No. of Pages	3
No. of Questions	4
Total Marks	30
Time: 80 Minutes	

Department of Computer Science and Engineering
Final Examination
CSE 110: Programming Language I

- ❖ Write theory teacher's Name/Initial on top of the answer script in LARGE FONT.
- ❖ Answer all questions. Use **back part** of the answer script for rough work.
- ❖ Answer Question **1 & 2** at the **beginning part** of the answer script.
- ❖ Figure in bracket [] next to each question indicates marks for that question.
- ❖ At the end of exam, put **question paper** inside answer script and **return both**.
- ❖ Understanding the question is part of the exam, **please do not ask questions**. No washroom breaks

Section: ___ ID: _____ Name in CAPITAL: _____

Question 1 [CO1] [10 Points]
[Answer on the answer script]

You are given an array containing the names of some planets in our solar system and three additional arrays containing the corresponding **x, y,** and **z coordinates** of those planets. Write a Java program that prompts the user to input the name of a planet. The program should then determine and **print** the **closest planet** to the input one along with the **distance** between them. If the user input is not a valid planet name, the program should print "Invalid input". **Use the following formula to find distance between two 3D points. [You may use Math.pow() method. You don't need to handle the places after the decimal point in the output.]**

$$\text{Distance} = (x_1-x_0)^2 + (y_1-y_0)^2 + (z_1-z_0)^2$$

Given Arrays:

```
String[] planets = {"Mercury", "Venus", "Earth", "Mars", "Jupiter"}
double[] x_coordinates = {0.39, 0.72, 1.00, 1.52, -5.20};
double[] y_coordinates = {0.24, 0.00, 0.00, 0.99, 2.86};
double[] z_coordinates = {-0.10, 0.44, -0.02, 0.21, 0.42};
```

Sample Input 1:
Earth

Sample Output 1:
Closest Planet : Venus
Distance : 0.290000

Explanation:
3D coordinate of earth is = (1.00,0.00,-0.02)
After calculating the distance with every other planets' coordinates, we get Venus (0.72, 0.00, 0.44) as the closest.
Distance = (1-.72)2+(0-0)2+(-.02-.44)2 = 0.29

Sample Input 2:
Pluto

Sample Output 2:
Invalid Input

Explanation:
Since "Pluto" is not found in the given array (planets), the program prints "Invalid Input".

Question 2 [CO1] [10 Points]

[Answer on the answer script]

Write a java program called **StringCutter** that takes three inputs; firstly a **string** and then **an integer** that specifies how many characters to remove from that string. Next **a boolean value** is taken from user that determines where to remove the characters from. The string will be **shortened by the number of characters** provided in the integer input. Now, it will either be cut from the front or the back depending on the boolean input. If the boolean input is **false**, the string will be cut from the **front**. Otherwise the string will be cut from the **back**.

Sample Input 1: Enter string:Programming Enter number of character: 3 From the back? (true/false): false	**Sample Output 1:** gramming
Sample Input 2: Enter string: Language Enter number of character: 5 From the back? (true/false): true	**Sample Output 2:** Lan
Sample Input 3: Enter string: Final Exam Enter number of character: 12	**Sample Output 3:** Number of characters cannot be larger than the String

Question 3 [CO4] [5 Points]

[Answer on the question paper]

The code below is designed to sort an array in **increasing** order. However, it contains **6 errors**. Analyze the code, identify the errors, and correct them. Provide your corrections in the specified format.

```
1  public class A{
2  public void main(String args []){
3    int array = {20, 25, 10, 8, 3};
4    for (int i = 0; i <= array.length; i++){
5      int min_index = i;
6      for (int j = i+1; j < array.length(); j++){
7        if (array[j] > array[min_index]){
8          min_index = j;
9        }
10     }
11     int temp = array[min_index-1];
12     array[min_index] = array[i];
13     array[i] = temp;
14   }
15   System.out.println("Sorted Array in Increasing Order: ");
16   for (int j = 0; j < array.length; j++){
17     System.out.print(array[j]+" ");
18   }
19 }
20 }
```

Write your corrections in the table below. For better understanding, one error correction is shown.

Line Number	Fix
Line 2	public static void main (String [] args)

Question 4 [CO1] [6 Points]

[Answer on the question paper]

Illustrate the outputs of the following statements. Provide your workings on the answer script to verify your outputs. **Your answer will not be accepted without the workings. All of the outputs must be in the question paper.**

```
1  public class methodTracing_A{
2    public static void main(String [] args){
3      mTracing1(8);
4    }
5    public static void mTracing1(int n){
6      if (n>=3){
7        mTracing1(n-1);
8        System.out.println(mTracing2(n));
9      }
10   }
11   public static int mTracing2(int a){
12     int b = (a++) + 4;
13     return a-b*a;
14   }
15 }
```

Output