# Testing

This section should demonstrate the functioning and robustness of the implementation. It should contain clear, concise and comprehensive evidence that the system as a whole operates as required. You should be selective in what is included in the report. You should not include repeated complete printouts of large files just to show a few records successfully updated. Evidence will mostly be in hardcopy form but video evidence may be included if appropriate but this will need uploading to a site such as YouTube and the link to it included in the report.

You need to prove that you have met your objectives. Look through each of your objectives in turn and design a test plan to show that your program meets each of them.

You need to show that your program is robust - i.e. doesn't crash when invalid data is entered or when other errors occur. When testing validation do not just show the error message. You need to show the data or circumstance that caused the error.

**Possible contents:**

* an introduction and overview
* the test performed and its purpose if not obvious
* the test data
* the expected test outcome
* the actual outcome with a sample of the evidence, for example screenshots of before and after the test, etc. sampled in order to limit volume.

Your screenshots need to be annotated to explain what they show. Make sure that the screen shots are big enough so that the data can be seen clearly.

Perhaps the easiest way to present the test cases is by using various types of table like the ones shown in the example project. It is often best to do the testing in sections such as separate tables for different forms or processes.

Do not waste time testing a password system unless it is critical to your program. E.g. you have different levels of user that have different levels of access.

You should start off with empty files/tables and test that your program does not crash or give unexplained error messages when you try to process records that don't exist.

You should then systematically add records to the files in logical order. Whilst adding some of the records, you should test your validation routines using typical, erroneous and boundary data.

Once you have added the basic data for your system, you should then test the processing remembering to test all possibilities. You do not need a screenshot for every single test that you specify. Don’t forget to include example of printed reports if your system produces any.

### Testing Marking Criteria (8 marks)

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| **Mark Range 7-8** |
| Clear evidence, in the form of **carefully selected representative samples**, that thorough testing has been carried out. This demonstrates the robustness of the complete or nearly complete solution/thoroughness of investigation and that the requirements of the solution/investigation have been achieved. |
| **Mark Range 5-6** |
| Extensive testing has been carried out, but the evidence presented in the form of representative samples does not make clear that all of the core requirements of the solution/investigation have been achieved. This may be due to some key aspects not being tested or because the evidence is not always presented clearly. |
| **Mark Range 3-4** |
| Evidence in the form of representative samples of moderately extensive testing, but falling short of demonstrating that the requirements of the solution/investigation have been achieved and the solution is robust/investigation thorough. The evidence presented is explained. |
| **Mark Range 1-2** |
| A small number of tests have been carried out, which demonstrate that some parts of the solution work/some outcomes of the investigation are achieved. The evidence presented may not be entirely clear. |

**Evaluation**

This should be a critical appraisal that matches the original objectives to the final achievement. Suggestions for further development should be included if appropriate. Although this should be your own appraisal, you can include comments/reports from other users. Where appropriate direct feedback from the identified user is expected which needs to be authenticated by your teacher.

### Evaluation against objectives

You need to go back to the original objectives and assess point by point whether each was achieved, how it was achieved and how well it was achieved. You will get no marks for simply stating the objective and saying that it was achieved. Are there any weak areas that only work in certain situations? You should cross-reference to other parts of the report to provide evidence.

### Overall Assessment of the project

This is basically a brief summary which assesses the whole solution.

### User feedback

In this section you need to include the feedback obtained from your user(s). They are to give you feedback on all aspects of the system.

Probably the easiest way to do this is to give the system to your user(s) to try out then ask them to complete a questionnaire or you could write down verbal feedback. Completed copies of the questionnaire and/or transcripts of verbal feedback should be placed at the end of this section.

Note: The feedback needs to be signed and dated by your end-user ideally on headed notepaper.

### Analysis of User Feedback

In this section you need to analyse the feedback obtained from your user(s). You need to analyse the comments made, cross-referencing to particular comments where appropriate.

You can combine sections 2 and 3.

### Possible extensions and improvements

In the light of your user feedback describe possible improvements that could be made to your project. This could include ideas for making the system more robust or for enhancing its functionality. What additional features might it be useful to include?

You can also include ideas that you have come up with yourself.

You need to give some idea of how these improvements can be made.

The purpose of this section is as a critical appraisal; therefore it is insufficient for you to just state that your system objectives have been met. You need to state how they have been met or, if an objective has not been met, give the reasons why this was not possible.

User feedback, where present, should be objective and refer to how well the system met their requirements. If the user now uses the system then this should be clearly reported. You should refer back to any user feedback as part of your appraisal.

N.B. Your user feedback must be genuine! It has to be authenticated by your teacher.

### Evaluation Marking Criteria (4 marks)

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| **Band 4, Mark 4** |
| Full consideration given to how well the outcome meets all of its requirements. How the outcome could be improved if the problem was revisited is discussed and given detailed consideration. Independent feedback obtained of a useful and realistic nature, evaluated and discussed in a meaningful way. |
| **Band 3, Mark Range 3** |
| Full or nearly full consideration given to how well the outcome meets all of its requirements. How the outcome could be improved if the problem was revisited is discussed but consideration given is limited. Independent feedback obtained of a useful and realistic nature but is not evaluated and discussed in a meaningful way, if at all. |
| **Band 2, Mark Range 2** |
| The outcome is discussed but not all aspects are fully addressed either by omission or because some of the requirements have not been met and those requirements not met have been ignored in the evaluation. No independent feedback obtained or if obtained is not sufficiently useful or realistic to be evaluated in a meaningfully way even if attempted. |
| **Band 1, Mark Range 1** |
| Some of the outcomes are assessed but only in a superficial way. No independent feedback obtained or if obtained is so basic as to be not worthy of evaluation. |