ITP2200
Introduction to Software Testing

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Lecture 9
Testing for Different Technologies

So, more programming this week?

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What do we remember from last time(s)?

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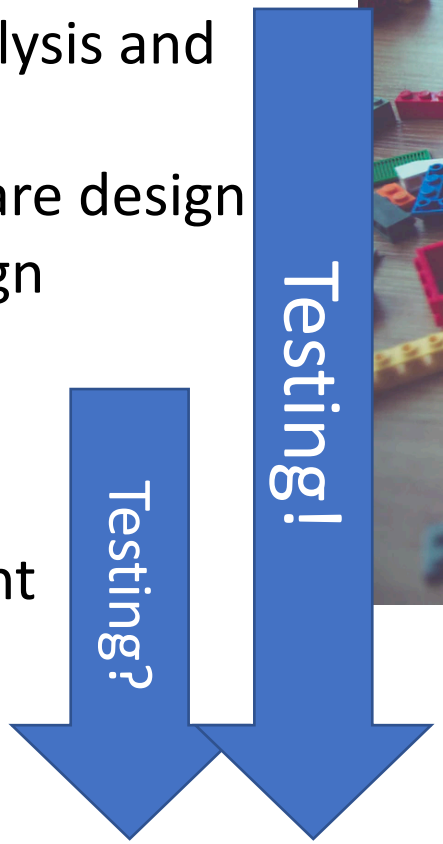
Software Development Process

Quick primer on how software development works:

1. Requirements analysis and specification
2. System and software design
3. Intermediate design
4. Detailed design
5. Implementation
6. Integration
7. System deployment
8. Operation and maintenance



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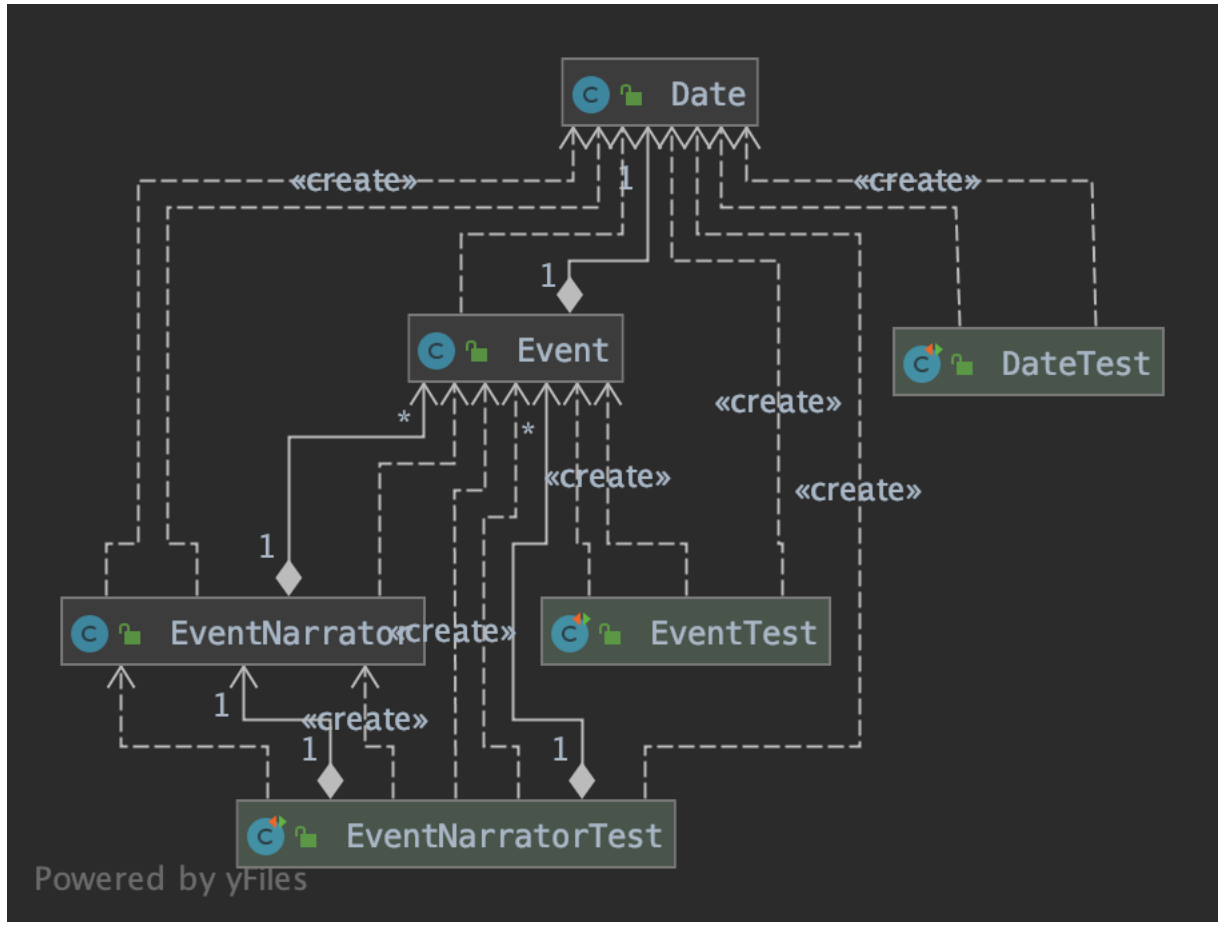
Object Oriented



This is familiar!

Unit Tests – at the method and Class level

Integration Tests – building modules

Regression Tests – Re-running old tests to verify new changes

All clear, right?

Who's wondering what the catch is?

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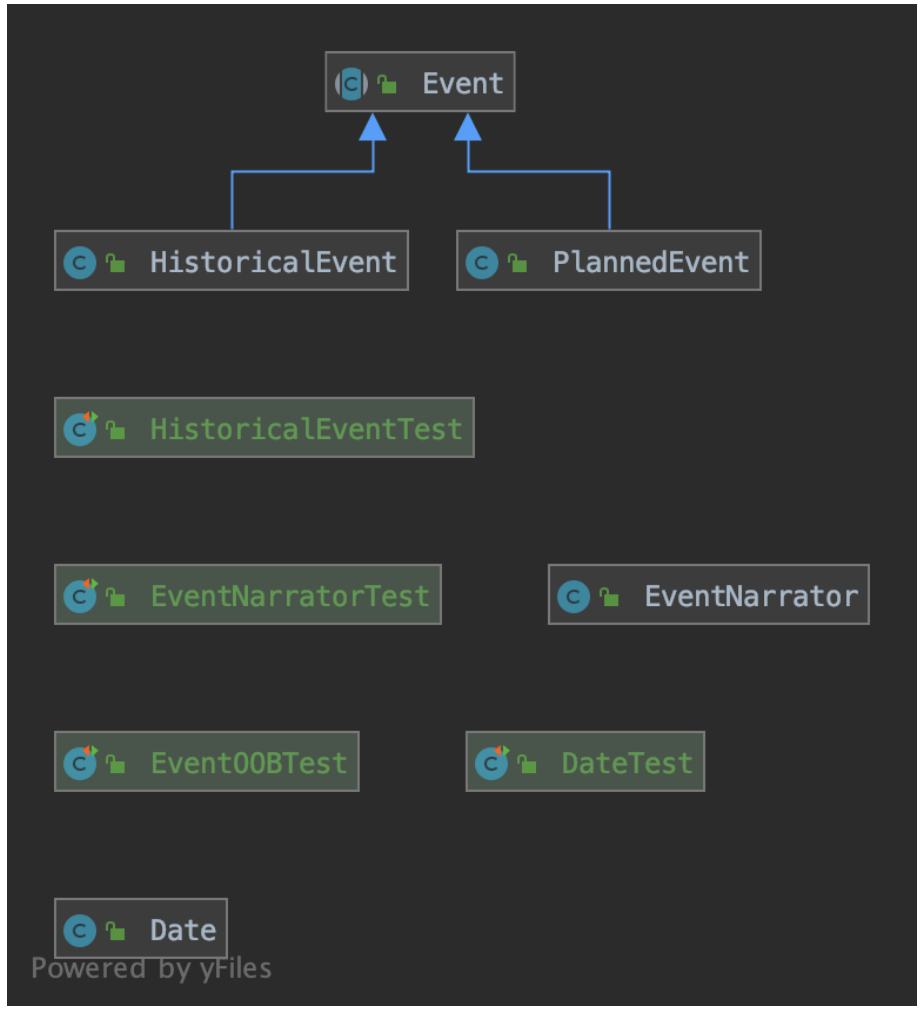
Object Oriented



The catch(es):

- **Polymorphism** – how do we test when several classes have the same methods?

- **Complexity** – each method should be tested individually and in combination
    - each class should be tested individually and in combination

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Object Oriented

Extra catch:

- **Dynamic binding** – exactly what class, what implementation, what methods and variables are available can change at runtime

- **Inheritance** - overriding methods with different semantics
  - different accessibility of variables

```
private Event[] sillyInit(){
    return new Event[]{new HistoricalEvent( name: "Midway", n
            new HistoricalEvent( name: "Death of Caligula", n
            new HistoricalEvent( name: "Reign of Aurelian", n
            new HistoricalEvent( name: "New Year's Party", ne
            new HistoricalEvent( name: "Online lecture due to
            new PlannedEvent( name: "Summer holidays", new Da
    };
}
```

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Object Oriented

Managing complexity:

- **Data flow**
- **Coupling**

Concepts are used in analysing and testing such code.

Clear understanding of design helps.
Clear design also helps.

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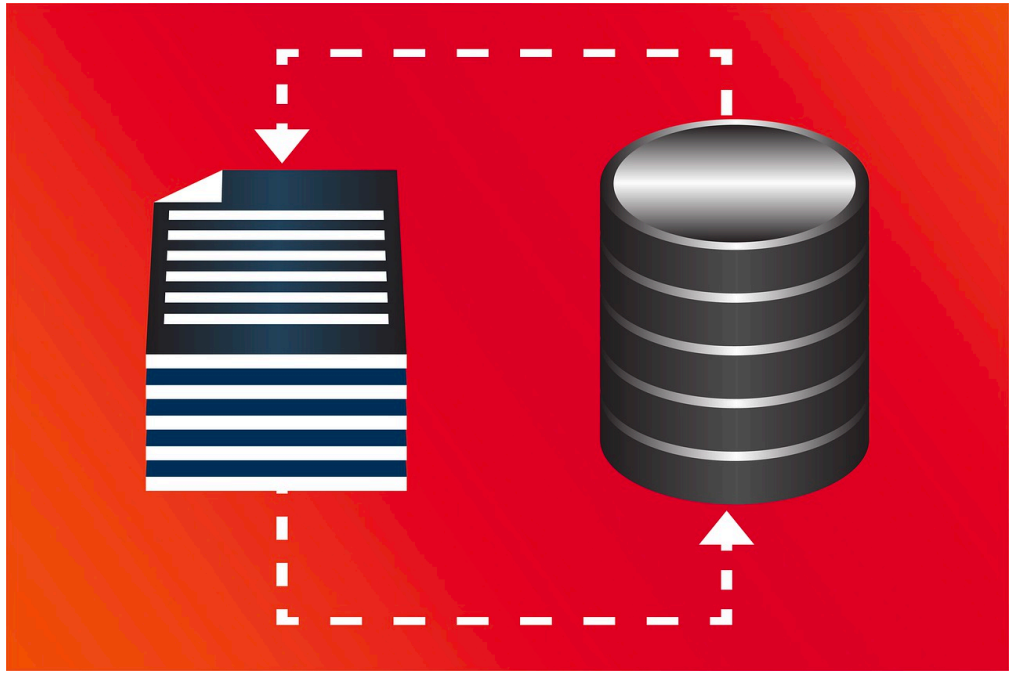
Questions so far?

Web Apps and Web Services

Online apps:

- Websites – html
- Dynamic web applications –javascript
- Web services – Java, Kotlin, etc.

Often, following a RESTful approach.



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Web Apps and Web Services

Websites and
client side of dynamic web applications

- Validity of links
- Displayed pages and accessibility
- Security
- Performance

- Often involves subjective components

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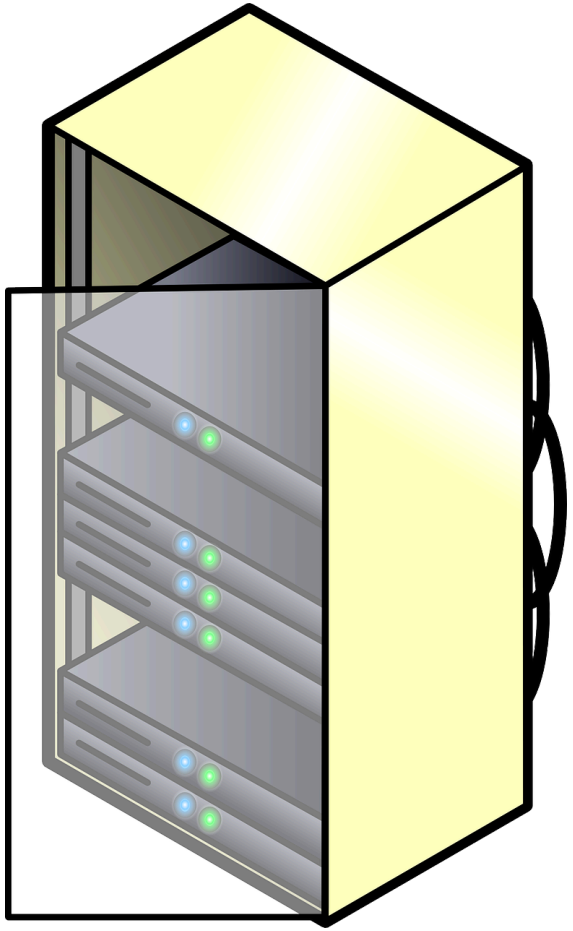
Web Apps and Web Services



Web services and
The server side of web applications

- Often through HTTP (stateless transfer)
- Often RESTful (at the time of writing)
- Focused on accessing the system via endpoints
- Include service finding, mocking, stubs

- Book mentions SOAP and WSDL
- Now it’s more JSON and OpenAPI

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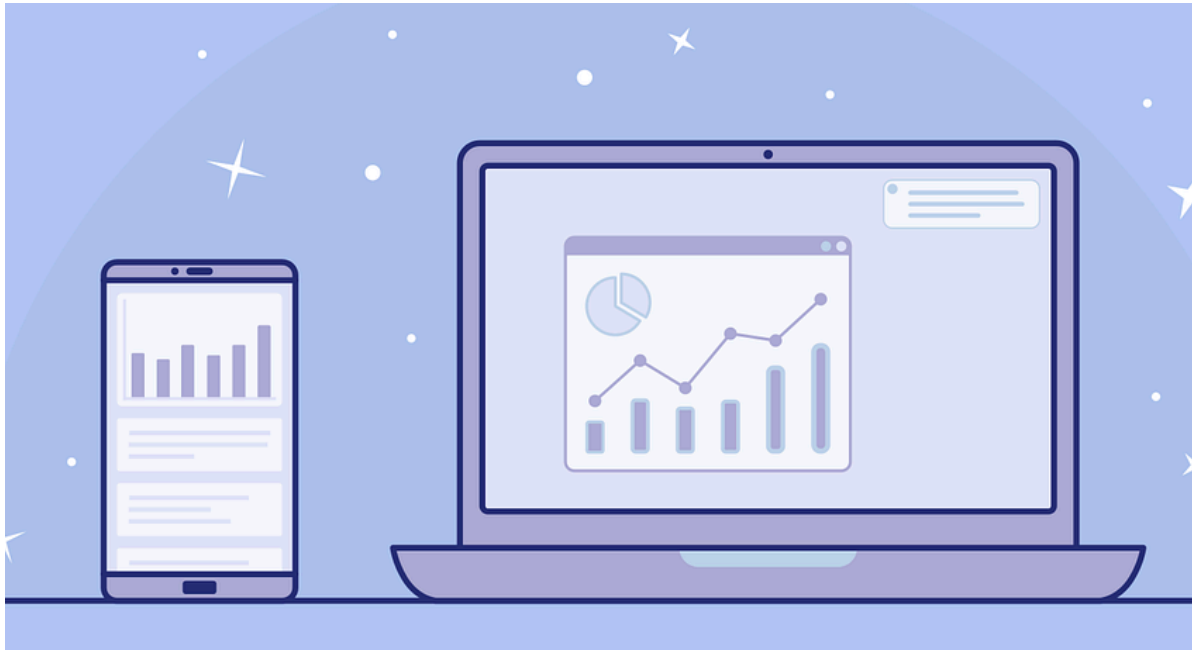
Questions so far?

Graphical User Interfaces



Focus on:

- User experience, user behaviour
- Capture-replay known behaviours

- Old friends: graphs and finite state machines

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Real-time and Embedded Systems

Focus on:

- Observability and reproducibility
- Probe effect (the measurement itself has an impact)

- More focus on timeliness (and strict enforcement of timing constraints).

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Questions so far?

Exercise for the Seminar

Online!

- Two submissions
- Good first step. Now, let’s go into detail.
- How can we ensure each requirement is met?
- Are there any changes you feel should be made to the requirements/design
- What bugs did you find and how would you report them?

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Exercise for the Seminar

Online!

- Put together a **test plan** for our Narrator
- Focus on the motivation, link the requirements to a clear plan for testing
- Also have tests that are in line with your plan
- End with a section about what is missing, and what should be done next

- Send me the document for comments and feedback (not grades!)

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