

TEAM#? _____

NET-IDs of students who are present: _____

1 Design

```
1
2 public class ObserverPattern {
3=  public static void main(String[] args) {
4     Account a = new Account();
5     Person p = new Person(a);
6     a.withdraw(100000);
7 }
8 }
9
10 class Account {
11     private double balance;
12     boolean withdraw(double amount) { }
13 }
14
15 class Person {
16     Account myAccount;
17
18=  Person (Account a) {
19     myAccount = a;
20 }
21
22= void ifAccountWithdrawAttempt() {
23     // do something
24 }
25 }
```

Rewrite above code to use the Observer Pattern. Show ALL the changes needed. **SHOW YOUR NEW CODE.**

```
import java.util.Scanner;
public class WordGame {

    public static void main(String[] args) {
        int currIdx = 0;
        Scanner keyboard = new Scanner(System.in);
        System.out.println("Enter your secret word:");
        String secret = keyboard.nextLine();
        int N = secret.length();
        char [] yourWord = new char[N];
        for (int i=0; i< N; i++) yourWord[i] = '-';

        for (int turn = 0; turn < 10; turn++) {
            System.out.println("Remaining Turns="+ (2-turn)+ " Enter your letter guess");
            String guess = keyboard.nextLine();

            if (guess.length() != 1) {
                System.out.println("Guesses must each be a single letter.");
                continue;
            }

            char c = guess.charAt(0);
            if (c == secret.charAt(currIdx)) {
                yourWord[currIdx++] = c;
                if (currIdx == N ) {
                    System.out.println("Yay! You guessed correctly!");
                    break;
                }
            }
            System.out.println(yourWord);
        }
    }
}
```

Assume that the above code will be re-written using MVC pattern.

Write down method signatures of the Model for the word search game.

Write down method signatures for the View for the word search game.

2 Testing

Q:

```
String guess = keyboard.nextLine();  
if (guess.length() != 1) {  
    System.out.println("Guesses must each be a single letter.");  
}
```

- a) Write test cases that will achieve statement coverage.
- b) Write test cases that will achieve branch coverage.

Q: A switch is switched on when the temperature falls below 50 degrees and then turned off when the temperature is above 70 degrees. Identify the equivalence classes for testing the switch.

Q: Given code for SORTING (say ascending), write down

- a) Signature of Oracle
- b) Logic of Oracle

Q: What is regression testing? Explain why it is important to do regression testing.

3 Ethics

Assume that you are currently designing a database management system for the personnel office of ABC a mid-sized company. You have been involving the management in the design process from the start of the project. Now it's time to decide about the kind of degree of security to build into the system. You described several options to the client. The client/ ABC Management decided to opt for the least secure system because the system is going to cost more than was initially planned, and the least secure option is the cheapest option. You know that the DB includes sensitive information, you feel that the weak security would make the system vulnerable, but the management is convinced that the cheapest security is what they want.

Q. What is one way to convince everyone that this is an ethical issue worthy of being further examined?

Q. Describe application of at least THREE of the five ethical approaches to the above problem.

a) Approach 1:

b) Approach 2:

c) Approach 3: