

7.3 Development and Testing

Syllabus 2026 - 2028

WHAT YOU NEED TO KNOW

- The need to test the system before implementation
- Test designs, test strategies and the test plan: test data, expected outcomes, actual outcomes and remedial action
- Testing data structures, file structures, input formats, output formats and validation routines
- Test strategies: each module, each function and the whole system
- Test data: normal, abnormal and extreme data; the use of live data

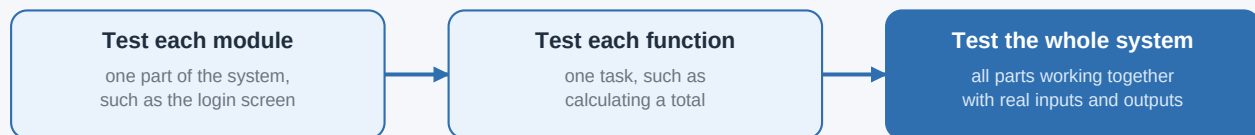
Why the system must be tested

- To find and **correct errors** before the users depend on the system
- To check that the system **meets the requirements** and works as designed
- To make sure data is not lost or damaged, and that calculations and outputs are correct
- Putting right a fault after implementation is far more costly and disruptive

Test designs and strategies

A **test design** decides what is to be tested: the data structures, file structures, input formats, output formats and validation routines. A **test strategy** is the way the testing is organised.

Figure 24: Test strategies

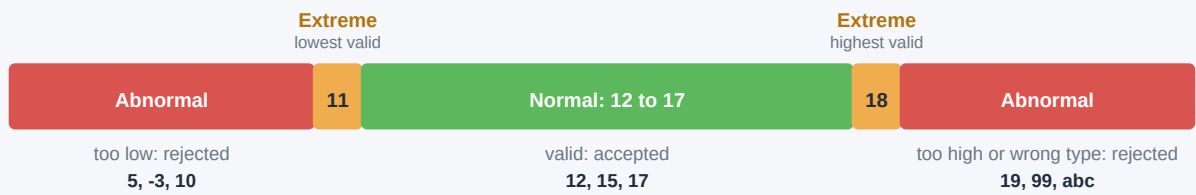


- **Each module:** each part of the system is tested by itself
- **Each function:** each task, such as a calculation or a search, is tested separately
- **Whole system:** all the parts are tested together, from input through processing to output

Test data

Type	Description	Example (age must be 11 to 18)
Normal data	Valid data that should be accepted	12, 15, 17
Extreme data	Valid data at the very edge of the allowed range; it should be accepted	11 and 18
Abnormal data	Invalid data that should be rejected, such as the wrong type or outside the range	5, 19, 99, -3, abc

Figure 23: Normal, extreme and abnormal test data (rule: age must be 11 to 18)



Extreme data is valid data at the very edge of the allowed range

Live data is real data that the system will use in everyday work, such as real customer orders. It is used after testing with test data, for example in parallel or pilot running, to check that the system works in real conditions. The results of live data are not known in advance, so the risk is greater.

The test plan

A **test plan** lists each test with the **test data**, the **expected outcome** (what should happen), the **actual outcome** (what did happen) and any **remedial action** (what is done to fix a fault). If the actual outcome differs from the expected outcome, the fault is corrected and the test is repeated.

Test	Test data	Expected outcome	Actual outcome	Remedial action
1 Normal	15	Accepted	Accepted	None
2 Extreme	11	Accepted	Accepted	None
3 Extreme	18	Accepted	Rejected	Change the range check from less than 18 to less than or equal to 18
4 Abnormal	19	Rejected with an error message	Rejected with an error message	None
5 Abnormal	abc	Rejected with an error message	Rejected with an error message	None

EXAM TIP

Test data must come with an **expected outcome**, written before the test is run. Do not mix up **extreme** data (valid, at the limit) with **abnormal** data (invalid, should be rejected).

Key terms

Term	Meaning
Testing	Checking that the system works correctly before it is used.
Test plan	A list of tests with data, expected and actual outcomes.
Test data	Data used to check that the system works.
Normal data	Valid data that should be accepted.
Extreme data	Valid data at the limits of the range.
Abnormal data	Invalid data that should be rejected.
Live data	Real data used when the system is in operation.
Remedial action	The action taken to fix a fault found in testing.

Practice questions

Answer each question in full sentences. Command words used: State (give a short answer), Describe (say what it is like), Explain (give reasons), Analyse (break it down and examine it), Suggest (apply your knowledge to a situation), Compare and contrast (similarities and differences), Evaluate (weigh up and reach a judgement).

No.	Question	Marks
1	State the three types of test data.	[3]
2	Describe what is meant by live data.	[2]
3	Explain why a system must be tested before it is implemented.	[2]
4	Analyse why extreme data is used when testing a range check.	[3]
5	Suggest one item of normal, extreme and abnormal test data for a field that accepts marks from 0 to 100.	[3]
6	Compare and contrast testing each module with testing the whole system.	[4]

Total: 17 marks