National University of Computer and Emerging Sciences, Lahore Campus

Course Name:	Software Design and Architecture Lab	Section:	BSE-4A
Program:	BS (Software Engineering)	Semester:	Spring 2022
Duration:	2 hour	Total Marks:	40
Evaluation Type:	Lab Mid Exam	Weight:	30 %
Name:		Roll Number:	

Note:

- The quality of the answers will affect the marks.
- Students will receive **ZERO** marks if the answers are plagiarized.
- Use of mobile phones, helping code, **internet**, flash drives, and smart devices are strictly prohibited.
- Discussion with other students is not allowed.
- You must ensure that you have made proper submission of your code and well in time. No queries will be entertained later.
- Your submission file must bear your **Roll number** and the **question number**. Any submission not bearing a roll number will not be entertained even if it bears your name.
- Submission location: **\\cactus1\Xeon\Spring 2022\Muhammad Saifullah\Mid Exam Submission\BSE-4A (SDA)**

(Marks 10)

Question 1

Draw a class diagram for the following description:

Consider an external intrusion blocking and inspection tool (**E-BIT**). This tool is used to block unauthorized access to data from the computer system. This tool will filter IPs for data access requests out of the machine and check for any anomalies on the basis of the target IP. There are two types of users: **guest users**, and **administrator users**. The **guest user** can only see the list of IPv4s: **white list**, **grey list**, and **black list**. The **administrator users** have to log in first via the **login screen**. Now after login is successful, the administrator can *allow an IPv4*, *Block an IPv4*, *update the* ***cloud database*** and *add/remove IPv4* from any of the lists. In allowing/blocking an IPv4 functionality, it simply updates the local database by adding or removing IPv4 via **IPv4Panel class**. In updating the database functionality, it updates the **cloud database** which is connected with the **local database**. The E-BIT tool uses a **network interface card class** and a **classify IP class** to get IPv4 from raw data packets and categorize them respectively.

(Marks 10)

Question 2

Considering the solution of question 1, draw a sequence diagram for the following description:

The user opens the E-bit application, clicks on the login button, and enters the credentials. After a successful login, the user adds an IPv4 to block it. Afterward, the user updates the cloud database. Finally, the user views the white, grey, and black list as a guest user.

(Marks 10)

Question 3

Draw a state diagram for the following description:

ATM is initially turned off. After the power is turned on, ATM performs startup action and enters the **Self Test** state. If the test fails, ATM goes into the **Out of Service** state, otherwise, there is the **triggerless transition** to the **Idle** state. In this state, ATMs wait for customer interaction.

The ATM state changes from **Idle** to **Serving Customer** when the customer inserts a banking or credit card in the ATM's card reader. On entering the **Serving Customer** state, the entry action **read card** is performed. Note, that transition from the **Serving Customer** state back to the **Idle** state could be triggered by a **canceled** event as the customer could cancel the transaction at any time.

(Marks 10)

Question 4

Consider the following code and determine which S.O.L.I.D principle it follows or not. If their exits violation. Correct the violation and draw a class diagram for it.

```
Public abstract class SocialMedia {
        Public abstract void chatWithFriend ();
        Public abstract void publishPost (Object post);
        Public abstract void sendPhotosAndVideos ();
        Public abstract void groupCall (Strings users);
}
```

```
Public Facebook extends Social Media {
        Public void chatWithFriend ( ) {...}
        Public void publishPost (Object post) {...}
        Public void sendPhotosAndVideos ( ) {...}
        Public void groupCall (Strings users) {...}
}

Public WhatsApp extends Social Media {
        Public void chatWithFriend ( ) {...}
        Public void publishPost (Object post) {...}
        Public void sendPhotosAndVideos ( ) {...}
        Public void groupCall (Strings users) {...}
}
```

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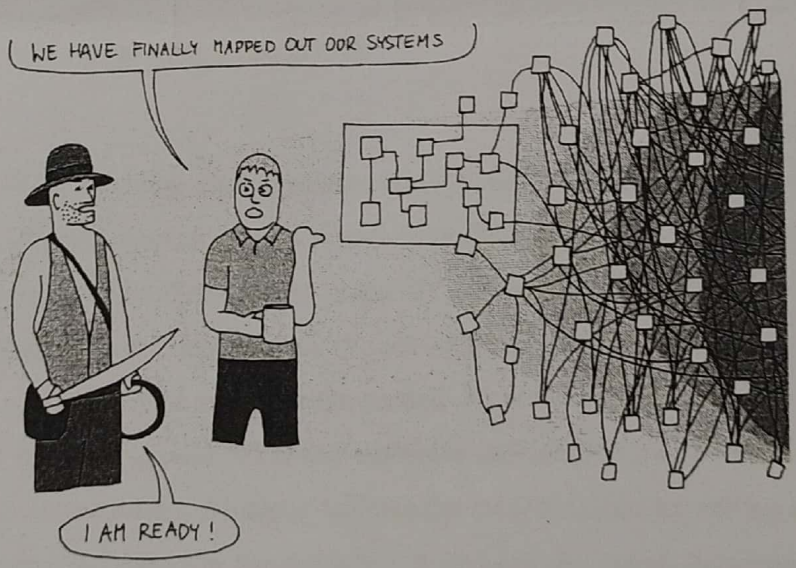

Big technology can be a real jungle. And if you are going to the jungle, you need to be prepared.