Beijing Jiaotong University

2021—2022 School Year Second Semester Exam (A)

Course Name: <u>Software Quality Assurance and Testing Techniques</u>

Teacher: <u>Xiaoping Che, Haiming Liu, Haonan Tong</u>　　Major:_____

Class:_____　　　　Name:_____　　　　Student ID:_____

No.	1	2	3	Total Score
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Part 1. Black Box Testing and Test cases Design. (5*6=30 marks)

If you take the train before 9:30 AM or in the afternoon after 4:00 PM until 7:30 PM ('rush hour') you must pay full fare. A saver ticket is available for trains between 9:30 AM and 4:00 PM, and after 9:30 PM.

Q1: What are the partitions and boundary values to test the train times for this ticket types?

Q2: Which are valid partitions and which are invalid partitions?

Q3: What are the boundary values? (A table may be useful)

Q4: Design test cases for the partitions and boundaries.

Q5: Do you have any questions about this 'requirement'? Is anything unclear?

Q4 take train time   excepted Outcomes
         0:00
         0:01   full fare
         9:00
         9:29
    _____
         9:30
         9:31   saver ticket
        13:00
        15:59
        16:00
    _____
        16:01
        21:00   full fare
        21:29
        21:30
    _____
        21:31
        23:00   saver ticket
        23:58
        23:59

Q5 full fare before 9:30A.M.
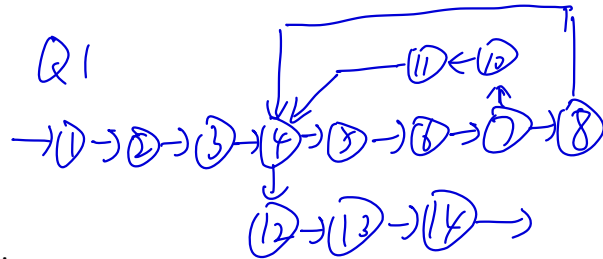 and saver ticket after 9:30P.M. 会重复在怎么划分

Part 2. White Box Testing and Test cases Design. (20*2=40 marks)

Now we have two code written by some programmers which are shown below, please provide the Control Flow Testing process of each code, including **Control Flow Graph, Cyclomatic complexity and Basis Set. And you can report the bugs if you find any.**

Q1:

```
1    int main() {
2        int i;
3        double number, sum = 0.0;
4        for (i = 1; i <= 10; ++i) {
5            printf("Enter a n%d: ", i);
6            scanf("%lf", &number);
7            if (number < 0.0) {
8                continue;
9            }
10           sum += number;
11       }
12       printf("Sum = %.2lf", sum);
13       return 0;
14   }
```

[Handwritten notes to the right:]

Q1

Control flow graph: →①→②→③→④→⑤→⑥→⑦→⑧, ④→⑫→⑬→⑭→, ⑦→⑪←⑩

Cyclomatic complexity = 3

Basic Set:
1. ①→②→③→④→⑫→⑬→⑭
2. ①→②→③→④→⑤→⑥→⑦→⑩→⑪→④
3. ①→②→③→④→⑤→⑥→⑦→⑧
④→⑫→⑬→⑭

bugs: 6 行输出符号

Q2:

```
1    public static void main(String[] args) {
2                File f = new File("ciaFactBook2008.txt");
3                Scanner sc;
4                sc = new Scanner(f);
5                Map<String,Integer>wordCount=newTreeMap<String,Integer>();
6                while(sc.hasNext()) {
7                    String word = sc.next();
8                    if(!wordCount.containsKey(word))
9                        wordCount.put(word, 1);
10                   else
11                       wordCount.put(word, wordCount.get(word) + 1);
12               }
13               for(String word : wordCount.keySet())
14                   System.out.println(word + " " + wordCount.get(word));
15               System.out.println(wordCount.size());
16           }
```
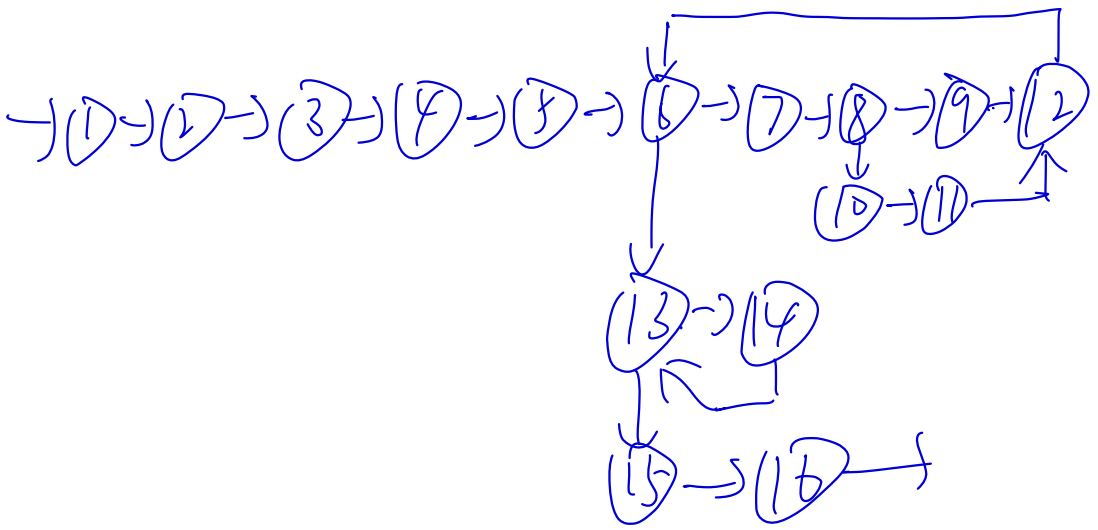
Cyclomatic complexity : 4

Basic Set:

1, 2, 3, 4, 5, 6, 13, 15, 16

1, 2, 3, 4, 5, 6, 13, 14, 13, 15, 16

1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 6, 13, 14, 16

1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 6, 13, 15, 16

bugs: 文件读取失败，阶以77-8以内缩容？

Part 3. Understanding of Testing. (5*6=30 marks)

Q1: Please put the test cases that implement the following test conditions into **the best order** for the test execution schedule and **explain why**, for a test that is checking modifications of customers on a database.

1) Print modified customer record
2) Change customer address: House number and street name
3) Capture and print the on-screen error message
4) Change customer address: Postal code
5) Confirm existing customer is on the database by opening that record
6) Close the customer record and close the database
7) Try to add a new customer with no details at all

5, 2, 4, 1, 7, 3, 6

Q2: Why are **both behavioral testing** (specification-based testing) and **structural testing** (structure-based testing) techniques useful?

1) 为测试输入与输出是否符合预期 结构测试代码结构的

Q3: What are the key characteristics of **structural testing** (structure-based testing) techniques?

white box testing, code coverage, defect-based, Test Case design

Q4: What are the differences of **Unit Testing, Integration Testing, System Testing,** and **Acceptance Testing**?

Q5: What are the differences of **Software Quality Assurance** and **Software Quality Control**?