

Independent University, Bangladesh

Practice Problem:

1. Write a program in C++ that will calculate accuracy (ACC) and F1 score True Positive Rate (TPR) and False Positive Rate (FPR) of machine learning system using following formulas. Here, True Positives (TP), True Negatives (TN), False Positive (FP), False Negative (FN) values are integer numbers given as input by the user. (25)

Following is the sample Input and Output of the written program. You can just consider it as an example.

|  |  |
| --- | --- |
| **Sample Input** | **Sample Output** |
| Please Enter True Positives (TP) = 0.63  Please Enter True Negatives (TN) = 72  Please Enter False Positive (FP) = 28  Please Enter False Negative (FN) = 37 | For (TP=63, TN=72, FP=28, FN=37)  ACC = 63.36  F1 = 0.6596  TPR = 0.63  TNR =0.72. |

1. Write a program in C++ that will display a right-angled triangle with a combination of “\*” and “#” sign. User will be asked to provide an input, which will be taken as the number of rows of your triangle. (25)

Following is the sample Input and Output of the written program. You can just consider it as an example.

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| --- | --- |
| **Sample Input** | **Sample Output** |
| Please Enter the number of rows of your triangle: 4 | \*  ##  \*\*\*  #### |

3.

|  |  |
| --- | --- |
| Write a C++ code that will print the sequence and sum of all prime numbers within a given positive sequence. **20 points** [ you will be assessed for your overall ability to use iterations, conditions and input, output abilities] | |
| **Example 01:** |  |
| **Input:**  Enter the left range x: 15  Enter the right range y: 35 | **Output:**  17 + 19 + 23 + 29 + 31 = 119 |
| **Example 02:** |  |
| **Input:**  Enter the left range x: 5  Enter the right range y: 25 | **Output:**  5 + 7 + 11 + 13 + 17 + 19 +23 = 95 |

4.

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| A pricewise function is a compound function that has different values for dependent variables for inputs for independent variable from different range. Write a code in C++ for the following pricewise function. **20 points**  [ You will be assessed for our ability to use conditions] | |
| **Example 01:** |  |
| **Input:**  Enter the value of independent variable x: 40 | **Output:**  Y = 5.025 |
| **Example 02:** |  |
| **Input:**  Enter the value of independent variable x: 0 | **Output:**  Y = -10 |
| **Example 03:** |  |
| **Input:**  Enter the value of independent variable x: 10 | **Output:**  Y = 90 |
| **Example 04:** |  |
| **Input:**  Enter the value of independent variable x: -10 | **Output:**  Y = 12 |

5.

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| --- | --- |
| Write a C++ code that will print the sequence and sum of all prime numbers within a given positive sequence. **20 points** [ you will be assessed for your overall ability to use iterations, conditions and input, output abilities] | |
| **Example 01:** |  |
| **Input:**  Enter the left range x: 15  Enter the right range y: 35 | **Output:**  17 + 19 + 23 + 29 + 31 = 119 |
| **Example 02:** |  |
| **Input:**  Enter the left range x: 5  Enter the right range y: 25 | **Output:**  5 + 7 + 11 + 13 + 17 + 19 +23 = 95 |

6. Write a program which will calculate surface area and volume of a sphere. User will enter radius as a floating point input and his choice. If the choice is 1 then your program will calculate and print the surface area of a sphere, if the choice is 2, then volume of sphere will be calculated, if the choice is 3 then both surface area and volume will be calculated, if any other number is entered, your program should print “Wrong choice!”

Formula for surface area of sphere: (the value of is 3.142)

Formula for volume of sphere: (the value of is 3.142)

|  |  |
| --- | --- |
| **Sample Input** | **Sample Output** |
| Radius = 2 , choice = 1 | Surface area of sphere is 50.272 |
| Radius = 3, choice = 2 | Volume of sphere is 113.112 |
| Radius = 4, choice = 4 | Wrong choice! |

7.