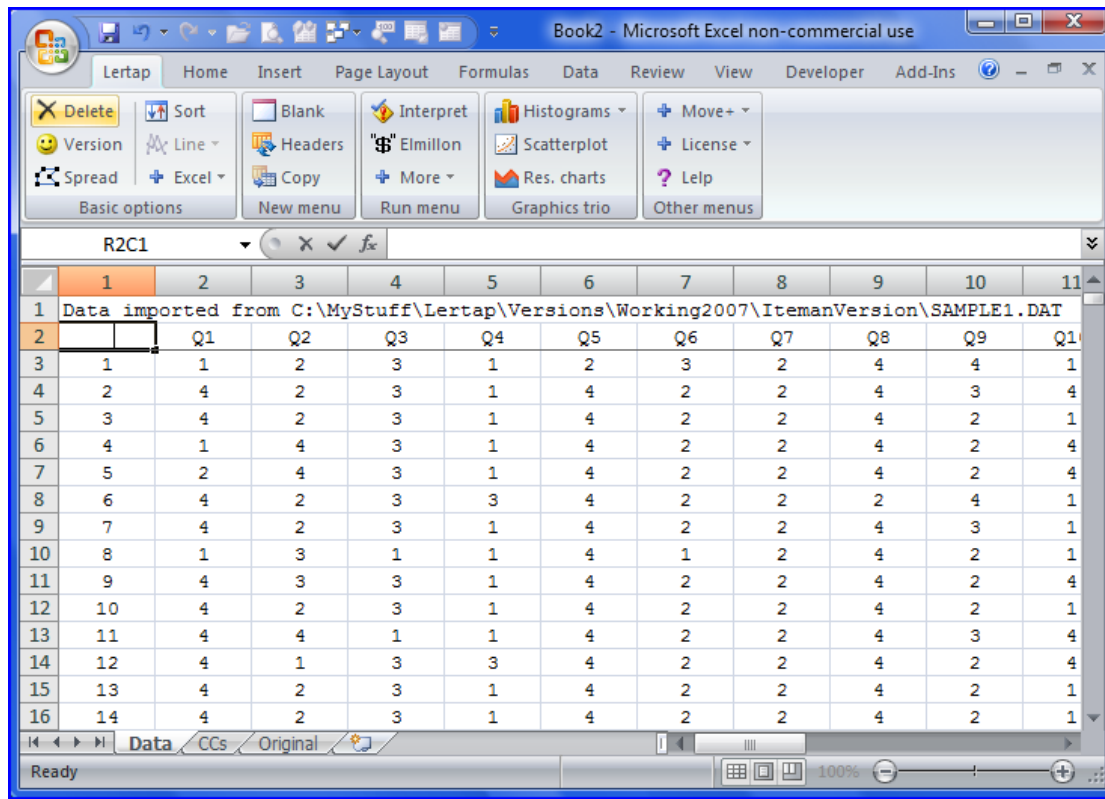


Figure 14

I am now ready to get results, Lertap-style. Look at Figure 20 again. There's a panel of control icons in an area called the "Run menu". See it? The panel has three options: Interpret, Elmillon, and More.

The Interpret option gets Lertap to read the control lines in the CCs worksheet, scanning them for possible errors. I click on it. If no errors are encountered, Figure 21 shows a typical result.

At this point most Lertap users tend to rush back to the Run menu and the option which produces item and test results, "Elmillon". However this is a hasty action; the Interpret option not only checks for syntax errors in the CCs control lines – it also produces a report of response frequencies for each item whose column is covered by the *col line in the CCs worksheet.

You can see a bit of this report in Figure 21. The item whose responses are found in c2 (column 2) of the Data worksheet, "Q1", used options 1, 2, 3, and 4; these are called "response codes" in Lertap. Of the 400 data records in the Data worksheet, and in the original ITEMAN DAT file, 63 of them had a "1" as the response for the first item; the most popular response was 4, found on 317 of the data records.

This is straightforward, is it not? Where the frequencies report is particularly handy is when it comes to looking for invalid, missing, or strange responses.

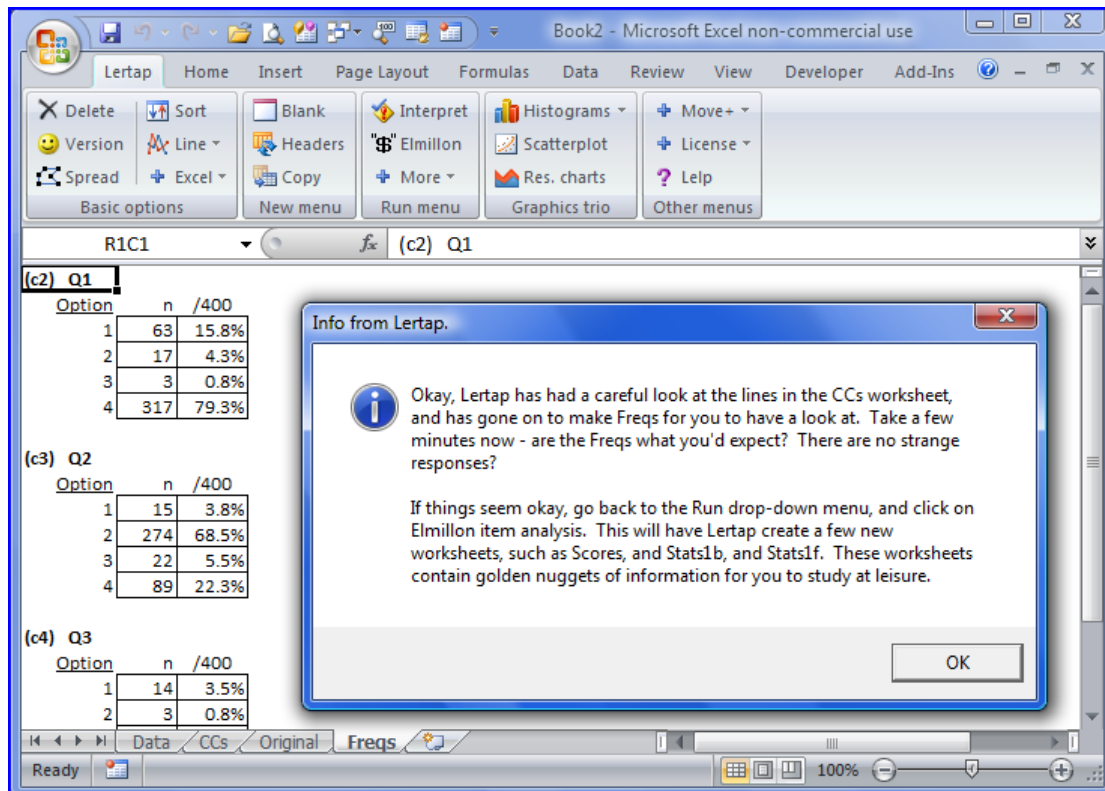


Figure 15

Have a look at Figure 22. In this case I have imported an ITEMAN DAT file which had 120 item responses, and 500 data records. The item response codes were A, B, C, and D.

The little Freqs report in Figure 22 indicates that two (2) of the 500 data records had something other than A, B, C, D as a response for the first item. Four (4) of the records had something other as their response for the second item. Excel makes it easy to find out what these potentially peculiar responses may have been – in this case they were asterisks inserted by a scanner as the test results were processed. Scanners will sometimes do this when they find an item which has not been answered.

Okay? Let's get some results. I'm back at Figure 21. I click the OK button. I scroll down the Freqs report, looking for potentially peculiar responses. I find none. I cruise up to the Run menu and click on Elmillon.

Excel becomes quite busy. Lertap makes an effort to explain what the busyness is about by flashing messages in the Status Bar at the very lower-left of the Excel window. After not too long Lertap produces the message seen in Figure 23.

I now have five new worksheets: Scores, Stats1f, Stats1b, csem, and Stats1ul. Glimpses of these worksheets are shown in Figures 24 through 28. Some of these worksheets have summary information at the end. Figure 29 shows the content found towards the end of a Stats1f report, or worksheet. Note the item difficulty and item discrimination "bands". One item, Q20, had a difficulty index in the 40s band, meaning between 0.40 and 0.49. Four items, Q5, Q7, Q24, and Q29 had very low discrimination figures.

These bands are simply summary tables. Actual difficulty and discrimination statistics are found in other spots of the Stats1f, Stats1b, and Stats1ul worksheets.

Figure 30 captures the bottom of a Stats1b report. The little scatterplot seen in this figure suggests that this test was on the easy side as most of the item difficulties were above 0.80. Two items had negative discrimination values.

Why three worksheets with item statistics? ITEMAN has only one. Do we need three? Maybe not. You get to pick the one you prefer – simply ignore the others, as you wish. Much more extensive information about these worksheets and their reports is in the manual – refer to Lertap5UserManual.pdf.

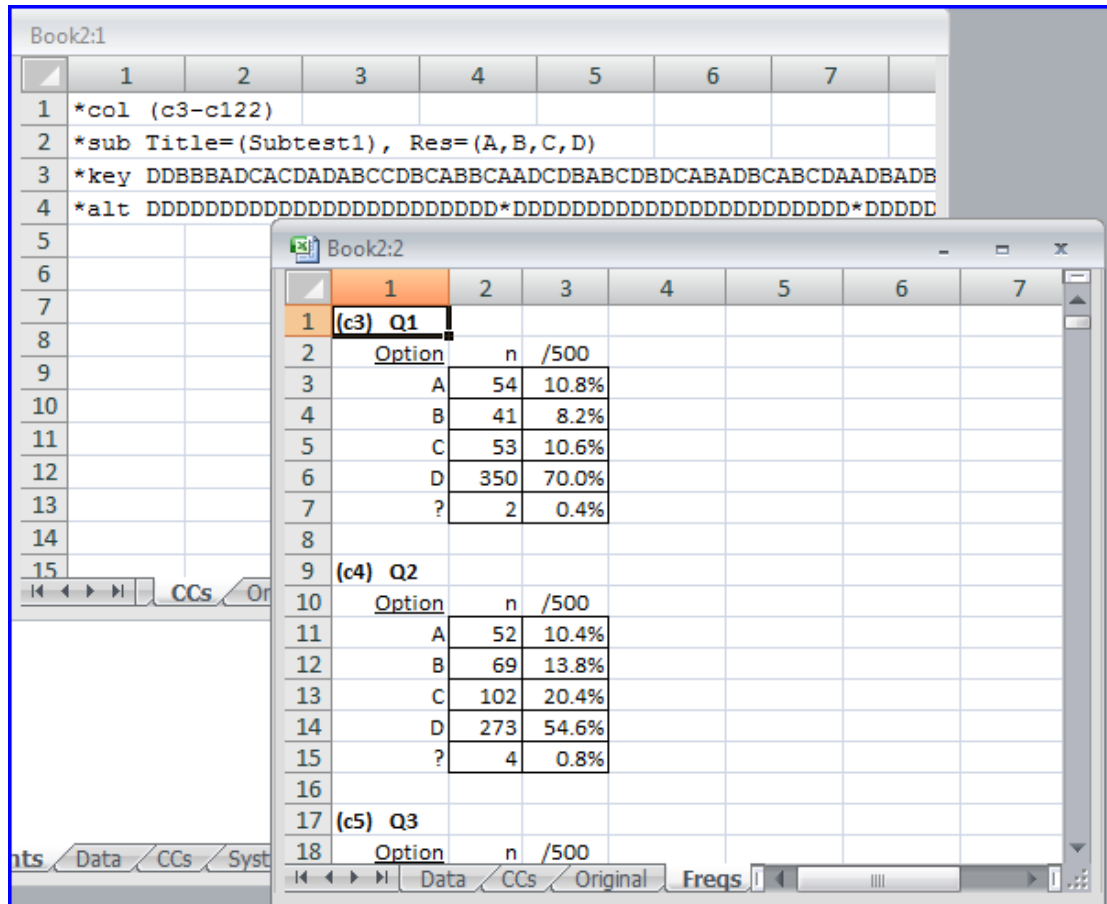


Figure 16

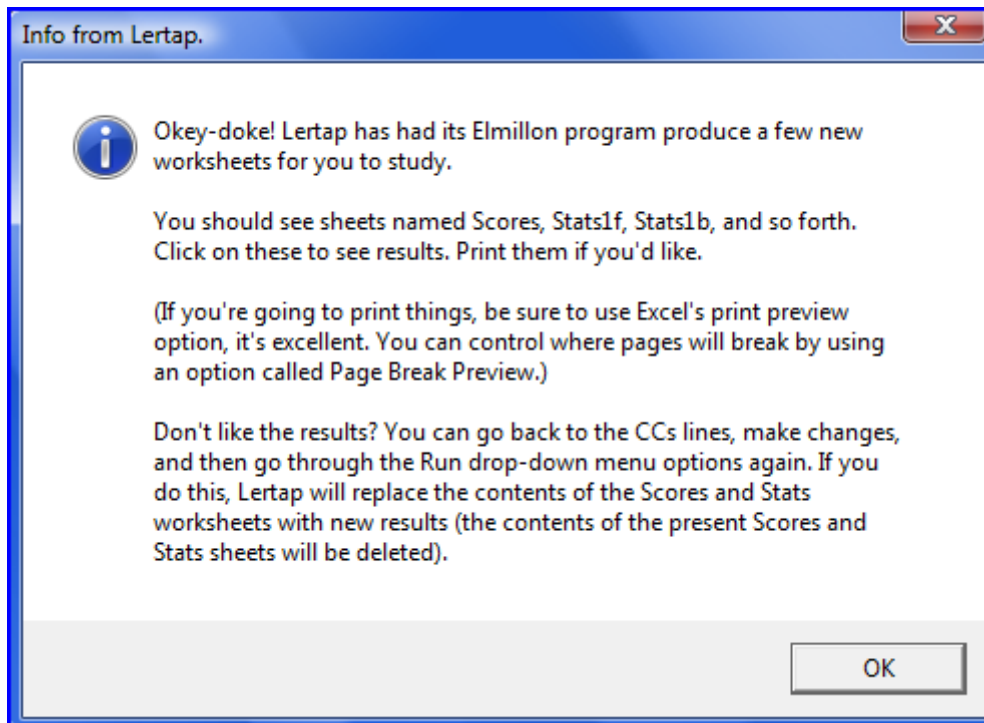


Figure 17

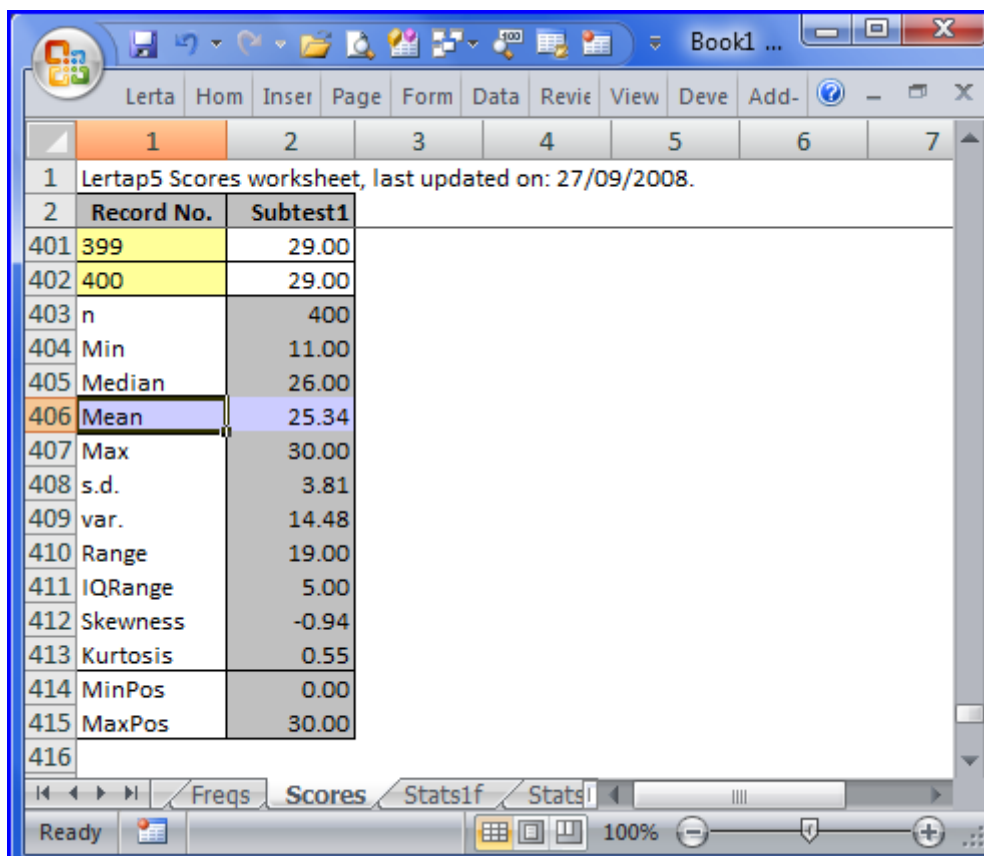


Figure 18

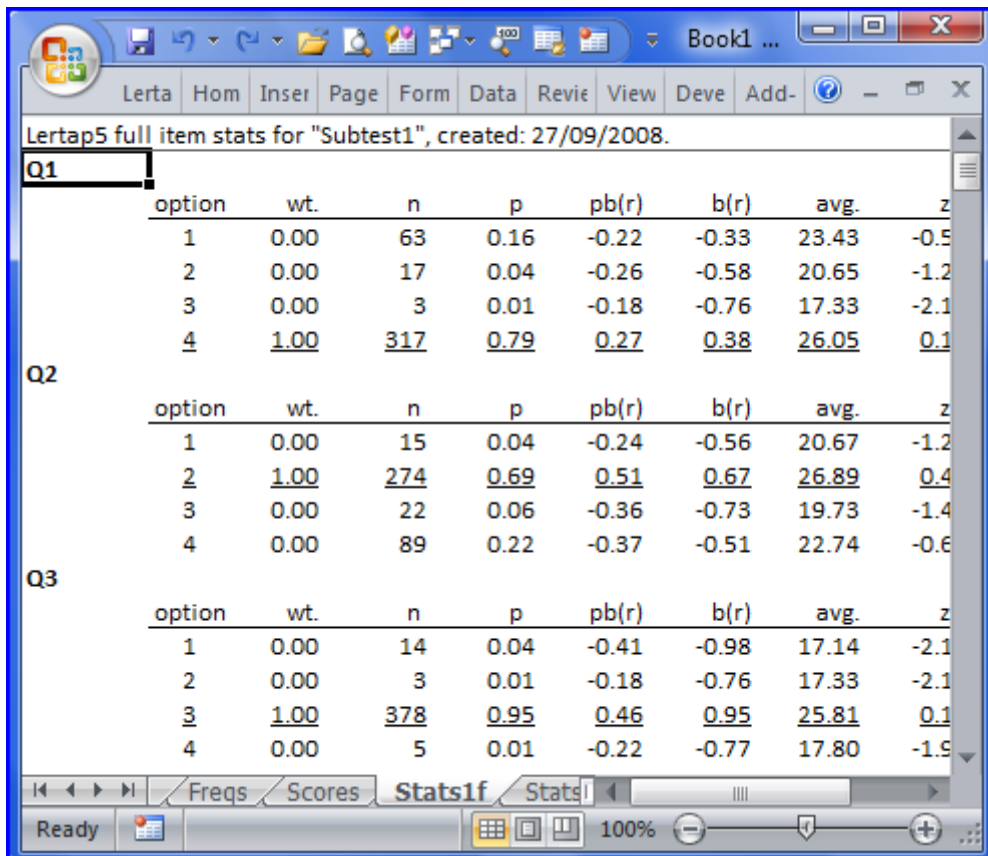


Figure 19

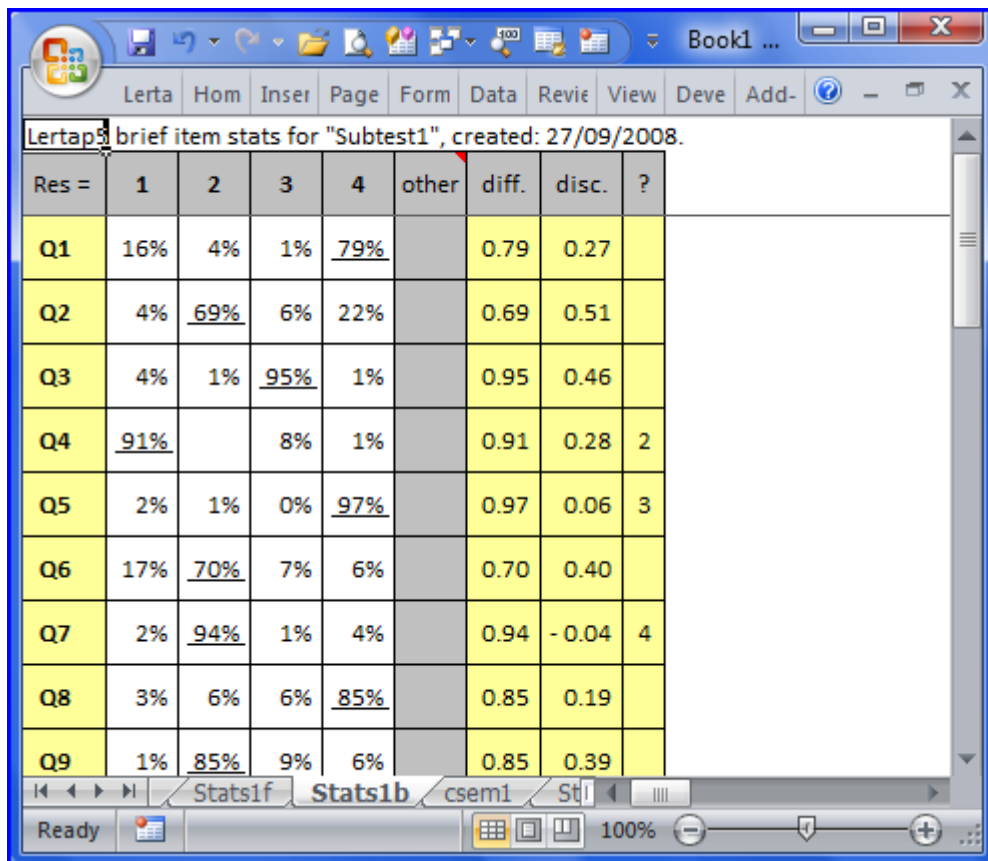


Figure 20

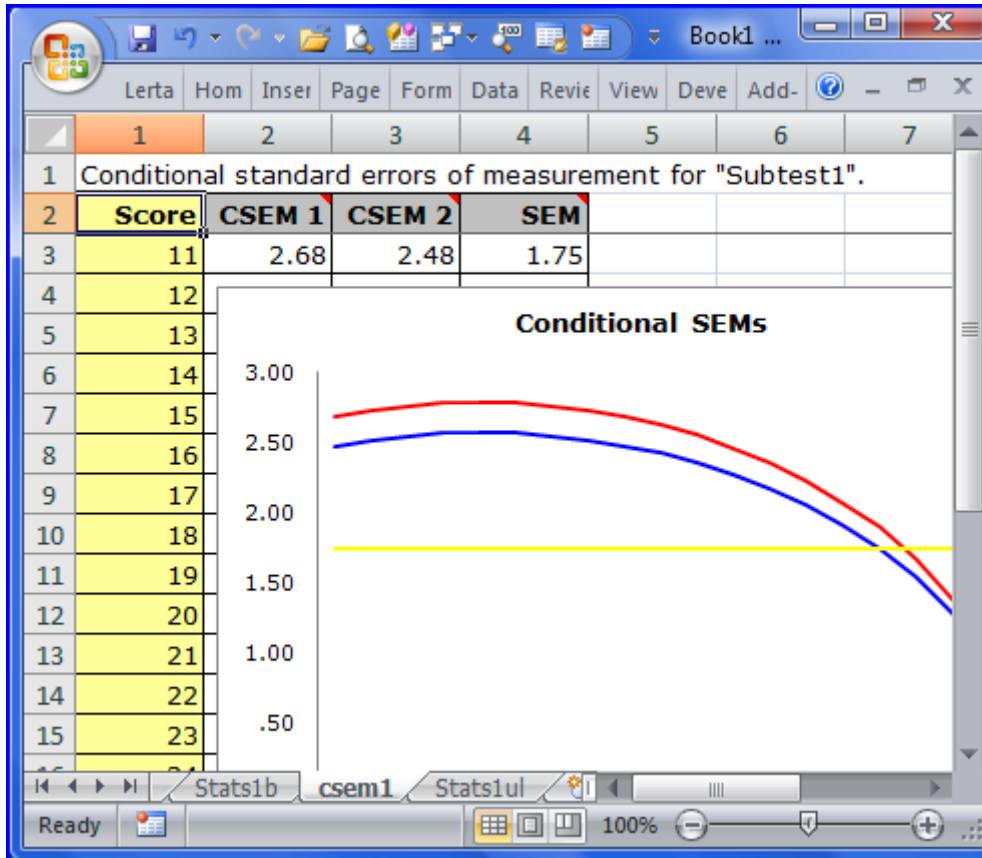


Figure 21

Lertap5 U-L stats for "Subtest1", created: 27/09/2008.

Res =	1	2	3	4	other	U-L diff.	U-L disc.
Q1 upper	0.00	0.00	0.00	<u>1.00</u>	0.00	0.78	0.45
2nd	0.14	0.00	0.00	<u>0.86</u>	0.00		
3rd	0.14	0.03	0.00	<u>0.84</u>	0.00		
4th	0.25	0.04	0.00	<u>0.71</u>	0.00		
lower	0.26	0.15	0.04	<u>0.55</u>	0.00		
Q2 upper	0.00	<u>0.99</u>	0.00	0.01	0.00	0.60	0.78
2nd	0.00	<u>0.89</u>	0.00	0.11	0.00		
3rd	0.03	<u>0.78</u>	0.03	0.18	0.00		
4th	0.01	<u>0.56</u>	0.06	0.36	0.00		
lower	0.15	<u>0.21</u>	0.19	0.45	0.00		
Q3 upper	0.00	0.00	<u>1.00</u>	0.00	0.00	0.86	0.28
2nd	0.00	0.00	<u>1.00</u>	0.00	0.00		
3rd	0.00	0.00	<u>1.00</u>	0.00	0.00		

Figure 22

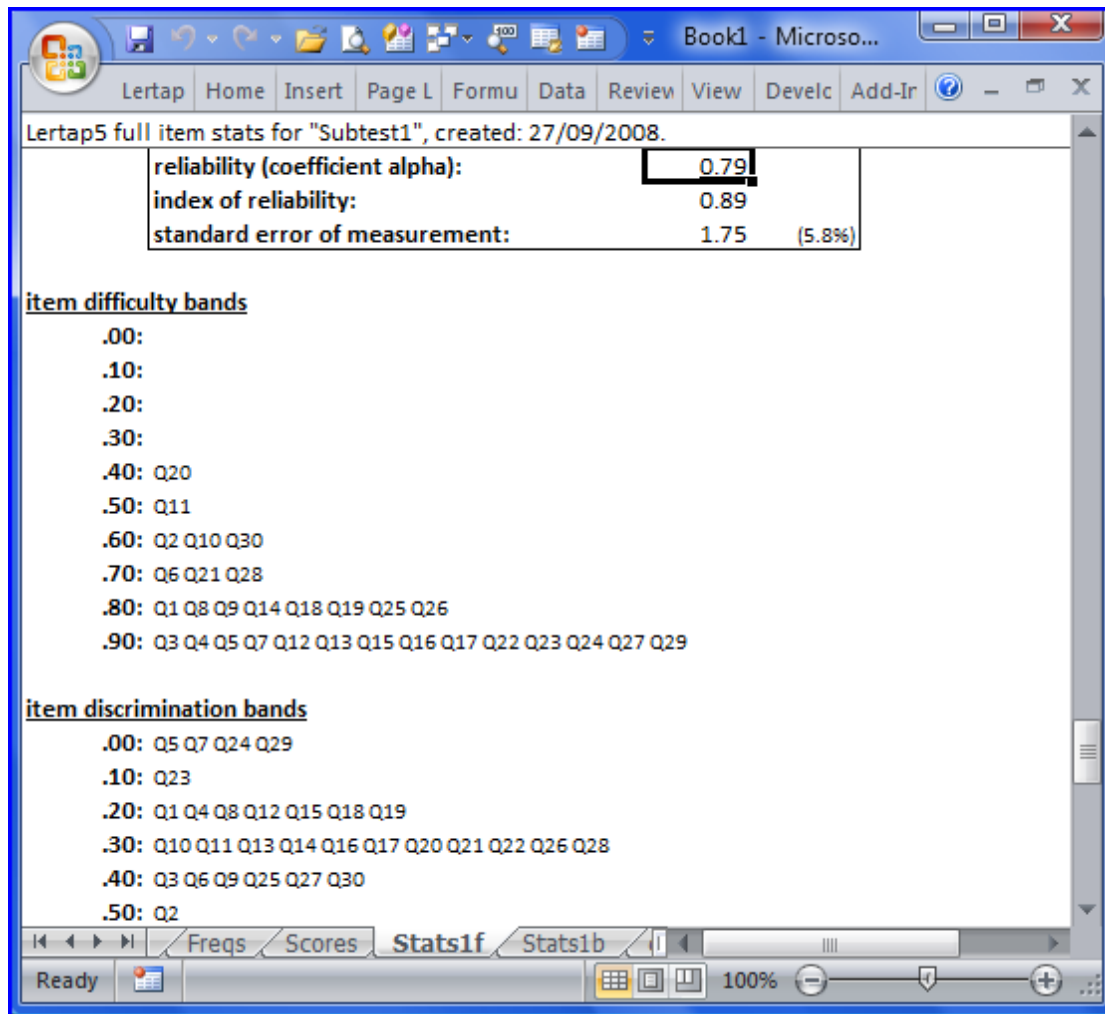


Figure 23

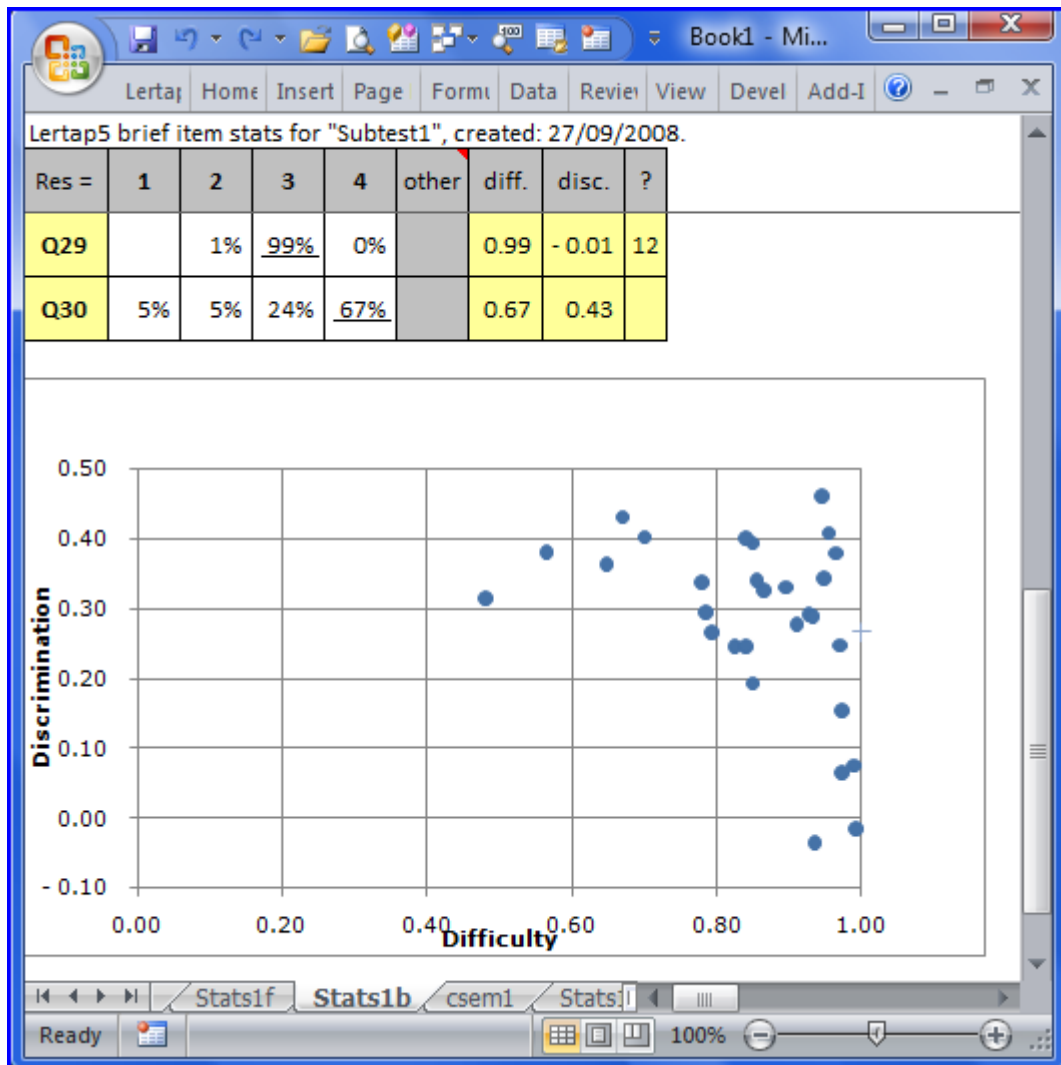


Figure 24

The graphics trio.

All of the results produced to this point have come from clicking on the Interpret and Elmillion options seen in the "Run menu" section of Lertap's panel of control icons (more properly called the "Lertap Ribbon Tab" in Excel 2007).

Quintile

Lertap's main website is: www.lertap.curtin.edu.au.