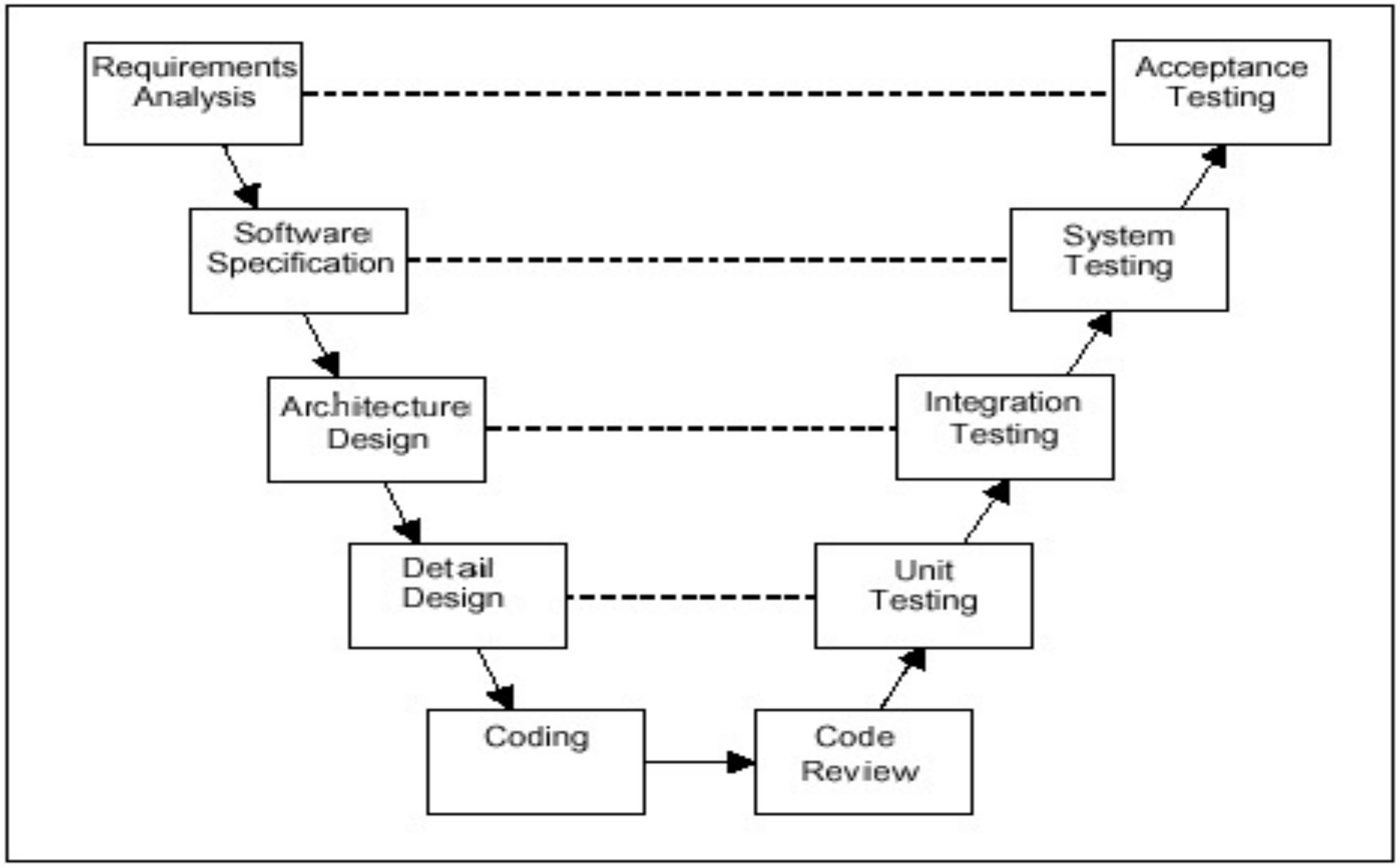
Introduction to Unit Test

Contents

What is UniTest

- "Unit testing" refers to testing software code at the smallest testable unit (method or function) and base on detail design
- Exception testing
  - Range of feasible input
- Functional testing
  - Conform to specification
  - Black Box Testing
  - White Box testing
- Regression testing
  - Conducted after a change
  - To find new fault

When do Unit Test



Why do Unit Test

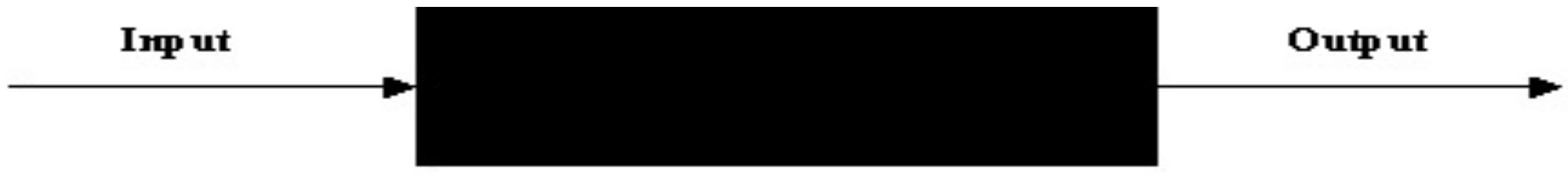
- Ensure quality of software unit
- Detect defects and issues early
- Reduce the Quality Effort & Correction Cost

Unit Test - Methodologies

To implement 1 software testing, we use both:

- Black box Test
- White box Test

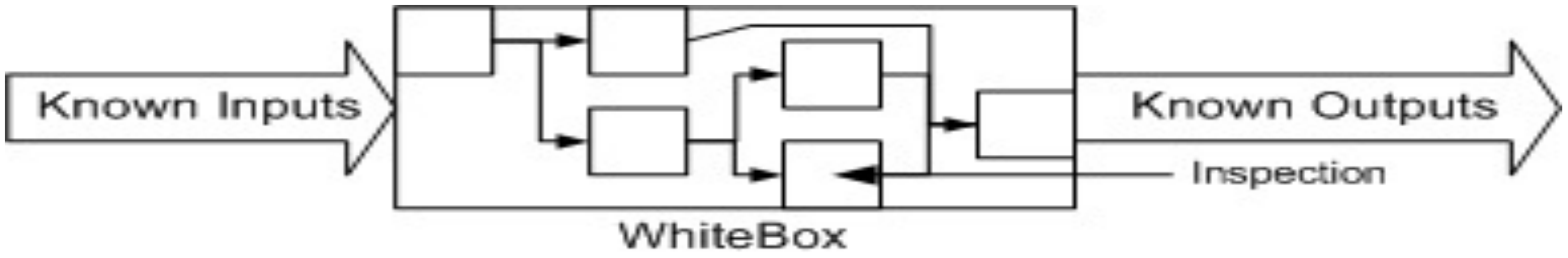
Back box testing



A Simple Black box Specification

- Based on external behavior of the unit tested
- Specification based testing
- Strategies
  - Equivalence partitioning
  - Boundary-value analysis
  - Combination strategy

White box testing (1)



- Based on internal behavior of unit
- Code coverage based testing
- Criteria
  - Statement coverage
  - Decision coverage
  - Path coverage

White box testing (2)

- int Func(int a,int b)

```
1 {
  2 if (a > 0)
    3 if( b > 0)
        4 return(a+b);
      else
        5 return(a-b);
  else
    6 return 0;
}
```

$$\begin{tikzcd}
 & & 1 \arrow[d] & & \\
 & & 2 \arrow[dl] \arrow[dr] & & \\
 & 6 & & 3 \arrow[dl] \arrow[dr] & \\
 & & 4 & & 5
\end{tikzcd}$$

6 tatements: 1,2,3,4,5,6
4 decisions(branchs):2→6, 2→3, 3→4, 3→5
3 paths: 1 – 2 – 6, 1 – 2 – 3 – 4,1 – 2 – 3 – 5
Ex:Test case: a =1, b = 1 has TC = 4/6, DC = 1/3, PC = 2/4

Cunit Framework

- Cunit is used to test C code *units*
- Using Steps:
  - ✓ Write functions for tests
  - ✓ Initialize the test registry
  - ✓ Add suites to the test registry
  - ✓ Add tests to the suites
  - ✓ Run tests using an appropriate interface
  - ✓ Cleanup the test registry

CPPUnit Framework

- Used to test C/C++ code units
- Using Steps
  - Create your class
  - Create your new testing class deriving from TestFixture class
  - Create the event manager and test controller
  - Add a listener that colllects test result
  - Add a listener that print dots as test run
  - Add the top suite to the test runner
  - Print test in a compiler compatible format

Parasoft C++ test

- Give automated – creating test case testing for C/C++ units (functions, methods)
- Source Unit testing
- Native Unit testing
- Test case Results
- Stub configuration

Thank you

Q&A