

Designing for Testability

Laura Inozemtseva

University of Waterloo

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What is Testability?

- “Any features that aid your ability to observe or control software operations improve testability.” (Lessons Learned in Software Testing, Kaner et al., pp. 123)
- Before you code, think about what, where and how you want to test

Your Architecture can Help or Hinder

- Three examples:
 - 1 MVC
 - 2 Event-based
 - 3 Pipe and filter

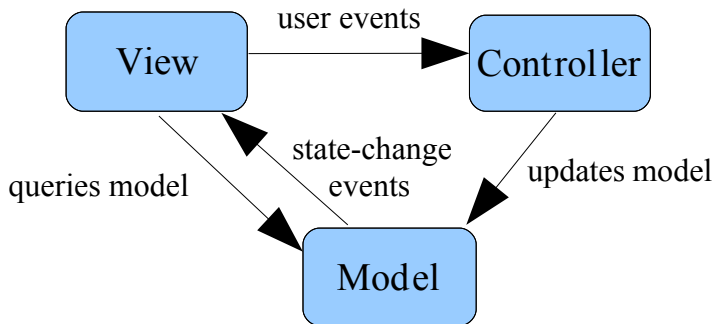


Figure from

<http://commondatastorage.googleapis.com/gtb/TotT-2009-02-05.pdf>

Aside: Testing GUIs

- Exponential number of test cases
- GUI changes more than underlying code
- How do you capture NFPs like usability?

Alternative to MVC: MVP

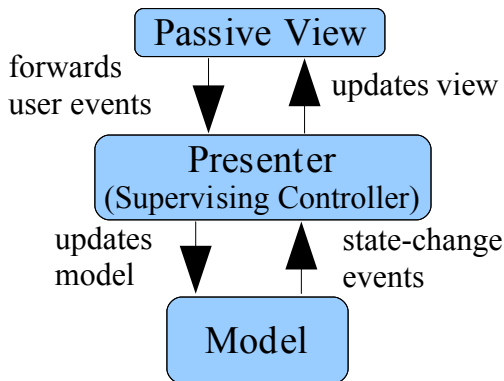
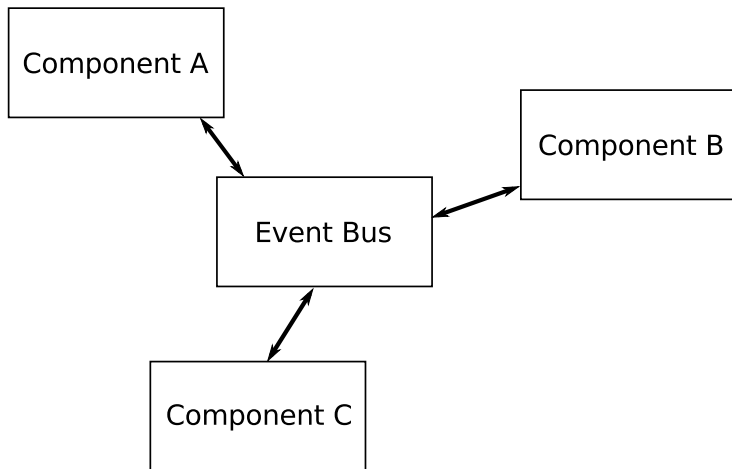


Figure from

<http://commondatastorage.googleapis.com/gtb/TotT-2009-02-05.pdf>

Event-Based



Aside: Testing Parallel Programs

- Very hard to do well
- Some research into concurrent testing/debugging (e.g., Chess from Microsoft Research)

Technique: Mock Objects

- Mocks can increase isolation and performance
- However, introduce maintenance overhead
- What if the object being tested creates another object it uses?

Example

```
class Application {  
    ...  
    public void run() {  
        View v = new View();  
        v.display();  
    }  
    ...  
}
```

Pipe and Filter

DITROFF FLOW:

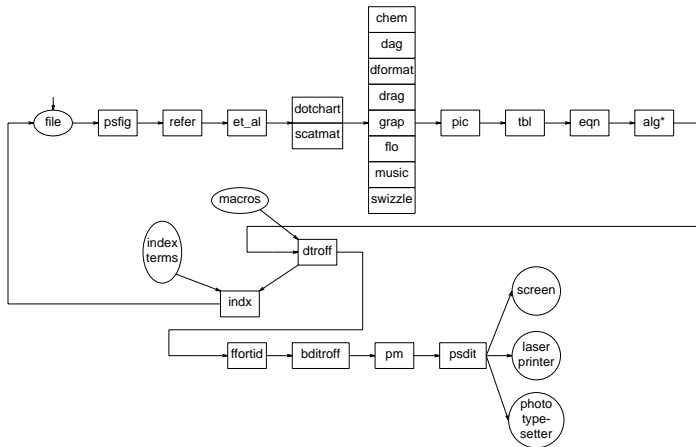


Figure from Dan Berry's slides

Summary

- Each architecture has different strengths and weaknesses
- Knowing about them helps you plan the what, where and how of testing (extreme version: TDD)
- Rule of thumb: decrease coupling

What We *Didn't* Talk About

- What tests do versus what users do
- Identifying testability smells (Testability Explorer)
- The tradeoff between adding complexity and catching bugs
- ...

- GoogleTechTalks
(<http://www.youtube.com/user/GoogleTechTalks>)
- Google's testing blog
(<http://googletesting.blogspot.ca/>)
- Lessons Learned in Software Testing – Kaner, Bach and Pettichord

- Discuss in project groups: how can you make your projects more testable?