2021-2022 RESIT

2022年12月29日 14:37

Question A.1 (12 marks)

Suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems. Justify your answer (12 marks)

i. Corporate human resource system
ii. Airplane flight control system
iii. Mobile application for the university navigation system

Question A.2 (12 marks)

The non-functional requirements are mainly satisfied by the physical architectural design. Illustrate the fact by showing TWO examples. Your examples must consist of the non-functional requirement and its solution. (12 marks)

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Question A.3 (16 marks)

i. Explain why *modularity* is important for software design **(3 marks)**

ii. Two software engineers are arguing on how to modularize their software design. One engineer decomposes the design into too few modules while the other engineer decomposes the design into too many modules. What factors must the engineers be considering when decomposing a software design? **(5 marks)**

iii. Consider the following two classes: Author and Editor.

```
class Author{
    public String Name;
    public String skypeID;

    public String getskypeID(){
        return skypeID;
    }
}

class Editor{
    public void clearEditingDoubts(Author author){
        setUpCall(author.skypeID);
    }

    void setUpCall(String skypeID){
        ...
    }
}
```

A software engineer commented that the code is tightly coupled and suggests refactoring the code. Rewrite the code to produce a loosely coupled code. **(8 marks)**

Question A.4 (15 marks)

i. Describe the scenarios when you need to do integration testing and explain why integration testing is needed in the software testing process. **(7 marks)**

i. Suppose you have the following class which you want to test:

```
public class Calculation {
    public static int findMax(int arr[]){
        int max=arr[0];
        for(int i=1;i<arr.length;i++){
            if(max<arr[i])
                max=arr[i];
        }
        return max;
    }
}
```

findMax is a function that accepts an array of an integer as its input parameter. It returns the largest value among the values in the input array. Write a Junit unit test for the *findMax* function. Additional requirement is: - **(8 marks)**

- Use an array with values 1, 3, 4, 2 as the test case

Section B – Answer all questions (45 marks):

Question B.1

Below are the facts gathered during the preliminary requirements study for a university. Draw a class diagram to document the requirements. **(15 marks)**

- In a university, there are different classrooms, offices, and departments.
- A person working at the university can be a professor or an employee.
- A professor can be a full, associate, or assistant professor who enrolls in one department.
- Every person working in the university will allocate to an office.

Question B.2

Here are the steps that occur in the use case named 'Create New Library User Account'.

- The librarian request the Library Management System to create a new online library account by providing the system: -
  - Account type.
  - User details.
- The Library Management System validates the user details using the User Credentials Database.
- If the validation pass: -
  - The system creates a new library user account.
  - A summary of the new account details are then emailed to the user using the Email System.
- If the validation fails: -
  - The system will not create a new library user account.
  - Feedback stating the validation outcome is then emailed to the user using the Email System.

Draw a sequence diagram to document the requirement. **(15 marks)**

Question B.3

Buy 99 is a wholesales company selling stationery. The company starts its order processing when it receives an order from the customer. After the company accepts the order, the clerk will check the order against the inventory; if the inventory has sufficient stock, the clerk will reserve the stock and charge the customer credit card for the order. If the inventory has insufficient stock, the clerk will notify the customer and ends the process. If the clerk charges the credit card successfully, the clerk will register the payment. At the same time, the clerk will also generate a pick-and-pack slip, followed by updating the inventory. After completing the registration of payment and the updating of inventory, the clerk will notify the customer. If the clerk did not charge the credit card successfully, the clerk will cancel the reservation of the stock and then notify the customer about the failure of the payment.

Draw an Activity Diagram to document the above system. **(15 marks)**