SOFT410911: Software Quality Assurance 2022-Fall
Homework-**5** Solutions

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Honor Code: I promise that I finished the homework solutions on my own without copying other people's work.

White-box Testing

1. Code

I chose password circumstance of the case used in previous homework solution, QQ register, and wrote a piece of pseudo codes to simulate whether input is proper or not.

Listing 1: pseudo code for password style check

```
/*
 * A piece of pseudo code for password input correctness checking.
 */
boolean a = b = c = false;
if(input.Contain(' ')) a = false;
else a = true;
if(input.length >= 8 && input.length <= 16) b = true;
else a = false;
if(input.Secure()) c = true;
else c = false;
// Print messages about whether code is proper and why.
PrintMessage(a, b, c);
```

2. Code Analysis

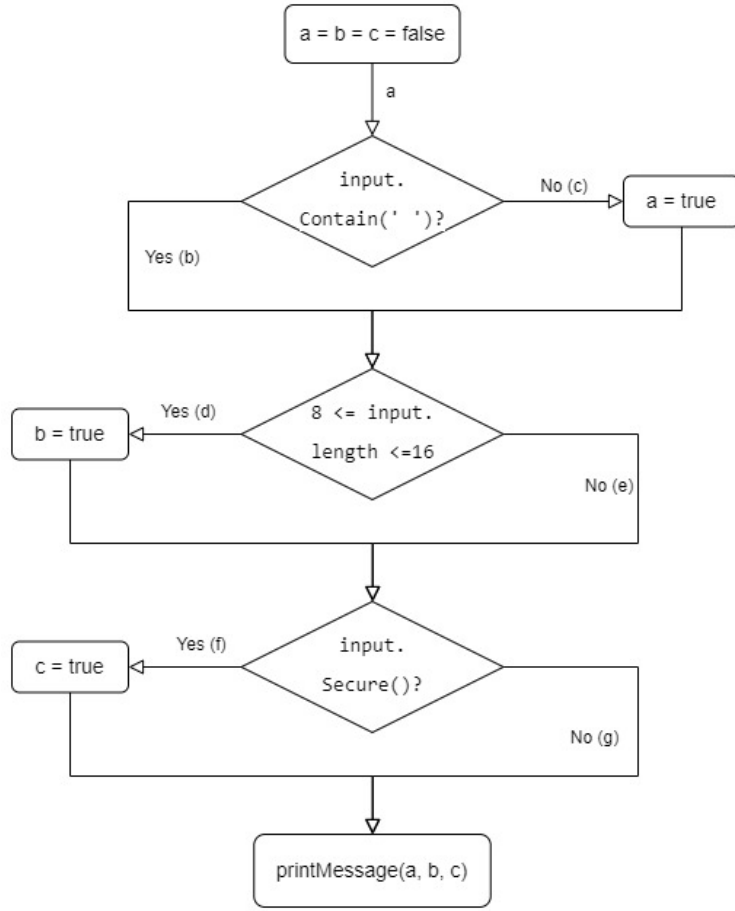After analyze the logic of code above, we can draw a flowchart as below.

图 1: flowchart

There are 13 paths in total.

3. Concrete Test Cases

To simply description, we give conditional judgments short names as below.

Judgement	Short name	Condition	Short name
input.Contain(' ')?	P1	input.Contain(' ') ?	C1
judge.length	P2	judge.length >= 8 ?	C2
		judge.length <= 16 ?	C3
input.Secure()	P3	judge.Secure() ?	C4

3.1 Statement coverage

Input	C1	C2	C3	C4	P1	P2	P3	Path
12wer?789					F	T	T	a→c→d→f

表 1: Statement Coverage Case

3.2 Branch coverage

Input	C1	C2	C3	C4	P1	P2	P3	Path
12wer?789					F	T	T	a→c→d→f
1 2					T	F	F	a→b→e→g

表 2: Branch Coverage Cases

3.3 Condition coverage

Input	C1	C2	C3	C4	P1	P2	P3	Path
12wer?789	F	T	T	T				a→c→d→f
1 2	T	F	T	F				a→b→e→g
123abc456def789efg	F	T	F	T				a→c→e→f

表 3: Condition Coverage Cases

3.4 Decision-Condition coverage

Input	C1	C2	C3	C4	P1	P2	P3	Path
12wer?789	F	T	T	T	F	T	T	a→c→d→f
1 2	T	F	T	F	T	F	F	a→b→e→g
123abc456def789efg	F	T	F	T	F	F	T	a→c→e→f

表 4: Decision-Condition Coverage Cases

3.5 Condition combinatorial coverage

Input	C1	C2	C3	C4	P1	P2	P3	Path
eq213 456	T	T	T	T				a→b→d→f
12345 456	T	T	T	F				a→b→d→g
qwbw1098 89asbb?-	T	T	F	T				a→b→e→f
00000000 000000000	T	T	F	F				a→b→e→g
@1 q?	T	F	T	T				a→b→e→f
1 2	T	F	T	F				a→b→e→g
12wer?789	F	T	T	T				a→c→d→f
12345678	F	T	T	F				a→c→d→g
123abc456def789efg	F	T	F	T				a→c→e→f
0000000000000000	F	T	F	F				a→c→e→g
@1q?Q2	F	F	T	T				a→c→e→f
000000	F	F	T	F				a→c→e→g

表 5: Condition Combinatorial Coverage Cases

3.6 Path coverage

Input	C1	C2	C3	C4	P1	P2	P3	Path
eq213 456					T	T	T	a→b→d→f
12345 456					T	T	F	a→b→d→g
qwbw1098 89asbb?-					T	F	T	a→b→e→f
00000000 000000000					T	F	F	a→b→e→g
12wer?789					F	T	T	a→c→d→f
12345678					F	T	F	a→c→d→g
123abc456def789efg					F	F	T	a→c→e→f
0000000000000000					F	F	F	a→c→e→g

表 6: Path Coverage Cases

4. Summary

It's easy to realize that the Condition Combinatorial Coverage Cases can cover other tests, which leads to his huge amount of tets cases. Other coverage may have less cases, but they always

neglect some likelihood. In real world, we have to trade off between amount of cases and coverage percentage.

Other things

LaTeX code refer to these things and was complied on texlive2020 by `xelatex`.

- UCB-CS70's given homework template.

- A free website useful to edit LaTeX table code.

The purpose of writing in English is to adapt to bilingual teaching and to improve my poor English writing skills in preparation for a possible future exchange program.

Thanks for your correcting and grading :).