

National University of Computer and Emerging Sciences, Lahore Campus



Course:	Introduction to Software Engineering	Course Code:	SE1001
Program:	BS (SE)	Semester:	Spring 2023
Duration:	60 Minutes (1 Hour)	Total Marks:	35
Paper Date:	April 10, 2023	Weight	15%
Section:	All	Page(s):	4
Exam:	Midterm II		

Instruction/Notes:

1. Attempt all questions on the question paper. Do not submit any extra sheet
2. You are allowed to use a single-sided, hand-written, A-4 size cheat sheet

Name: _____

Roll Number: _____

Section _____

Question 1 (5+5 = 10 Marks)

(CLO-2)

List the software process that you think will be most appropriate for the following situations. List your reasons for choosing a particular process. If you just list the process without any justification, you will not be awarded any marks.

- a) Picasa Solutions is a large-scale software development company. One of their clients wants to get a WhatsApp like application developed for their business. The client wants to use this application to secure all business-related communication, and this app is intended to be used only for the internal company communication. Client wants to get this application fully developed and ready to use in 2-3months time. Your company has highly skilled professionals to build application in the required time frame however availability of them is a big concern. Client's business is spanning over 3 countries including Pakistan, China and USA. So the app needs to provide secure communication between multiple businesses entities geographically located at long distance locations. At first the text messages exchange feature is required to be developed. Development budget for this project is very high but agreed upon by the client and your company. Project needs to be built with highly modular design so that the code might get reused for future projects.

Software Process:

Reasons:

- b) Alpha manufacturers is a company that designs and manufactures medical devices. They manufacture a large range of devices from small thermometers to health monitoring devices installed in ICU. The experts at alpha manufactures are designing a new device that will be used for diagnosing and treating a serious medical condition. Your company has been asked to assist alpha manufactures during design and development of this device. Given the critical nature of the device, a rigorous development process is to be followed that emphasizes safety and reliability. Only early requirements of the device are known yet. There are various factors which can potentially harm the project's progress. Development team is required to work on identifying all these factors & requirements associated with the project. Device is expected to be tested in a simulated environment, creation of which is also a big challenge for the team.

Software Process:

Reasons:

Answer the Following questions related to software engineering principles.

a) MVC is an architectural pattern that separates an application into three components:

1. Model - Model component corresponds to all the data-related logic
2. View - UI logic of the application
3. Controller - process all the business logic

Each of these is built to handle a specific aspect of the application. MVC is the most popular architecture used in web development frameworks such as Laravel, Spring, and many others.

Which principle of software engineering is being followed by MVC? Explain your answer.

b) The following code will take two strings, concatenate them and store result in third character array

```
//code snippet starts
void concat(string arr1, string arr2, char arr3[])
{
    int i, j = 0;
    for (i = 0; i < arr1.length(); i++)
    {
        arr3[i] = arr1[i];
    }
    while (arr2[j] != '\0')
    {
        arr3[i++] = arr2[j++];
    }
    arr3[i] = '\0';
}
//code snippet ends
```

Now we want to make this function more generalized to concatenate two or more strings. How can you modify this code to achieve **Generality**? Rewrite the code after the modification(s).

- c) Given the following code to print the series of perfect numbers between two numbers. You are required to add two functions for giving **better modularity** in this code. Make one function **bool checkPerfect(int)** that will check whether the given number is perfect number or not and the second function **void printSeries(int,int)** to print the series of perfect numbers. Note: Complete Logic is given below, Just modularize it

```
#include<iostream>
using namespace std;
int main(){
    int stLimit = 2, enLimit = 7;
    bool flag;
    int i, sum;
    while (stLimit <= enLimit){
        sum = 0;
        for (i = 1; i < stLimit; i++)
        {
            if (stLimit % i == 0)
            {
                sum += i;
            }
        }
        if (sum == stLimit)
            flag = 1;
        else
            flag = 0;
        if (flag){
            cout << stLimit;
        }
        stLimit++;
    }
}
```

Question 3 (10 Marks)**(CLO-4)****Draw Use Case Diagram for the following Swiss Bank Management System:**

In an Online banking system, A Customer is required to create an account to avail services offered by Bank. Bank verifies detail and creates new account for each new customer. Each customer can check the balance in bank account and initiate request to transfer an account across distinct branches of Bank. A customer can execute cash transactions where the customer must either add cash value to bank account or withdraw cash from account. Either of two or both that is credit as well as debit cash, might be executed to successfully execute one or multiple transactions. After each successful transaction customer might or might not want to get details for action. Manager can check interest value for each account corresponding to transaction to ensure and authenticate details. A customer can also request loan from bank where customer must add request for loan with the appropriate details. The manager of each branch of bank has choice to either accept or approve loan to initiate process further or just reject request for loan based on terms and conditions.