COMP110: Principles of Computing

Software Quality

Today's lecture

Today's lecture has **three parts**

- Software quality and quality assurance
- Pathfinding and the A* algorithm
    - Introducing the next worksheet
- Live coding: applications of OOP techniques

Software testing

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In this section

In this section you will learn how to:

- **Discuss** the importance of software testing in game development
- **Identify** the different types and levels of testing
- **Apply** test-driven development practices to your own programming projects

Further reading

- Pressman, R.S. (2009) Software Engineering: A Practitioner's Approach. 7th Edition. McGraw-Hill.

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- There are many ways of measuring the **quality** of a game or piece of software

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- **Quality assurance** is important to ensure that the software is of sufficiently high quality to provide benefit to developers and end users

Testing

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- ... but letting errors slip into the final product can be even more costly
- Testing $\neq$ quality assurance
  - Testing is an important part of QA, but **not the only part**

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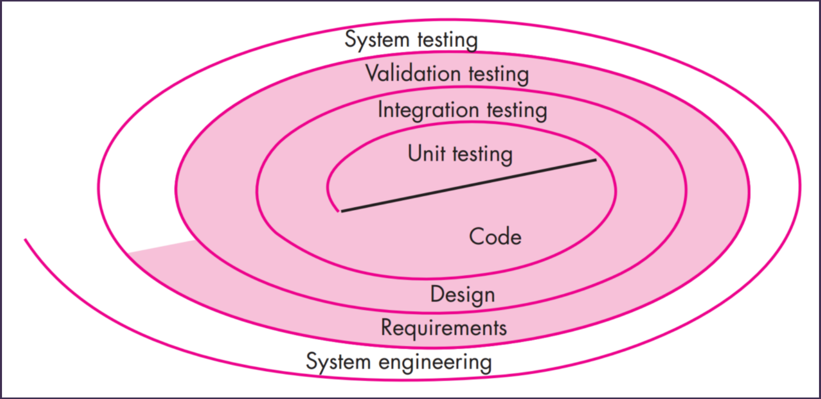
- Who should take responsibility for **testing**?
    - "**Developers** write the code, so they should make sure it works"?
    - "**Everyone** is responsible for quality, so everyone should pitch in"?
    - "Code should be tested by **someone other** than the developer who wrote it"?

Socrative `6E8NSW3IN`

So who should test game software?

- In pairs.
- Discuss for 2-minutes.
- **Suggest** which parties should take responsibility for testing **and justify** your answer.

Testing strategy



(Pressman, 2009) Figure 17.1

Testing strategy

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- **Black box testing**: testing the software **without** knowledge of its internal workings

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- E.g. verifies that a function called with invalid parameters throws the expected error

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- Aim for high **coverage**
  - Ideally, **every line of code** should be executed in **at least one** unit test

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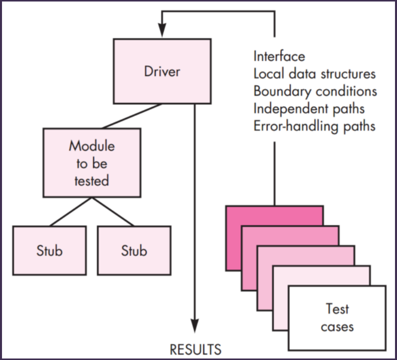
Drivers and stubs



(Pressman, 2009) Figure 17.4

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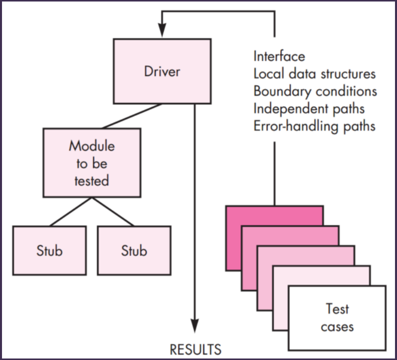

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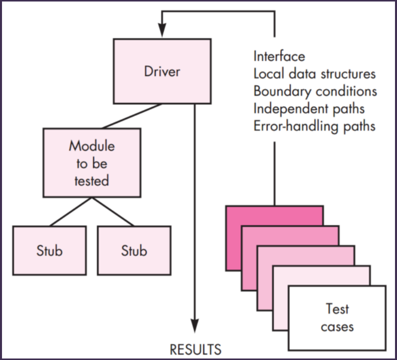

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- Unit testing generally requires extra code to be written
- **Driver** — to set up any required state and run the test
- **Stubs** — to replace any modules upon which the module under test depends

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- **Regression testing** is important — re-running tests to ensure that recent additions have not broken anything

Socrative 6E8NSW3IN

If the units have been thoroughly tested individually, why is integration testing needed?

- In pairs.
- Discuss for 2-minutes.
- Give an **example** of a problem that integration testing might uncover, but that unit testing might miss.

Validation testing

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- E.g. playtesting

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If unit testing and integration testing have been done correctly, why is validation testing needed?

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- When the software is (quantitatively or qualitatively) “good enough”
- Testing is never “done” — the burden just shifts onto the users

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  1. **Red**: create a new test case, which should initially **fail**
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  3. **Refactor**: **improve** the code, ensuring that all tests still **succeed**

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- Writing the bare minimum of code to make the test “green” lets you **focus on user stories**, not on **over-generalisation** or **non-essential functionality**
    - **KISS**: Keep It Simple, Stupid
    - **YAGNI**: You Aren’t Gonna Need It

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  - (you **did** commit before you started, right?)

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How suitable is the test driven approach for game development?

- In pairs.
- Discuss for 2-minutes.
- Suggest **one advantage and one disadvantage** of test driven development in the context of game development

COMP110 Coding Task 2

The assignment brief

LearningSpace: COMP110 assignment 4

The task

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  - BA Digital Games project
  - **or** your COMP150 group project
  - **or** your COMP130 Kivy project

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- Members of the same COMP150 team **must not** target the same component of their COMP150 game

Proposal

- For **next Wednesday's COMP110 lecture (9th March)**
- See assignment brief for details