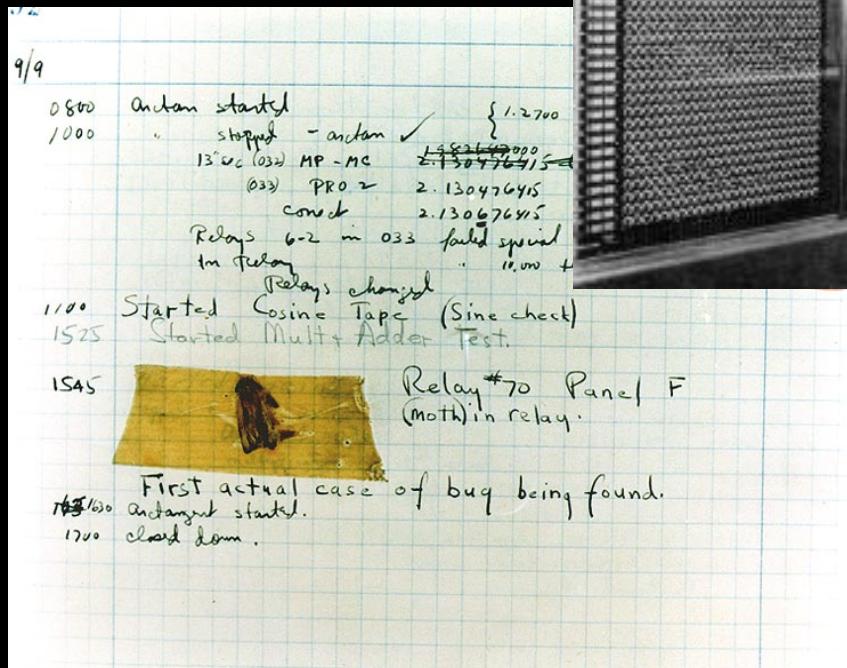


REQUIREMENTS & TESTING



TODAY

SPECIFYING SOFTWARE TESTING SOFTWARE PROJECT

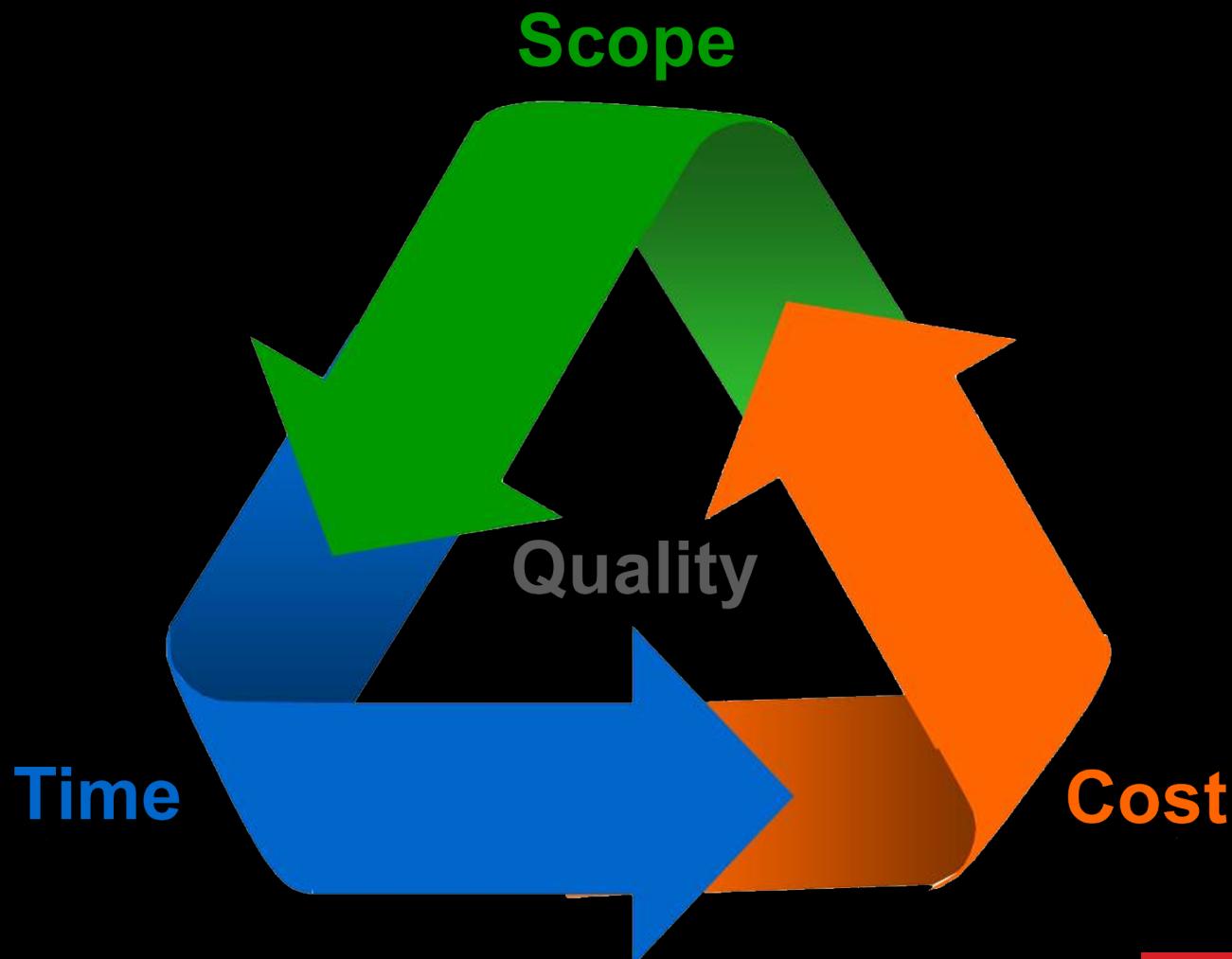
OTHER COURSES

TDA567 TESTING, DEBUGGING & VERIFICATION
DAT260 MODEL-BASED TESTING

TDA293 SOFTWARE ENGINEERING USING FORMAL
METHODS

DIT276 REQUIREMENTS ENGINEERING
TDA593 MODEL-DRIVEN SOFTWARE DEVELOPMENT

PROJECT MANAGEMENT



QUALITY ATTRIBUTES

- 1.FUNCTIONAL SUITABILITY
- 2.COMPATABILITY
- 3.PERFORMANCE EFFICIENCY
- 4.USABILITY
- 5.RELIABILITY
- 6.SECURITY
- 7.MAINTAINABILITY
- 8.PORTABILITY

ISO/IEC 25010

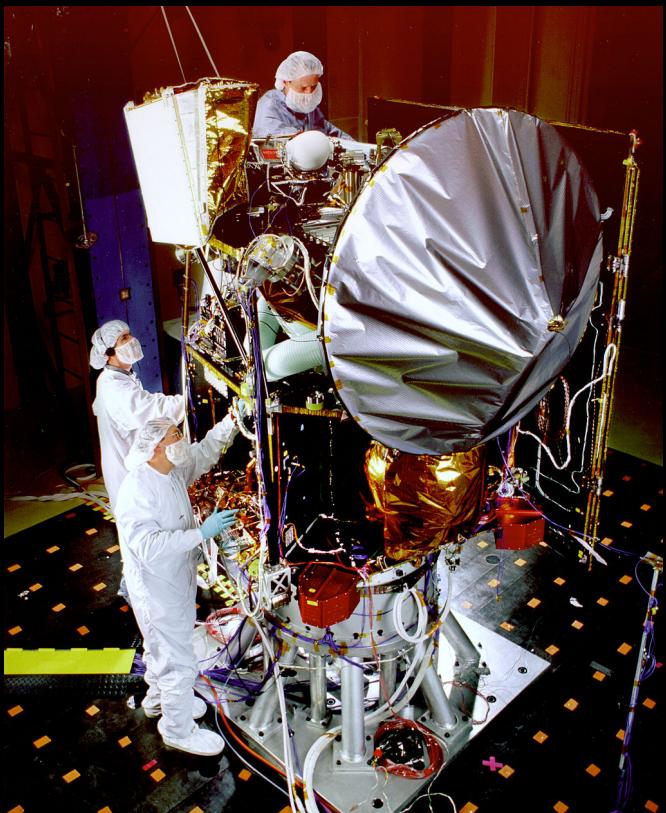
TESTING

VALIDATION

Are we building the
right software?

VERIFICATION

Are we building the
software right?



The Making of a Fly: The Genetics of Animal Design (Paperback)
by Peter A. Lawrence

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(125,891 total ratings)

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Google

TESTING IS NOT EASY

THE SPECIFICATIONS WILL CHANGE OVER TIME
IT'S IMPOSSIBLE TO COMPLETELY TEST A PROGRAM
TESTING CAN'T SHOW THAT A PROGRAM IS BUG-FREE
ALL FOUND BUGS CAN'T BE FIXED
DIFFICULT TO DECIDE IF IT'S A BUG OR NOT

WHAT IS THE COST OF BUGS?

NO REASON TO GIVE UP



PROVE IT
MODEL IT
TEST IT

PROVE IT



MODEL IT

TEST ON AN ABSTRACTION OF THE PROGRAM

WHAT HAS TO BE MODELLED?

WHAT CAN BE IGNORED?

WHAT IS ASSUMED?



TEST IT

STATIC

READ

INSPECT

DYNAMIC

BUILD

RUN

STATIC TESTING

LOOP CONDITIONS
ARRAY INDECES
VARIABLE INITIALISATION
ARGUMENT ORDER
NAMES

DYNAMIC TESTING

TEST-TO-PASS / TEST-TO-FAIL
WHITE / GREY / BLACK
AUTOMATIC / MANUAL

EXAMPLES



```
> java MyTest "1"  
> java MyTest "2"  
> java MyTest "3"  
> java MyTe|
```

SPECIFICATION & TESTING

VISION/USER STORIES ACCEPTANCE TEST

DESIGN SYSTEM TEST

INTEGRATION TEST

IMPLEMENTATION UNIT TEST

ACCEPTANCE TEST

USER EXPERIENCE

A / B TESTS

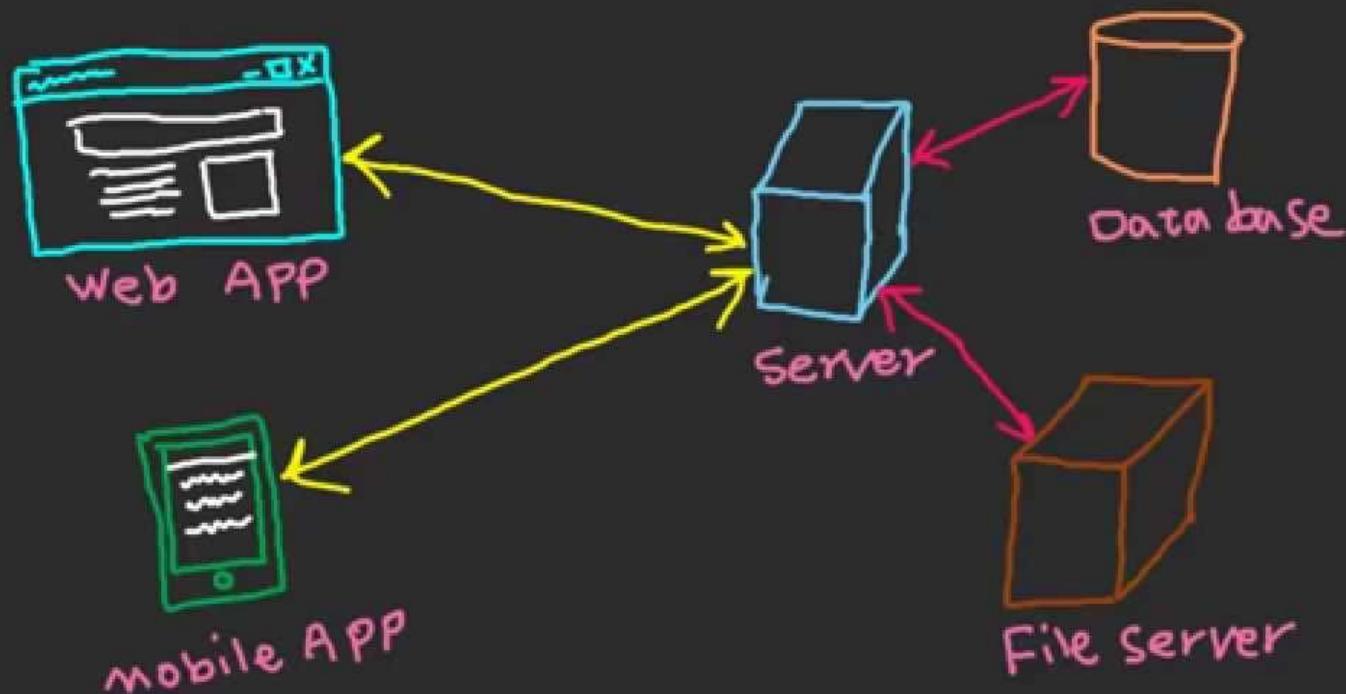
MULTI-VARIATE

BETA-RELEASE



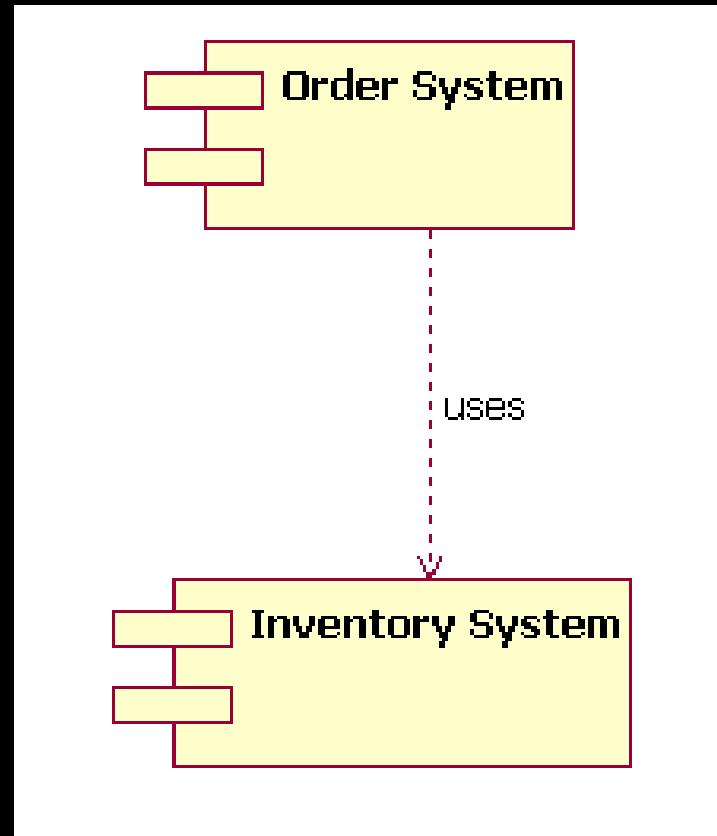
SYSTEM TEST

Front-End / Back-End



INTEGRATION TEST

GIVEN THAT ORDER
SYSTEM AND
INVENTORY SYSTEM
PERFORM AS
EXPECTED, WILL THEY
PERFORM AS
EXPECTED WHEN
INTEGRATED?



UNIT TEST

```
private static final String NUMBER_24 = "2 4 ENTER";
private static final String NUMBER_74 = "7 4 ENTER";
private static final String ADD_RESULT = "98";

public void testAddValues() {
    sendKeys(NUMBER_24);
    sendKeys(NUMBER_74);
    sendKeys("ENTER");

    String mathResult = result.getText().toString();
    assertTrue("The result should be 98",
               mathResult.equals(ADD_RESULT))
}
```

<http://code.tutsplus.com/tutorials/android-sdk-unit-testing-with-the-junit-testing-framework--mobile-421>

TEST COVERAGE

QUALITY ATTRIBUTES USING METRICS
LINES OF CODE EXECUTED
EXHAUSTING ALL POSSIBILITIES
CORNER TESTING

CORNER TESTING

WHICH ARE THE CORNERS TO TEST?



REGRESSION TESTING

SUITABLE FOR EVOLVING PROJECTS

EVERYTIME YOU FIX A BUG
YOU RUN THE TEST SUITE
TO MAKE SURE THAT
NOTHING IS BROKEN

TEST-DRIVEN DEVELOPMENT

ADD A NEW TEST
RUN ALL TESTS
ADD SOME CODE
RUN ALL TESTS
REFACTOR

POSSIBLE DELIVERABLES

USER EXPERIENCE ACCEPTANCE TEST

IMPLEMENTATION SYSTEM TEST
 INTEGRATION TEST
 UNIT TEST

PROCESS WHEN?
 WHO?

WHAT'S NEXT?

SEPT. 18-19:

CONCEPT GENERATION FACTORY

SEPT. 24, 28 & 30:

WORKSHOPS

DEADLINE SEPT. 19 @ 13:00

SEPT. 28 & 30: SUPERVISION

SEPT. 21:

CYBERCOM EXPLAINS THE API

GIT / ANDROID

SEPT. 23:

DESIGN AND IMPLEMENTATION

A FEW TIPS

MERGE-MERGE-MERGE
CHALLENGE YOUR ASSUMPTIONS
SELF-ORGANISATION & RESPONSIBILITY
THE JURY ≠ THE EXAMINER

QUESTIONS?

- DATABASES
- VISION
- BUILD PROCESS
- ...

'Questions don't have to make sense, Vincent', said Miss Susan.

'But answers do'

Terry Pratchett

Thief of Time, 2001