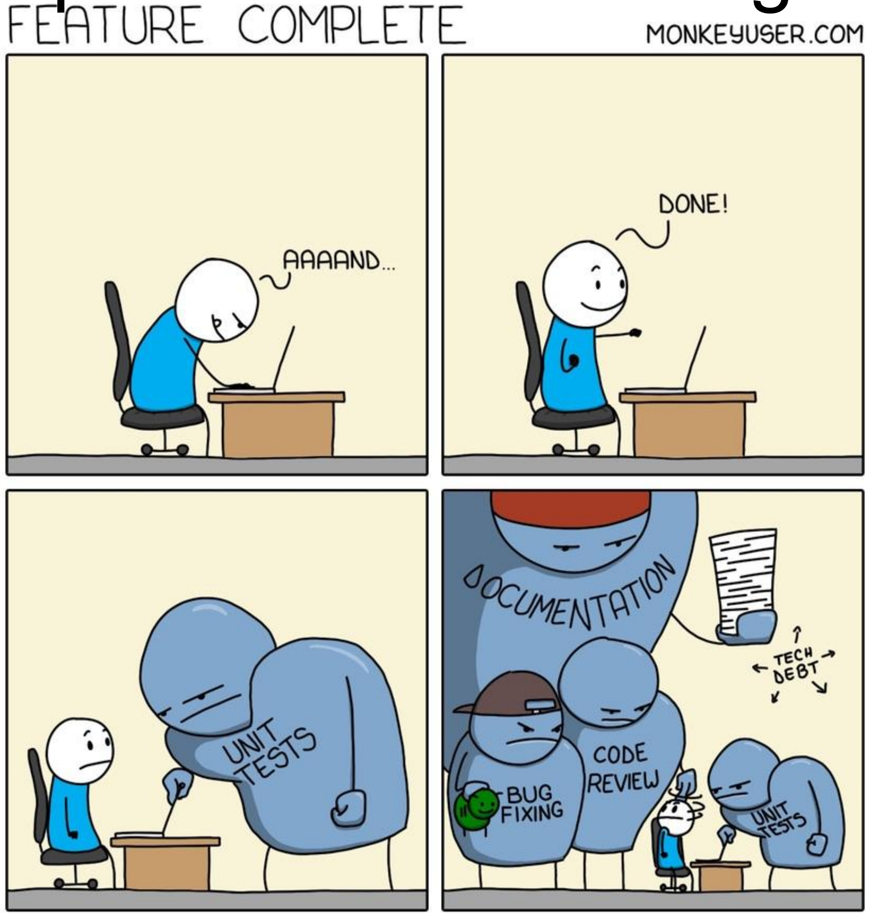
COSC 499: Capstone Software Engineering Project



Traditional Waterfall Model

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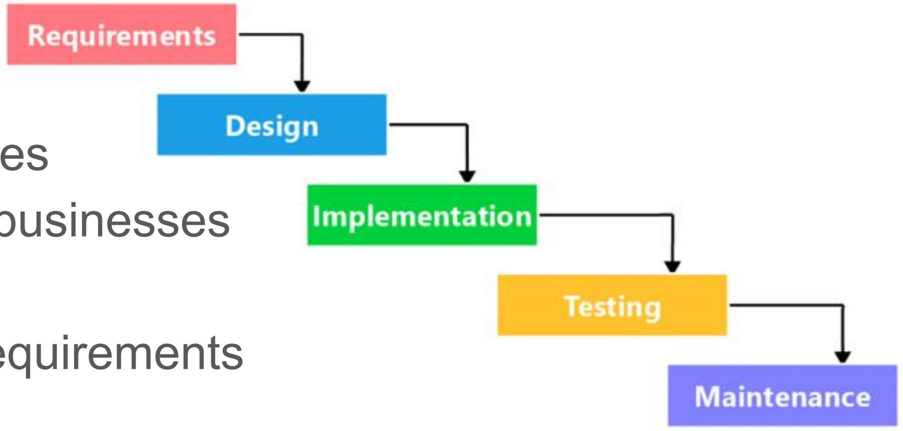
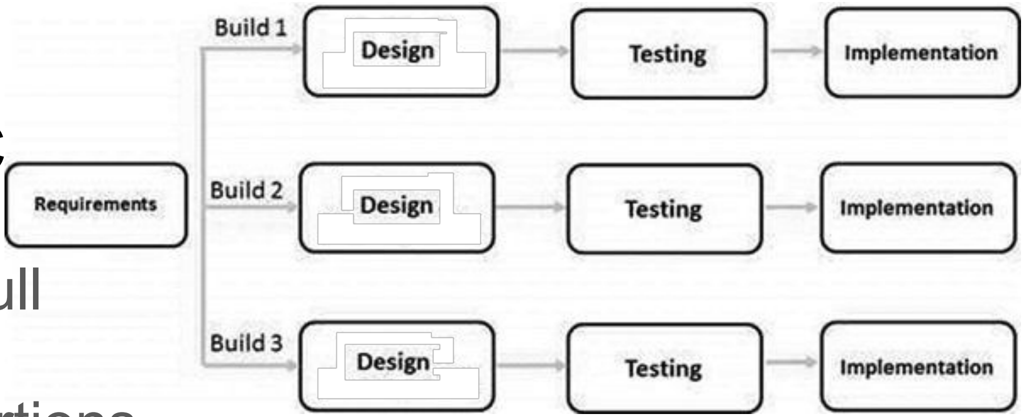
- Software development lifecycle (SDLC) describes the process of how a piece of software is developed by a group of engineers
- Waterfall model
    - Linear model with sequential phases
    - Easy to understand and adopt by businesses
    - Expensive to fix and maintain
    - Cannot accommodate changing requirements



Iterative/Incremental SDLC



- Does not attempt to have full spec of requirements
- Incrementally add small portions

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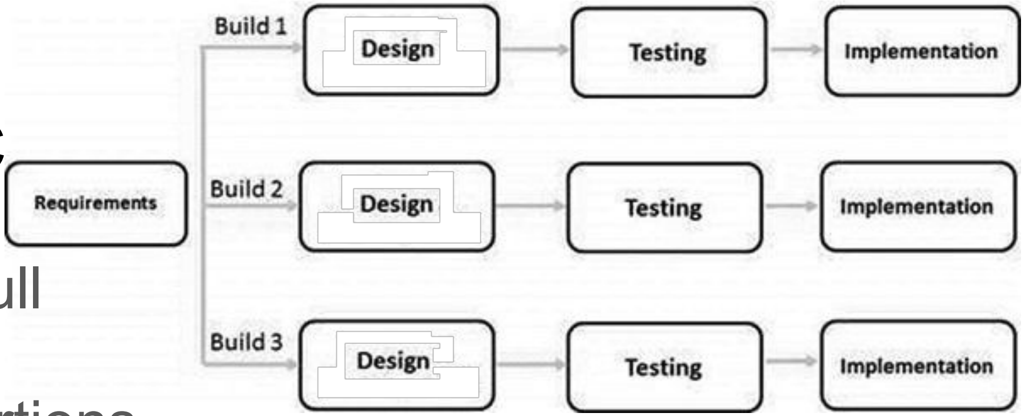

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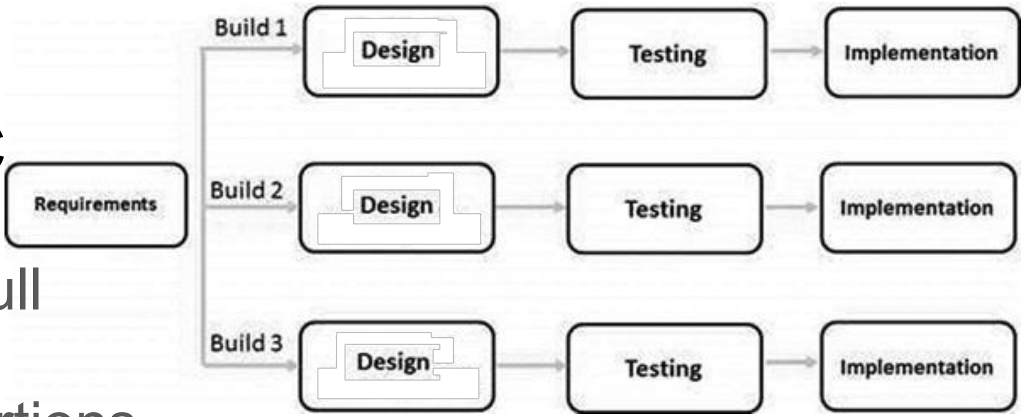

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    - Observe working system (prototypes) early in the development process
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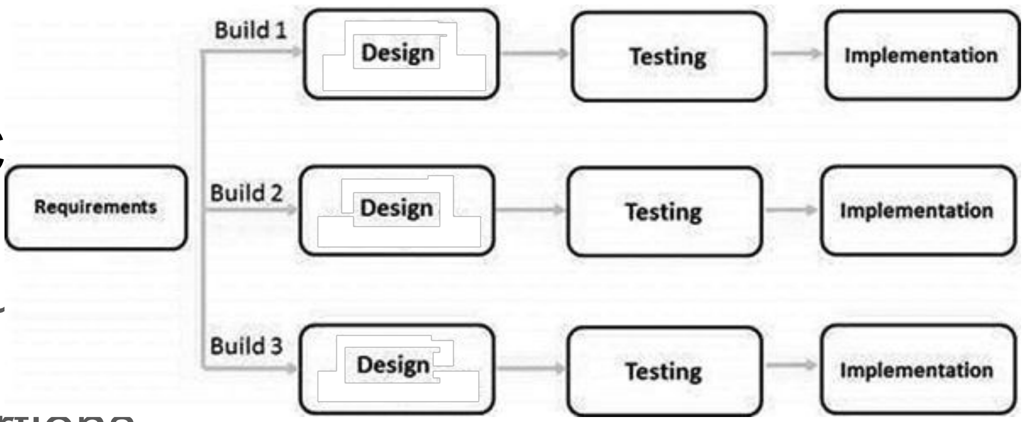

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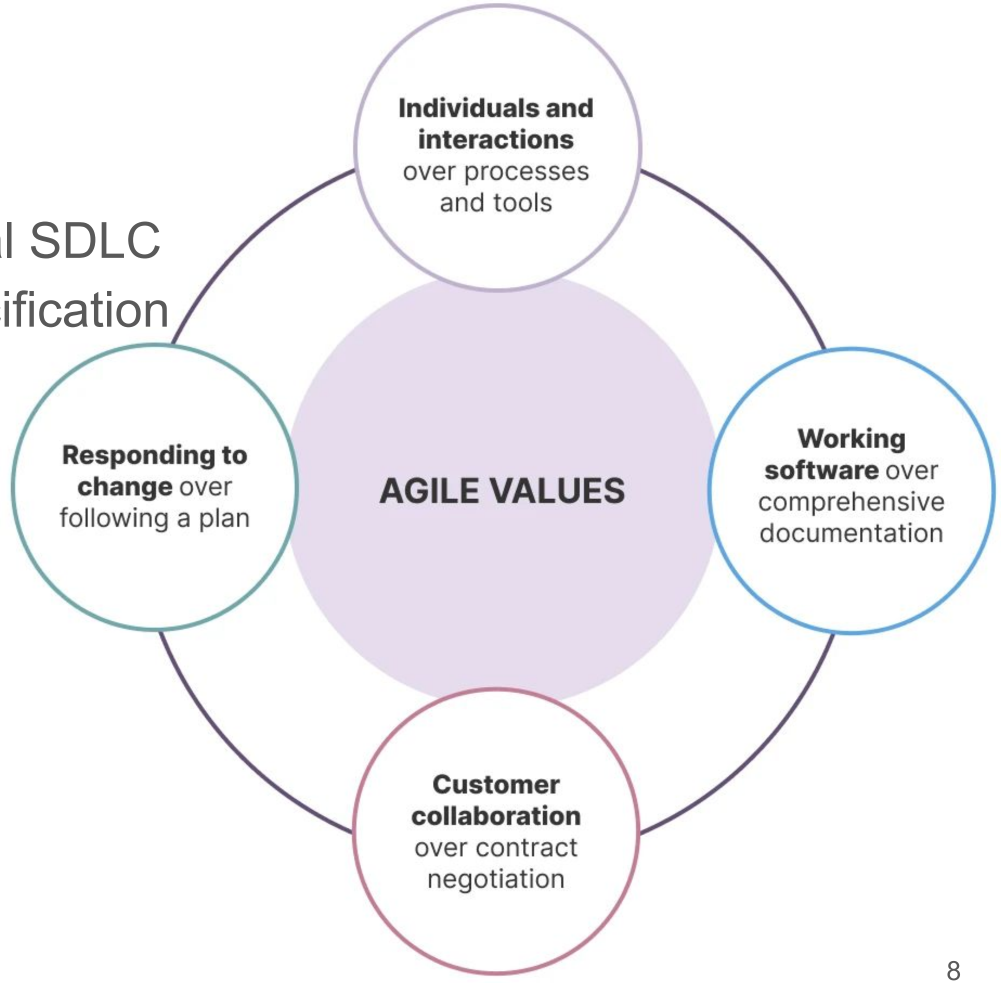
Note: test *before code*

Agile SDLC

- Derived from Iterative/Incremental SDLC
- General plan rather than full specification


Individuals and interactions over processes and tools
Working software over comprehensive documentation
AGILE VALUES
Responding to change over following a plan
Customer collaboration over contract negotiation

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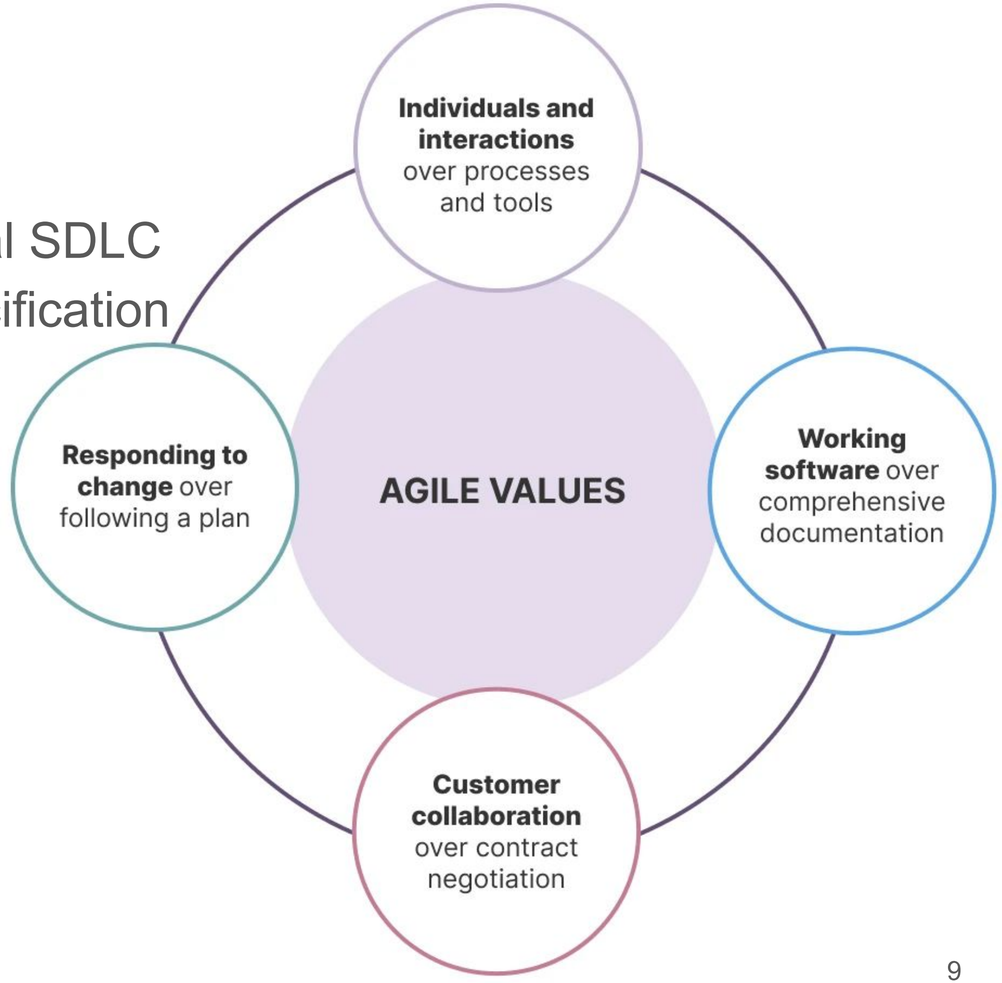
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- Agile methodologies: Scrum, extreme programming (XP), etc.
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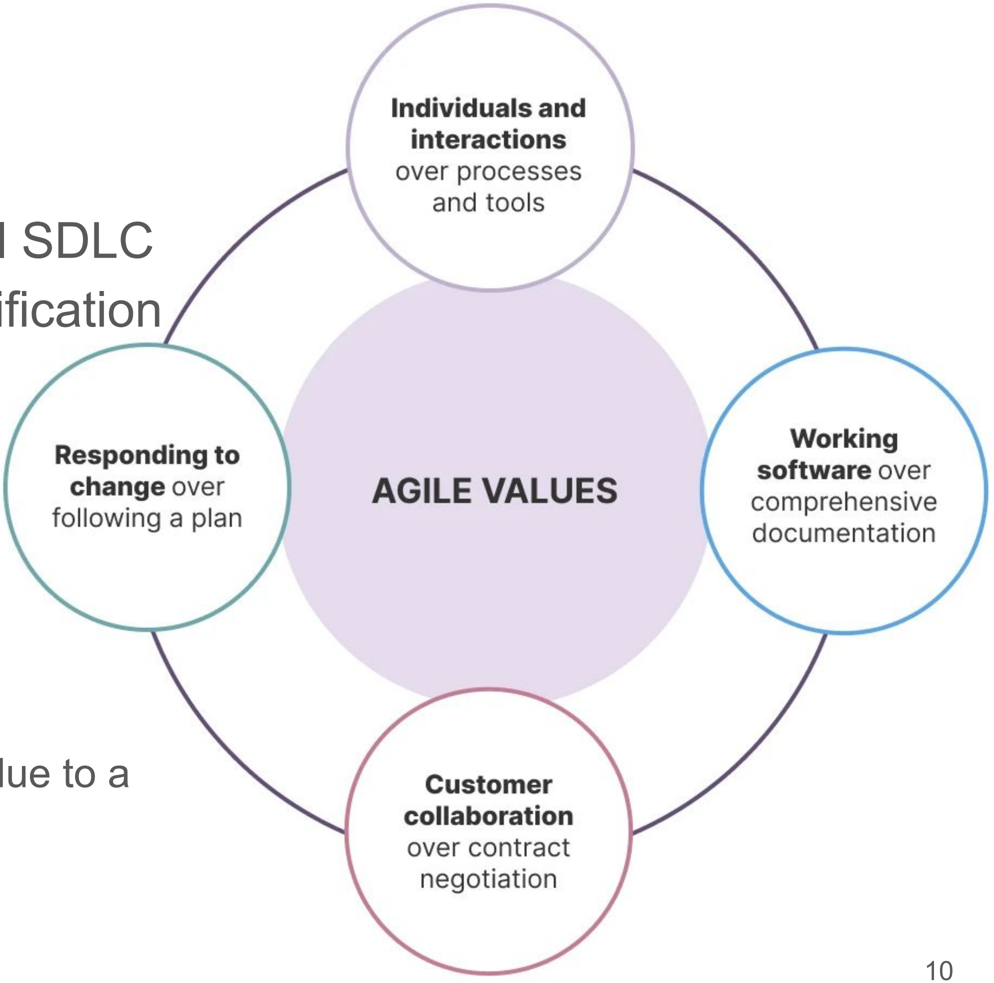
- Characteristics:
  - Hard to budget and manage
  - Challenging to transfer technology due to a lack of documentation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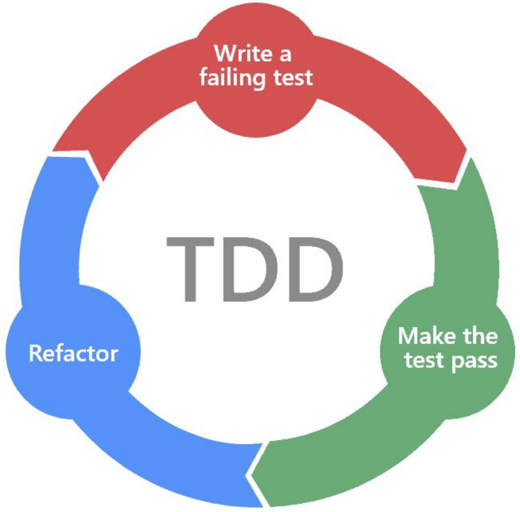
Test Driven Development (TDD)



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$\Big\}$ *test before code*

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    - What does it need to do to meet the requirement?
    - Translate this to:
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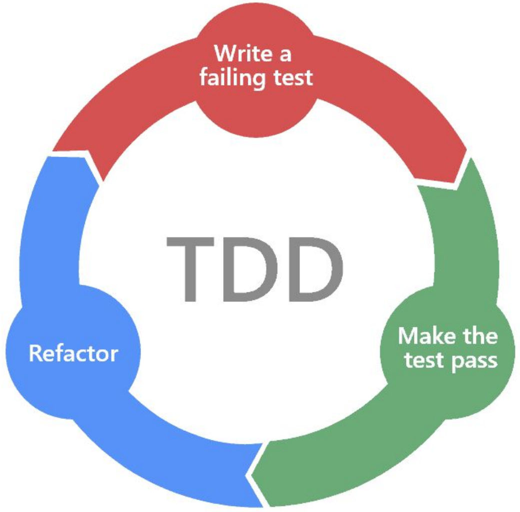

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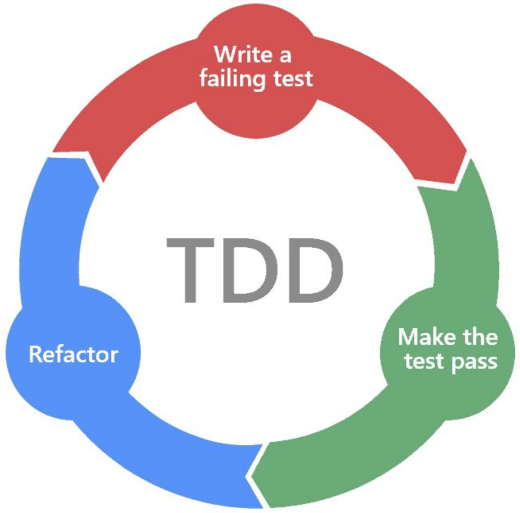

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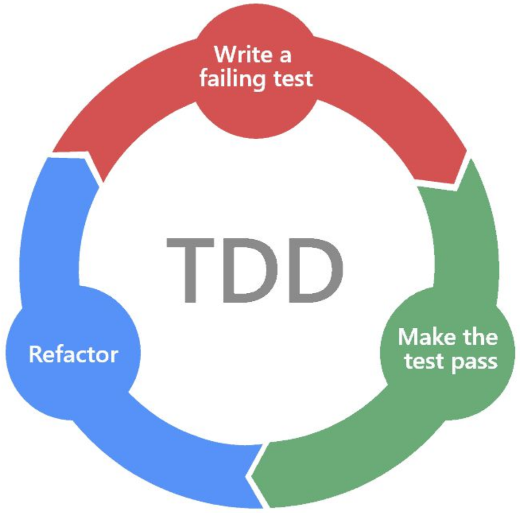

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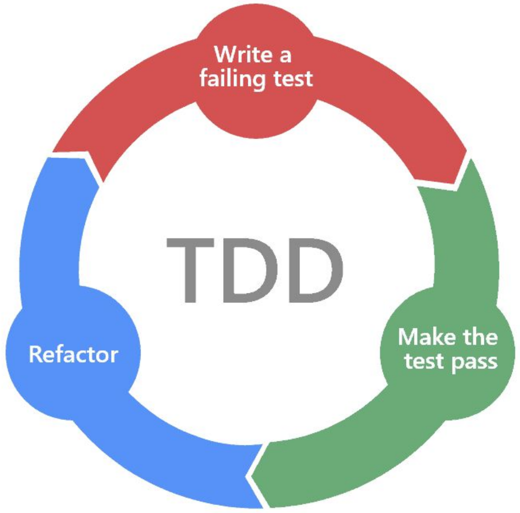

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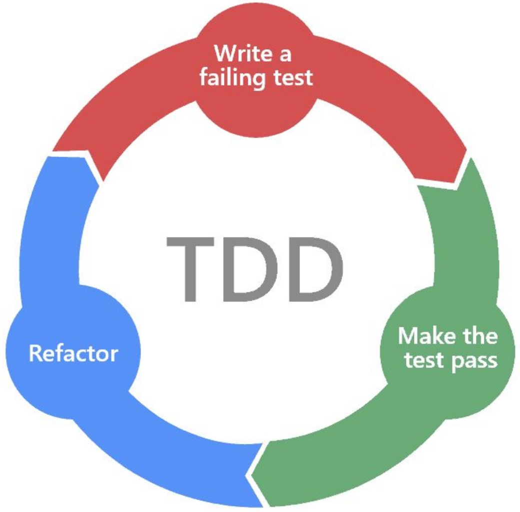

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  - What does it need to do to meet the requirement?
  - Translate this to:
    Which tests does this feature need to pass?
  - Write the tests:
    - Include positive and negative cases
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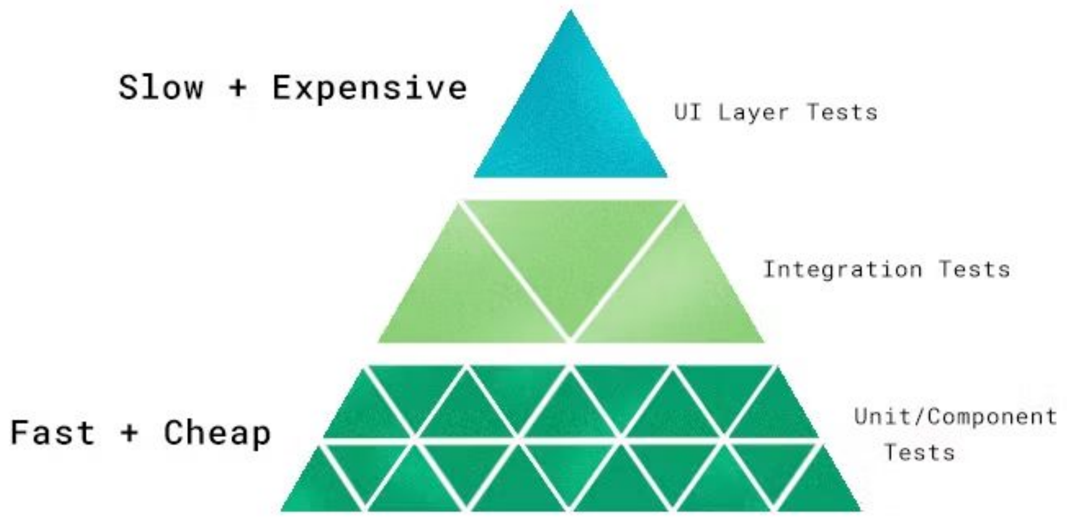
  - Let the tests fail
  - Write the code to pass each test
  - Refactor the code (clean up potential redundancies)
- Easy to do for unit testing or component testing

Types of Testing

- Integration and unit/component testing can be mocked and stubbed
- UI testing is often manual



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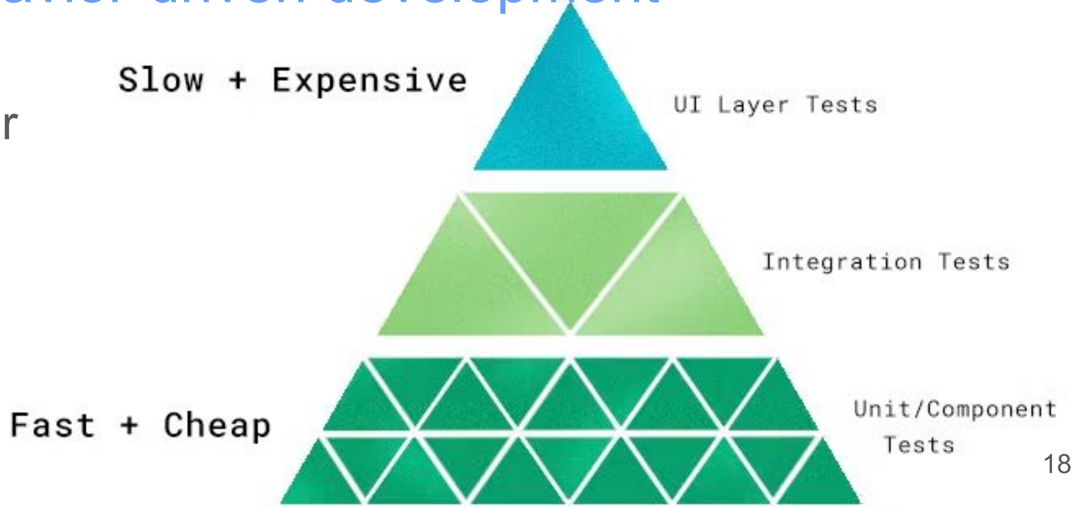
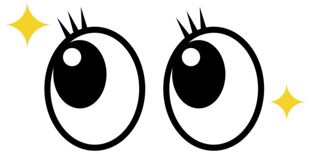
- UI testing is often manual
- Alternative is to use behavior-driven development
    - Automated testing while anticipating user behavior
    - Check: Selenium



Writing Constructive Code Reviews



- Purpose:
  - Share knowledge
  - Spread ownership
  - Unify development practices
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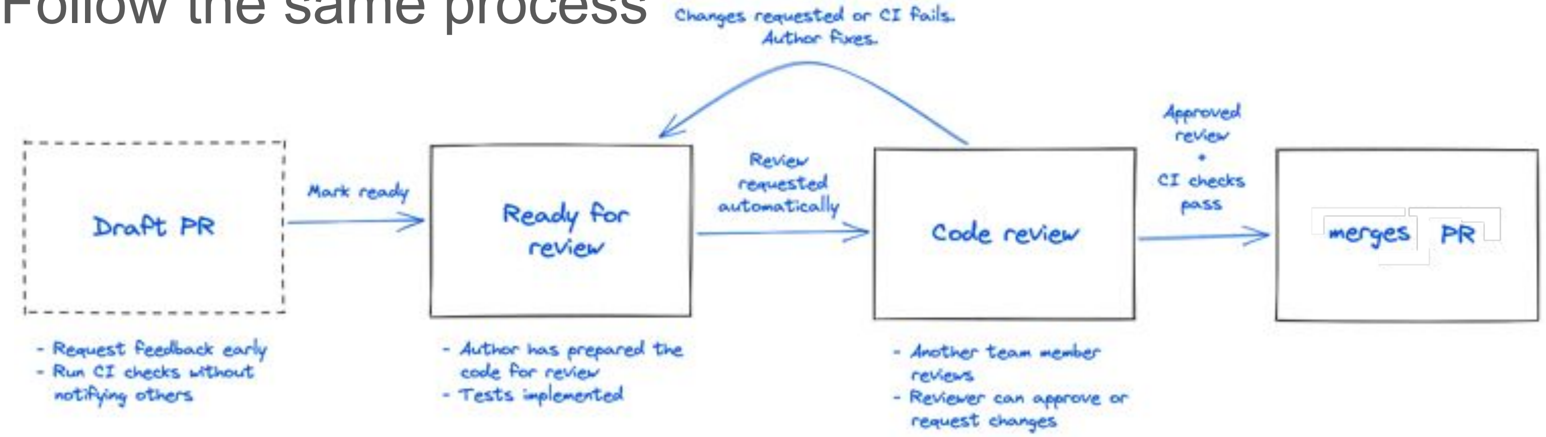
    - Quality control
- Follow the same process



Changes requested or CI fails. Author fixes.
Draft PR
Mark ready
Ready for review
Review requested automatically
Code review
Approved review + CI checks pass
merges PR
- Request feedback early
- Run CI checks without notifying others
- Author has prepared the code for review
- Tests implemented
- Another team member reviews
- Reviewer can approve or request changes

What to Comment On?

- **Functionality** - behavior as intended?
- **Tests** - are they complete? do they pass?
- **Complexity and design** - easy for others to understand? follow standard patterns?

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- **Functionality** - behavior as intended?
- **Tests** - are they complete? do they pass?
- **Complexity and design** - easy for others to understand? follow standard patterns?
- **Naming** - are they descriptive and follow pre-established conventions?
- **Comments** - are they clear and helpful?
- **Documentation** - are associated docs updated?

Things to Keep in Mind

- Keep PRs small
  - Earlier feedback
    Easier for others to review
  - Faster turnaround time

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- PR authors have feelings too

Next Steps

- Submit project plan with Google doc link on Canvas by Friday 11:59pm

- Next week: Open Topic
    - Focus on project checkin