

SOFTWARE PROJECT MANAGEMENT

9/9

0800 Antam started
1000 " stopped - antam ✓ { 1.2700
13° v6 (032) MP - MC 1.982167000
033 PRO 2 2.130476915
conv 2.130676915
Relays 6-2 in 033 failed special
tm relay " 11.00 +
(Relay) changed
1100 Started Cosine Tape (Sine check)
1525 Started Multi Adder Test.

1545 Relay #70 Panel F
(moth) in relay.

First actual case of bug being found.
1600 Antam started.
1700 closed down.



TODAY

SPECIFYING SOFTWARE TESTING SOFTWARE PROJECT

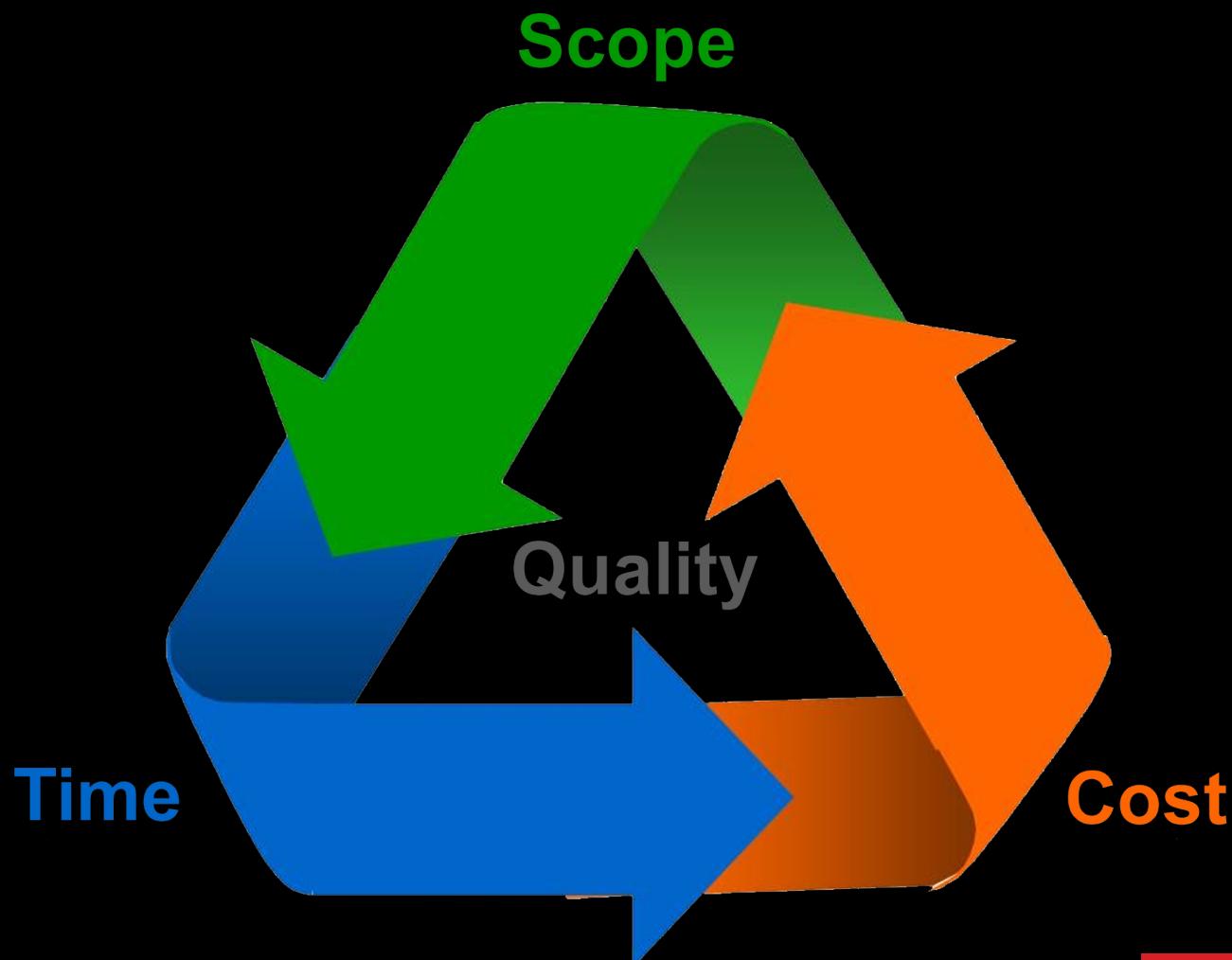
OTHER COURSES

TDA567 TESTING, DEBUGGING & VERIFICATION
DAT260 MODEL-BASED TESTING

TDA293 SOFTWARE ENGINEERING USING FORMAL
METHODS

DIT276 REQUIREMENTS ENGINEERING
TDA593 MODEL-DRIVEN SOFTWARE DEVELOPMENT

PROJECT MANAGEMENT



SCOPE

Quantity

functions

views

LOC

...

Quality

QUALITY ATTRIBUTES

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

ISO/IEC 25010:2011

ISO/IEC 25010

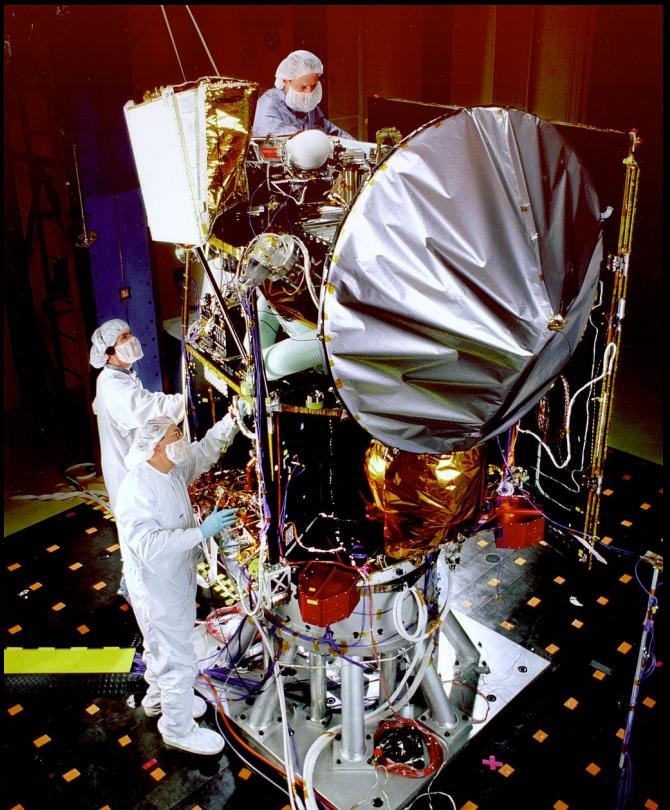
TESTING

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)

[◀ Return to product information](#)

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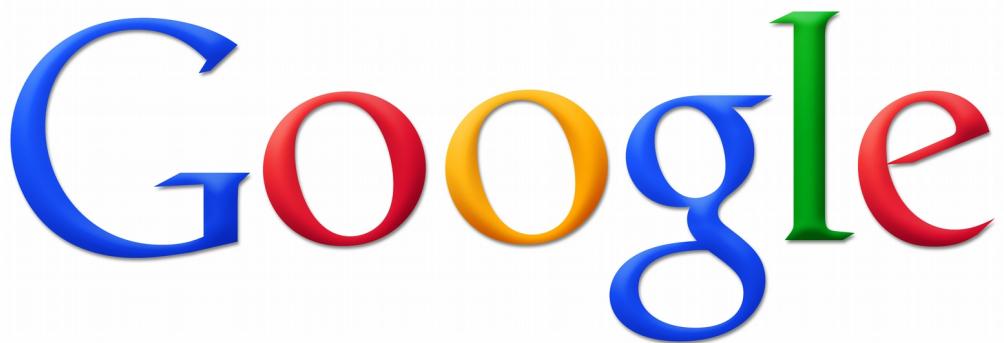
All New (2 from \$1,730,045.91) Used (15 from \$35.54)
Show New Prime offers only (0)

New 1-2 of 2 offers

Price + Shipping	Condition	Seller Information
\$1,730,045.91 +\$3.99 shipping	New	Seller: profnath Seller Rating: ★★★★☆ 93% positive (8,193 total ratings) In Stock. Ships from NJ, United States. Domestic shipping rates and return policy . Brand new, Perfect condition, Satisfaction G

\$2,198,177.95 +\$3.99 shipping	New
---	-----

Seller: borddeebook Seller Rating: ★★★★☆ 93% positive (125,891 total ratings) In Stock. Ships from United States. Domestic shipping rates and return policy . New item in excellent condition. Not used. May be an overstock or have slight shelf wear. Satisfaction G
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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

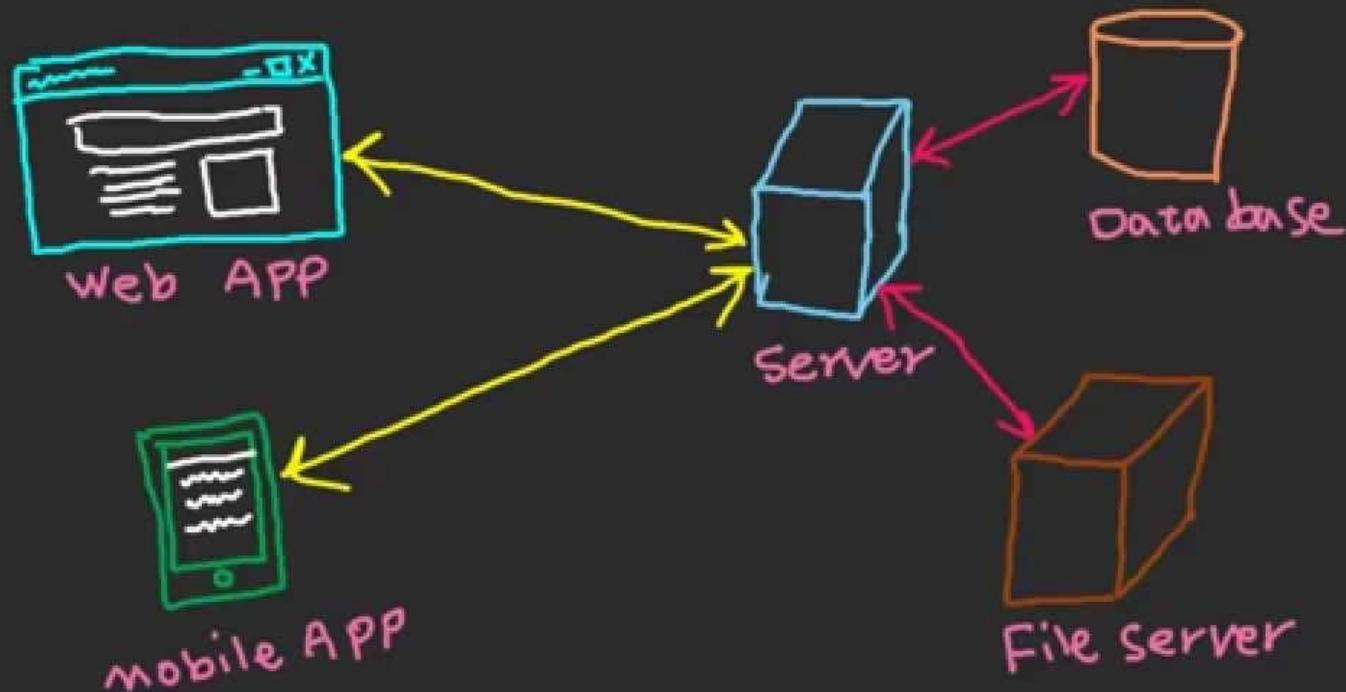
ACCEPTANCE TEST

USER EXPERIENCE
A / B TESTS
MULTI-VARIATE
BETA-RELEASE



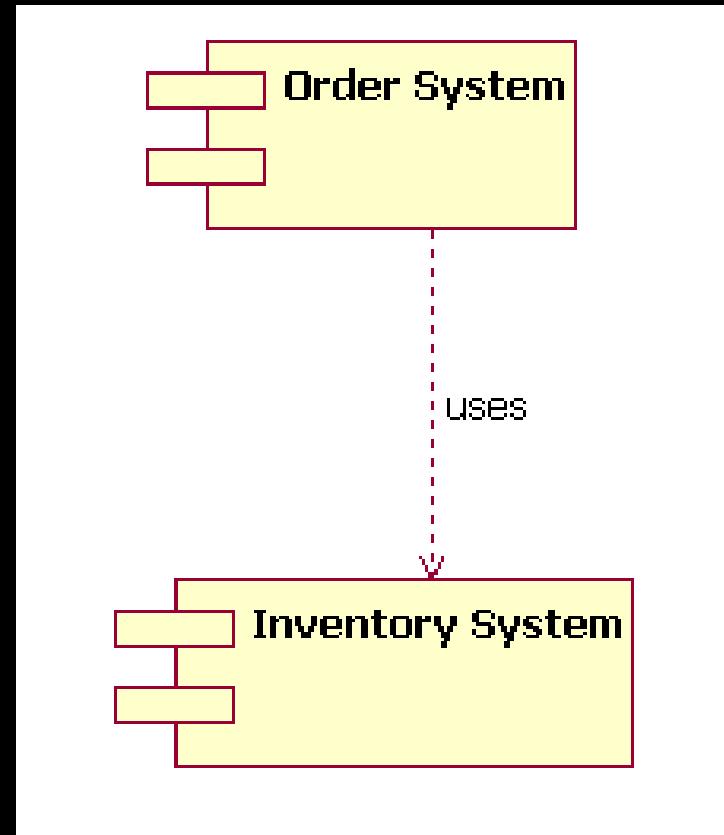
SYSTEM TEST

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

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?

APR 20th 13.00 – 15.00:
TOOL SUPERVISION
VASA 4

APR 22nd 13.00 – 15.00:
TOOL & PROCESS SUPERVISION
VASA C

UPCOMING:
APR 25th: VCC
APR 27th: ENTREPRENEURSHIP
APR 29th: HMI
MAY 2nd: SUPERVISION

APR 22nd 13.00 – **16**.00:
Busify
MajorHackers
BestNameEver
Outsourcify
ButAnswersDo
MooseCrunchers
Team Agil
Burden's burden
Crisp IT

REMEMBER

MERGE-MERGE-MERGE
CHALLENGE YOUR ASSUMPTIONS
SELF-ORGANISATION & RESPONSIBILITY
NO CONTEST / NO PRODUCTS

QUESTIONS?

- DATABASES
- BACKLOGS
- CONTACTS
- ...

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

'But answers do'

Terry Pratchett

Thief of Time, 2001