Chapter 2 Black-box testing

Part 1

1. black-box testing:

定义：testing based on a <mark>specification</mark>   —— **规格：告诉你input应该输什么，output会得到什么，来指导你测试**

2. Advantages of Black-box Testing

You don't need to know how it is implemented

☐ You can plan tests earlier   更早计划测试
☐ You can write tests earlier 更早写测试
☐ You do not need to be the person who implements the code   测试和开发不是一个人
☐ When the implementation changes, the tests should still work 实现方式改变不影响测试

3. Equivalence Partitioning

Input data and output results often fall into different classes, where all members of the class are related.

每个类中的东西是一个类别的

Range of a value

1、Valid equivalence classes

   正确输入的class，比如年龄在0到150之间

2、Invalid equivalence classes

   错误输入的class，比如年龄 < 0或 > 150

测试时正确class和错误class都要进行测试

4. summary

Definition of Black Box Testing

- Testing, based on the specification

Advantages of Black Box testing

Equivalence Partitioning as a technique to decide on tests values

- Valid and invalid equivalence classes

Approach to developing test cases based on equivalence partitioning

1、黑盒测试的定义（见上面）

2、黑盒测试的优点（见上面）

3、Equvalence Partition（见上面）

4、如何进行Equvalence Partition：可以用input或output来分类

Part 2

1. Weak, Normal, Strong, Robust?

  1. weak：考虑1个fault
  2. strong：考虑多个fault，可以在不同的类别中分别选一个然后一起测试（不太懂……）
  3. normal：valid
  4. robust：invalid

2. 三角形问题

- Isoscele：等腰
- Equilateral：等边
- Scalene：非等腰

  1. 用output分类：

Test Case	a	b	c	Expected Output
TC1	(0.0, 0.0)	(0.0, 5.0)	(5.0, 2.5)	Isosceles
TC2	(0.0, 0.0)	(5.0, 0.0)	(2.5, 4.33)	Equilateral
TC3	(0.0, 0.0)	(0.0, 5.0)	(5.5, 5.5)	Scalene
TC4	(0.0, 0.0)	(5.0, 5.0)	(10.0,10.0)	Not a triangle
TC5	(999.9,0.0)	(0.0, 5.0)	(5.0, 2.5)	Out of range

TC1~TC4 是 weak-normal

TC5是weak-robust

2. 用input分类：（更复杂了）

$$ab = ac = bc$$
$$ab = ac; ab \neq bc$$
$$ab = bc; ab \neq bc$$
$$bc = ac; ab \neq bc$$
$$ab \neq ac; ab \neq ac; ab \neq bc$$
$$ab \leq ac + bc$$
$$ac \leq ab + bc$$
$$cb \leq ab + ac$$

3. 边界值分析（Boundary Value Analysis）

1. Boundary Value Analysis focuses on the boundary of the inputs for the test cases.

   边界值关注于input的边界值

   为什么要关注边界值：因为 errors do occur near the extreme values of an input variable.

2. 边界值取法：

For any input variable, create tests cases with values that are:
- At the minimum (min)
- Just above the minimum (min + 1)
- At a nominal value
- Just below the maximum (max − 1)
- At the maximum (max)

3. Boundary Value Analysis works well when the variables are independent and represent bounded physical quantities.

边界值适用于那些独立的变量，并且这些变量还存在物理的数值边界

4. 三角形例子

We will use the same Triangle example:
- Six inputs: (Xa, Ya), (Xb, Yb) and (Xc, Yc)
- $1 <= Xa <= 200$ $1 <= Ya <= 200$
- $1 <= Xb <= 200$ $1 <= Yb <= 200$
- $1 <= Xc <= 200$ $1 <= Yc <= 200$

What boundary values could we select for Xa?

Xa = 1, 2, 100, 199, 200

4. summary

Summary

- What is black-box testing?

- Techniques to help specify test cases based on the specification

- The use of Equivalence Partitions

- The use of Boundary Value Analysis

1、testing based on a specification.

2、Equvalence Partition，Boundary Value Analysis.