Course Code: CS3009	Course Name: Software Engineering
Instructor Name: Hajra Ahmed, Dr. Syed Muazzam Ali Shah, Noureen Fatima	
Student Roll No:	Section No:

Instructions:

- Return the question paper and make sure to keep it inside your answer sheet.
- Read each question completely before answering it. There are 3 questions and 2 pages.
- In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.
- You are not allowed to write anything on the question paper (except your ID and section).

Time: 60 minutes.   **Max Marks**: 30 Points

Questions 1:   [CLO-1][weightage-1+3+1, pt-2+6+2]

a. You are supposed to develop a ticket machine used by passengers at a railway station. What type of architectural design decisions should be made to satisfy the functional and non-functional requirements of the ticket machine? Mention at least 4 decisions.

b. What is a 4+1 view architecture design model? Provide a description of each view/perspective included in the 4+1 view architecture design model. It is necessary to explicitly determine the type of viewer and the name of UML diagram for each view/perspective.

c. Select and justify the most appropriate architectural pattern for the following case study: A compiler performs language transformation: Input is in language A and output is in language B. In order to do that the input passes through various stages inside the compiler including the front-end, middle-end, and back-end. The front-end parses the input language and carries out syntax and semantic analysis, then transforms it into an intermediate language. The middle-end takes the intermediate representation and performs several optimization steps on it. The resulting transformed program is passed to the back-end which transforms it into language B.

Questions 2:   [CLO-2][weightage-1+4, pt- 2+8]

a. Define cohesion and coupling and why we are using these? How much coupling and cohesion need to be achieved for a good design?

b. Suppose you are working on a software to add reminders for tasks according to your location. In order to add a reminder with location into the system, your team's designer has designed the interface shown in figure 1.

Using your expert knowledge of interface design, answer whether the following design principles are being followed or not. Also justify your answer with a brief explanation.

i. Define interaction modes in a way that does not force a user into unnecessary or undesired actions
ii. Allow user interaction to be interruptible and undoable
iii. Design for direct interaction with objects that appear on the screen.
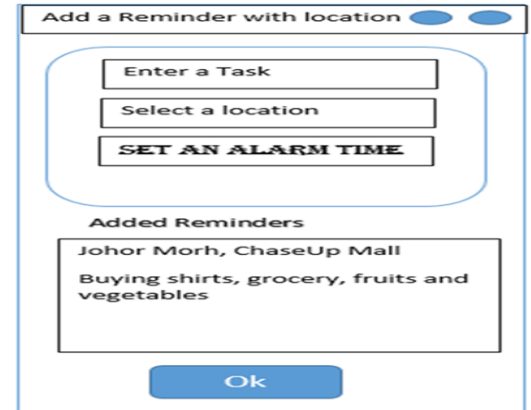iv. Maintain consistency across a family of applications

Figure 1

Questions 3:   **[CLO-4][wieghtage-3+2, pt- 6+4]**

a. For the given piece of code shown in figure 2., do the following tasks:

  i. Create neat and clear cyclomatic graph
  ii. Calculate cyclomatic complexity
  iii. Identify independent paths
  iv. Using equivalence partitioning concept, generate test cases for each value taken from a class of input i.e., X and write its corresponding Y values. Show your test cases in the Grid form.

b. An ATM machine has Screen buttons, a card reader, a speaker, a keypad, a deposit slot, a cash dispenser slot and a screen display. Write any 5 test cases for this ATM machine. Three functional test cases and 2 non-functional test cases for the ATM machine.

```
1      int x;
2      double y=0;
3      cout<<"enter value of X";
4      cin>>x;
5      if(x>0){
6          y=40;
7          if(x>20){
8              if(x<=30){
9                  y+=((x-25)*0.5);
10             }
11             else{
12                 y=y+50+(x-30)*0.1;
13                 if(x>=3000){
14                     y=y*0.9;
15                 }
16             }
17         }
18     }
19     cout << "value of Y= "<<y;
```

Figure 2