



Sri Lanka Institute of Information Technology

**B. Sc. Special Honours Degree  
in  
Information Technology**

**Final Examination  
Year 3, Semester I (2017)**

**Software Engineering Process & Quality  
Management (SE 3010)**

**Duration: 2 Hours**

**Instruction to Candidates:**

- This paper has **four** questions. Answer all questions.
- Total marks 100.
- This paper contains **four** pages excluding the cover page.

**Question 1:****(Total Marks 25)**

Refer the following code and answer the given questions.

```
/*This method returns the index of last occurrence of the
maximum value in the given array. It expects an array having
atleast 5 elements. If that condition fails, it returns -1.
Eg: if numbers=[1,2,5,3,5,2], it should return 4.
*/

public static int getMaxValueIndex(int[] numbers){ //NODE 1
    if (numbers.length<5) //NODE 1
        return -1; //NODE 2

    int maxValue = numbers[numbers.length-1]; //NODE 3
    int indx = numbers.length-1; //NODE 3
    for(int i= numbers.length-2;i>=0;i--){ //NODE 3
        if(numbers[i] >= maxValue){ //NODE 4
            maxValue = numbers[i]; //NODE 5
            indx = i; //NODE 5
        }
    }
    return indx; //NODE 6
}
```

- a. **“Faults do not result in Failures always.”** Justify above statement explain the conditions to satisfy for a Failure to occur. (4 marks)
- b. Identify the **fault** in above given code fragment. (2 marks)
- c. Identify a Test Case, (6 marks)
  - a. That doesn't execute the faulty statement.
  - b. That executes the fault but doesn't result in Infection.
  - c. That result in Infection, but not propagated.
  - d. That reveals a Failure.

**Part B**

- a. Draw the Control Flow Graph, label the nodes accordingly. (5 marks)
- b. Identify the Test Requirement Set and Test Set for 100%, (4 marks)
  - i. Edge Coverage
  - ii. Edge Pair Coverage

**Part C**

- a. Briefly explain the role of Developer and Test Engineers in the context of delivering good quality system to customers. (4 marks)

**Question 2:****(Total Marks 25)****Part A**

- a. Briefly explain **three** documents referred by the Test Engineers in test execution process as per to the **IEEE 829** Test Document series. (6 marks)
- b. **Though the test execution happens after implementation starts, tests can be designed in advance.** Identify the checkpoints that tests can be designed for Unit, Component and System Testing. (4 marks)
- c. Differentiate **Verification Vs. Validation** along with relevant testing levels used for each. (2 marks)
- d. Briefly explain the use of following V-Models using appropriate diagrams.
  - a. Testers Single V Model
  - b. Testers Double V Model(4 marks)
- e. Differentiate **Alpha Testing Vs Beta Testing**. (2 marks)

**Part B**

Refer the following code and answer the given questions.

```
BEGIN //NODE 1
  Input (x,y) //NODE 1
  Do { //NODE 2
    x = x+y; //NODE 3
    Input (y) //NODE 3
  }While (y>0) //NODE 4
  Print (x,y) //NODE 5
END //NODE 5
```

- a. Draw the Control Flow Graph and mark the Definitions and Uses of variable x. (3 marks)
- b. Identify the Test Sets for 100% All Defs (x) Coverage & All Uses (x) Coverage. (4 marks)

**Question 3:****(Total Marks 25)**

You are appointed as a project manager to develop site to online book and reserve hotels, motels, guest houses, properties, villas, apartments or rooms. Following are the key features users will have

1. To be able to register
2. To be able to easily reserve a place
3. To get a good idea of the place being reserved such as where it is located, pictures of the location and the rooms, services being offered etc.
4. View his/her own bookings
5. Reserve and pay by credit card on locations that require a reservation fee or advance payment
6. To be able to cancel a booking
7. To be able to get more details of the place being visited
8. Travel guides
9. A dashboard
10. Visitor reviews and ratings of the properties
11. A potential seller should be able to list his/her property with the site and site should be able to charge a commission from the seller

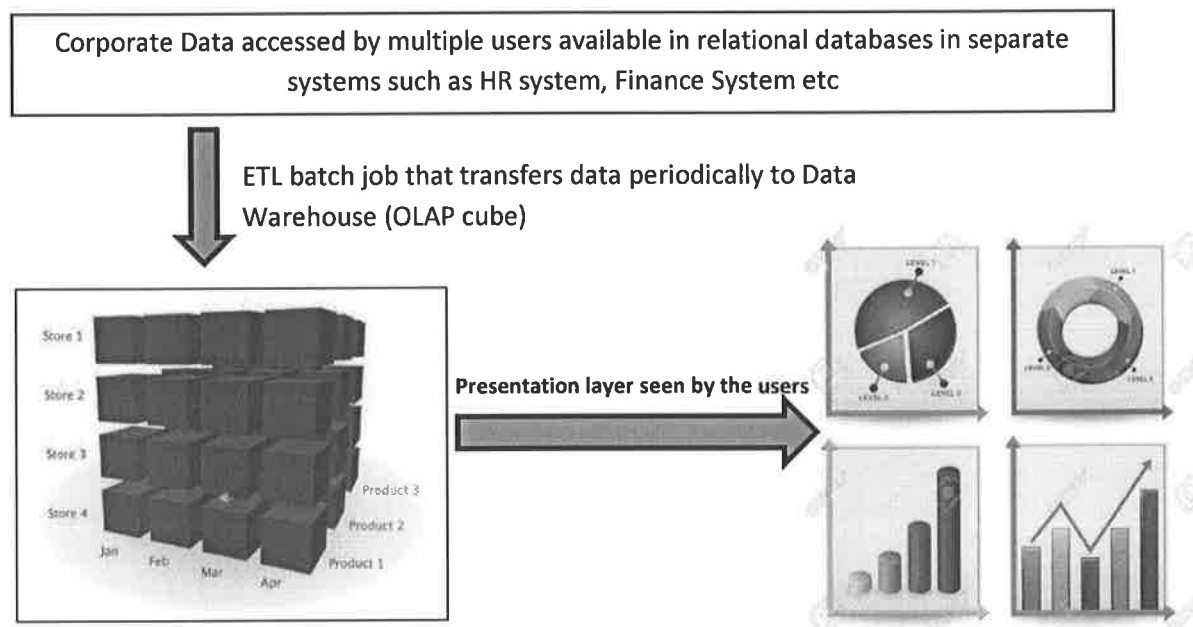
This would be built as a web site, but would be expanded to be installed as a mobile app that can be easily accessed through any mobile device or tablet. The site should be easily translatable to any language, starting with most common languages such as English and French. The company wishes to develop and expand this using agile methodology. (Hint – You can imagine Bookings.com or AirBnB that is used worldwide as examples to visualise this better)

- a. Identify a risk list with an impact of a possible damage in a scale of 1 to 5 and probability of occurrence in a scale of 1 to 100 as a percentage for each risk. You could also calculate the risk value for each risk (This should be listed in a table of four columns as description of the risk, impact, probability and the calculated risk value) (8 marks)
- b. Identify **three** most important risks to be handled (justify your answer) and derive the risk mitigation, avoidance or transfer plan for the three risks. (6 marks)
- c. Do you think the risks that you identified will remain the same throughout the project life cycle? Justify your answer through an example. (Hint :You may also use a graph and explain for better clarity) (6 marks)
- d. Define one suitable metric for each of the following
  - (i) Defects
  - (ii) Customer Satisfaction
  - (iii) Completeness of testing
  - (iv) Process Quality
  - (v) Product Quality

(5 marks)

**Question 4:****(Total Marks 25)**

Your company wishes to build a fully flexible, scalable and Self-Service OLAP BI (Business Intelligence) solution that converts raw corporate data into meaningful information which improves the way organisations measure and manage their operations. The product should be tailored, user-friendly visuals (charts controls) which support dynamic and robust decision making for executives and employees to take control of their BI requirements, as and when they need to. The visualization of the product is simply shown below for better clarity.



**Note: Users can click, right click and change the graphs charts that wishes to view in whatever way he/she wants**

The solution will be implemented using agile process

Answer following questions.

- If you are assigned as the QA Manager, when deriving the total solution list down three product risks that you foresee and what is your test strategy / approach to handle each risk (8 marks)
- If you were assigned as the project manager, what activities would you plan in your sprint one? (6 marks)
- Provide some arbitrary values for how remaining work changes in each day of the sprint and draw a sample burn down chart with values shown in a table. (6 marks)
- Either** Show a typical bug tracking flow that you would introduce to track the bugs **OR** a process maturity model that you are familiar. (5 marks)