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RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. in Applied Sciences
Second Year - Semester II Examination – January/ February 2023

COM 2308 – SOFTWARE ENGINEERING

Time: Three (03) hours

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1. This paper contains **five (05)** questions on **five (05)** pages.
2. The total maximum mark attainable is 100. The marks assigned for each question and section, thereof are indicated in brackets.
3. This is a closed book examination.
4. Mobile phones or any other communication devices are not permitted.
5. Clearly state the assumptions you make, if any.
6. Answer **ALL** questions.

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1. a) Describe the difference between generic software and bespoke software.
(02 marks)

b) Explain the heterogeneity challenge in software engineering.
(02 marks)

c) Explain how software engineering helps to solve the software crisis.
(04 marks)

d) Describe how maintainability helps to keep the overall costs low.
(04 marks)

e) Describe how UML would improve the maintainability and the reusability of a software system.
(04 marks)

f) Draw the activity diagram for the C++ code given below.
(04 marks)

```
int main()
{
    int k=0;
    cout<<"enter a number: "<<endl;
    cin>>k;
    if(k > 2)
    {
        for(int i=0;i<k;i++){
            for(int j=i;j<k;j++){
                cout<<"*";
            }
            cout<<"\n";
        }
    }else
    {
        cout<<"Number too small";
    }
    return 0;
}
```

2. a) Describe why the risk monitoring should be a continuous process throughout the software development process.
(02 marks)

b) It is said that developers are not fully in control of the evolution of the software in component based software engineering. Discuss the previous statement.
(02 marks)

c) Describe the reasons for using agile methods to develop a software.
(02 marks)

d) Describe the importance of version control in software development.
(02 marks)

e) Describe why requirement errors are expensive to fix compared to coding errors.
(02 marks)

f) Describe why accommodating changes is difficult in the waterfall model.
(03 marks)

g) Explain the function of sequence diagrams.
(03 marks)

h) Explain the use of checkpointing in a banking system.

(04 marks)

3. Consider the following description.

"Develop a student registration system for a university. This should allow the students to register for courses, academics to view registered students, management staff to view registered students and admins to create courses, create accounts and reset accounts. All the users need to sign in to the system to conduct their activities. "

a) Draw a use case diagram for the description given above.

(04 marks)

b) Write the use case scenario for the use case that describe students registering for a course for the description given in question 3.
For this to happen, a student needs to be logged in to the system. Students should be able to view the courses offered to them and register for multiple courses when needed. Include the exception and alternate scenarios in the use case scenario.

(04 marks)

c) Draw an activity diagram for the use case scenario described in question 3 b).

(04 marks)

d) Describe how release testing is conducted.

(03 marks)

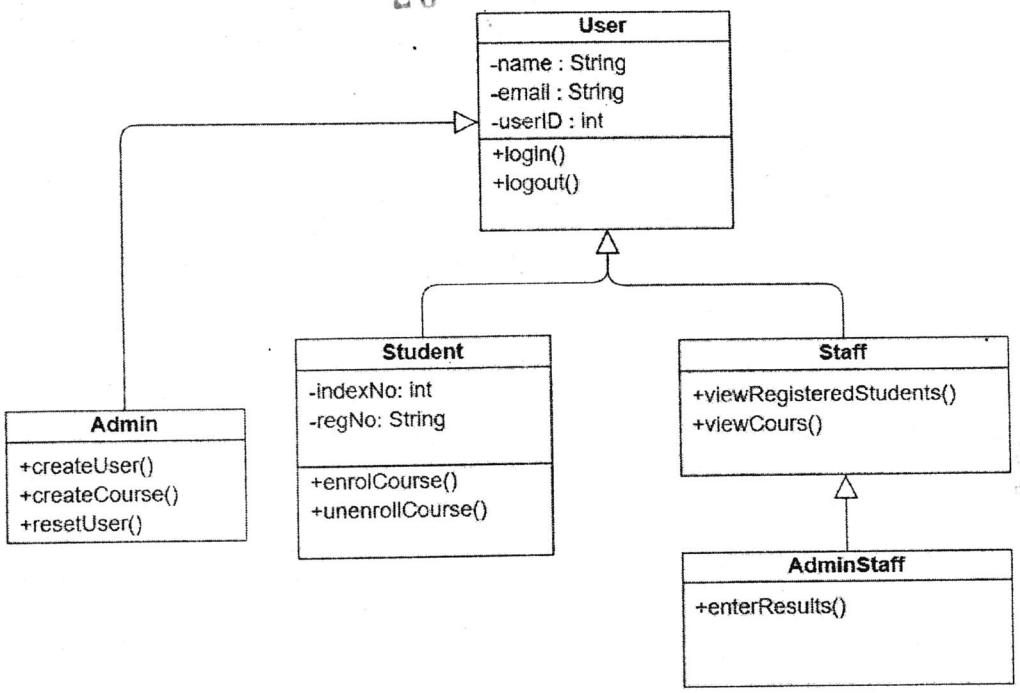
e) Describe the three (03) risk management strategies.

(03 marks)

f) Describe the difference between defect testing and validation testing.

(02 marks)

4 a) Write the code to represent the following class diagram. You do not need to write the function bodies.



(05 marks)

b) Explain how inheritance relationship will affect the coupling between objects.
(02 marks)

c) Explain the importance of a deployment diagram in your own words.
(02 marks)

d) Consider the following use case scenario description and draw an activity diagram for it

Pre-condition:
ATM machine and the bank is working correctly.

Main scenario
1. Customer inserts the ATM card into the ATM machine.
2. ATM machine prompts to the customer to enter the pin.
3. Customer enters the PIN.
4. PIN is validated by the bank
   E1 – Pin validation fails
5. ATM machine prompts the user to select the transaction option.
6. Customer chooses Cash Withdrawal option.
7. ATM machine prompts to the customer to enter the required amount.
8. Customer enters the required amount for withdrawing.
9. Bank checks the account balance.
10. Bank informs that the balance is sufficient to do the withdrawal.
    E2 – Balance is not sufficient to perform the withdrawal
11. ATM machine checks whether it has the cash in storage to make the withdrawal.
    E3 – Cash is not sufficient to perform the withdrawal
12. Bank debits the requested amount.
13. ATM cash dispenser is updated and sends the money to collection slot.
14. ATM displays the balance of the customer account.

15. ATM ejects the card.
16. End transaction.

E1 – Pin validation fails
1. ATM ejects the card.
2. End transaction.

E2 – Balance is not sufficient to perform the withdrawal
1. ATM displays the balance of the customer account.
2. ATM machine again prompts to the customer to enter the required amount and do the process again from step 7.

E3 – Cash in storage is not sufficient to perform the withdrawal
1. ATM displays the message that the ATM machine does not have enough cash.
2. ATM machine again prompts to the customer to enter the required amount and do the process again from step 7.

(05 marks)

e) Write the code for the activity diagram that you drew in question 4 d)

(06 marks)

5 a) Describe why it is difficult to estimate the cost of a project.

(02 marks)

b) Explain the importance of the UI to the success of a software system.

(02 marks)

c) Describe why a high-quality, low-business value legacy system can be scrapped completely.

(03 marks)

d) Explain how the team stability will affect the maintenance cost.

(03 marks)

e) Describe why code quality cannot be maintained only through testing.

(03 marks)

f) Describe the advantages of software re-engineering.

(03 marks)

g) Explain the effect of coding and documentation guidelines on the overall cost of a software project.

(04 marks)

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