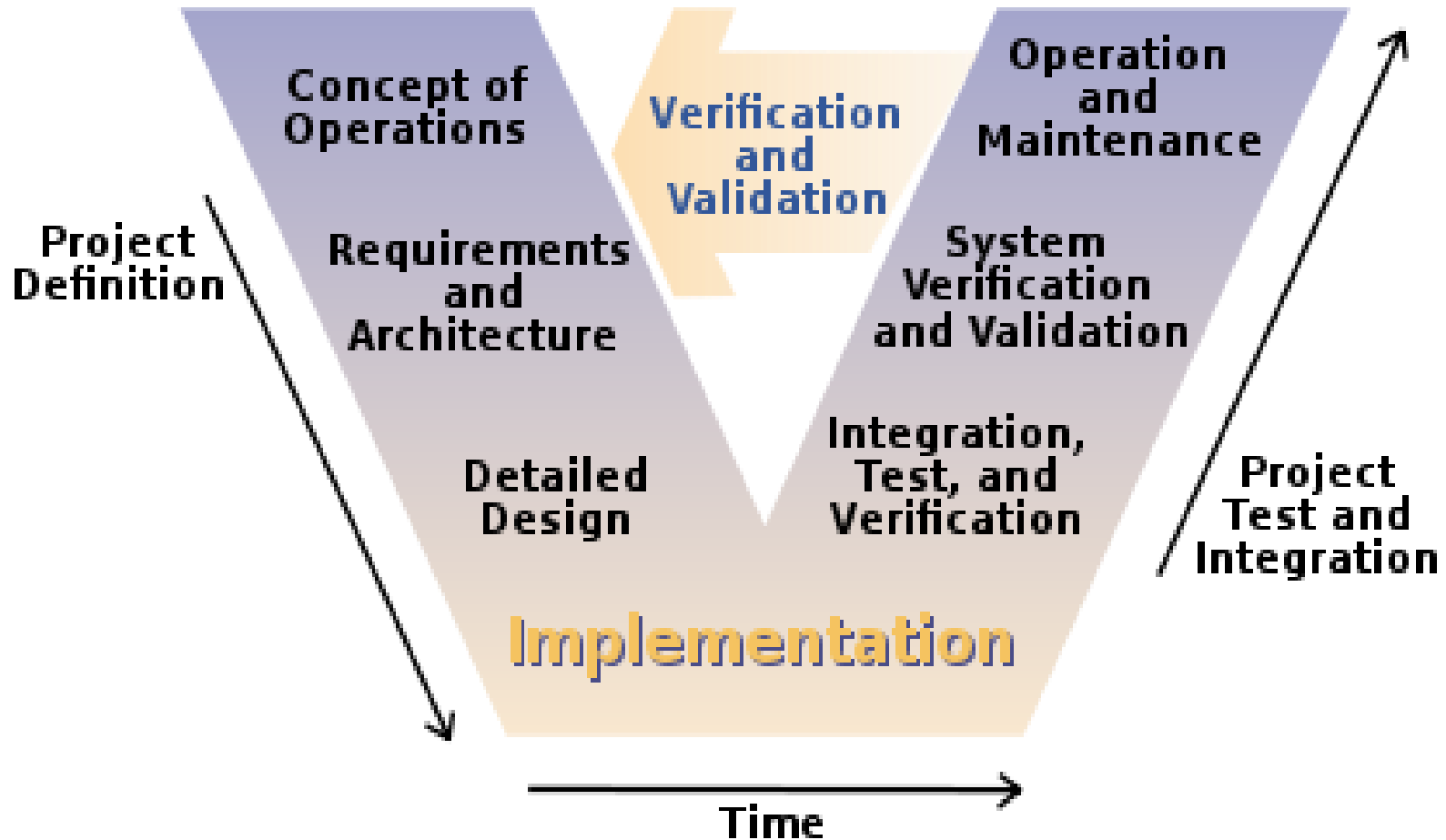
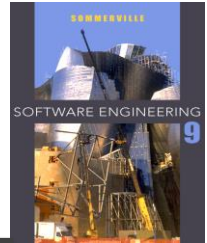
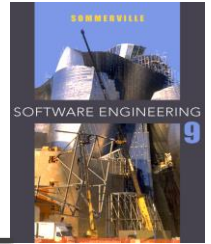


Software Testing

V model



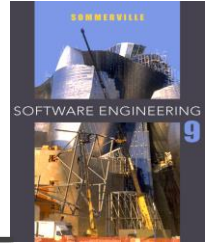
Program testing goals



- ✧ To demonstrate to the developer and the customer that the software **meets its requirements**.
=> leads to **validation testing**

- ✧ To discover situations in which the behavior of the software is incorrect, undesirable or does **not conform to its specification**.
=> leads to **defect testing**

Verification vs validation



✧ **Verification:** (testing)

"Are we building the product right".

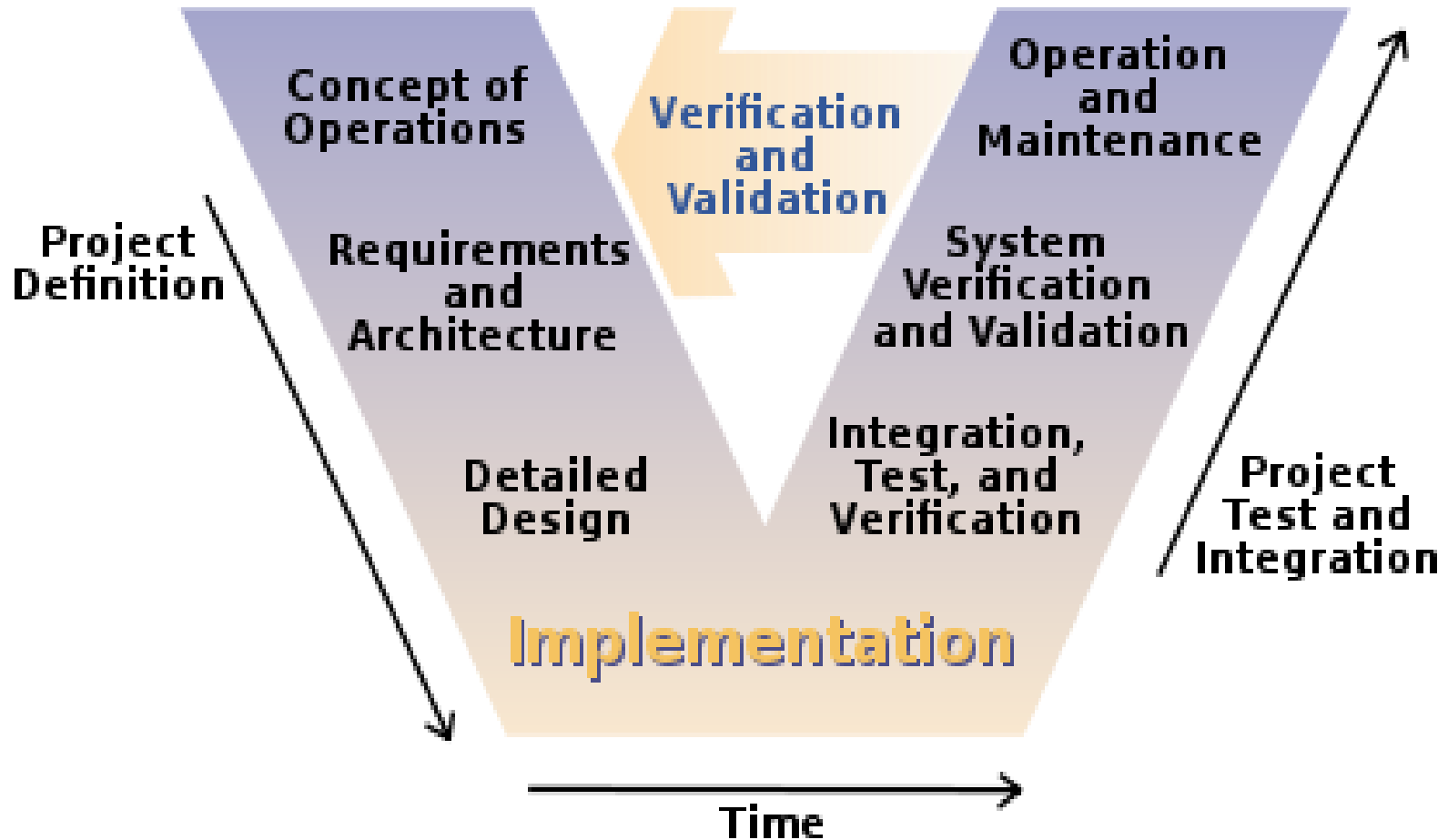
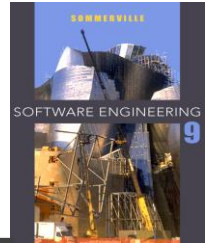
- The software should conform to its specification.

✧ **Validation:** (checking)

"Are we building the right product".

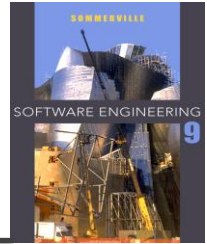
- The software should do what the user really requires.

V model



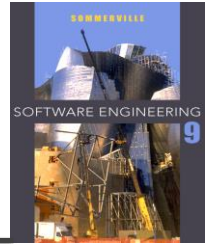
Different levels of testing

related to the V-model



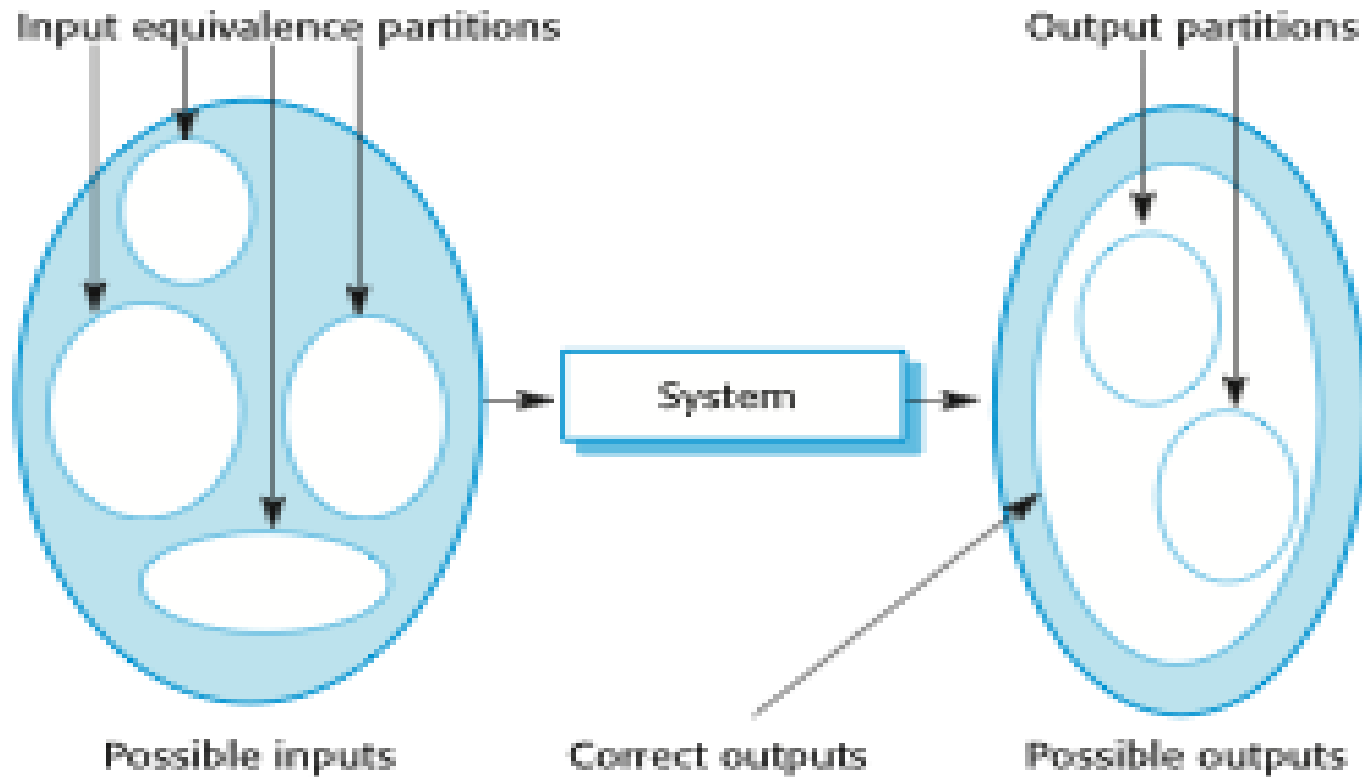
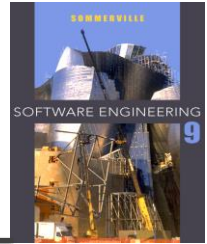
- ✧ Verify the concepts and requirements
e.g. Are the domain model right? The use cases? (the users)
- ✧ Verify the design
e.g. design class diagrams and design sequence diagrams
(Reviews, Technical walkthrough by the project team)
- ✧ Component Validation
e.g. **unit test** and test cases (implementer)
- ✧ System and integration validation
e.g. system/integration test
- ✧ Operation Validation
e.g. acceptance test

Black box testing

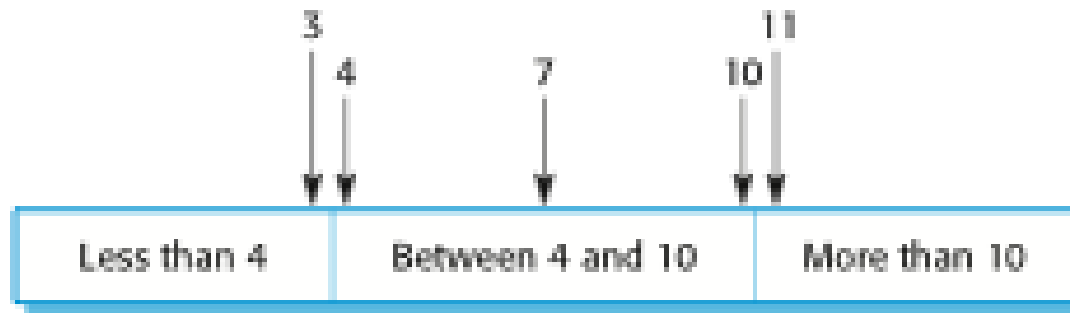
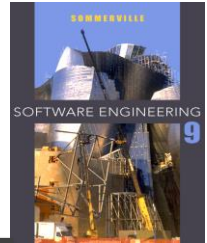


- ✧ The system code is 'unknown' -> a black box
- ✧ Look only at the methods signatures
- ✧ **Testing all kind of possible input and output**
- ✧ In C# create a Unit Test

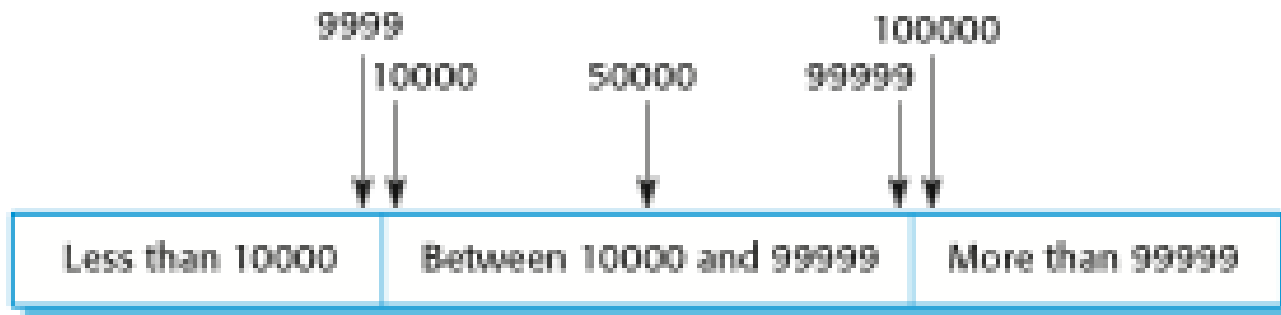
Equivalence partitioning



Equivalence partitions

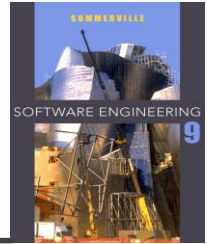


Number of input values



Input values

Unit test in c#



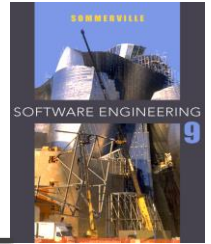
✧ Console Programs

- Create a test unit project,
- Add reference to the project,
- Remember to have the class to be tested **public**.
(in resharper set cursor at the class – right click choose generate unit test)
- Make a test method for each test case

✧ App Programs

- Create a unit test app (universal windows),
- Add reference to the project,
- Remember to have the class to be tested **public**.
(in resharper set cursor at the class – right click choose generate unit test)
- Make a test method for each test case

What can we do in in a test unit



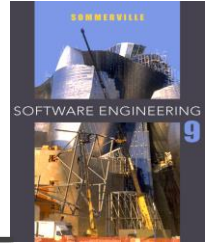
✧ Annotations

- ✧ [TestClass] : set up the test
- ✧ [TestMethod] : This is a test method to be run
- ✧ [TestInitialize] : Run this before each test method

✧ Testing validation

- ✧ Assert.AreEqual(expected, actual)
- ✧ Assert.IsTrue(actual)

Special for exception



✧ Console programs

- Make try – catch : NB! The catch is ok = green

- Try{

```
    Call method;
    Assert.Fail();
Catch{
    //Ok
}
```

- Alternative make an annotation
[ExpectedException typeof (xxxException)]

✧ App programs

- Assert.ThrowsException<xxxException>(() => call method)