Department of Information Technology – University of the Punjab
Programming for AI – MPhil/PhD (AI) F22
Lab-02

Max Time: 2.5 hours **Date: 14-12-2022**

Topics: Problem solving, operators, basic constructs, selection, repetition

Instructions:

- Please provide your own solutions and **DO NOT COPY** the code from your colleagues or the web.
- You can discuss your problems only with the teachers.
- All tasks carry equal points.

Task 1

The Meteorological department of Pakistan measures the temperature of Lahore in Celsius. Write a program that asks the user to enter Celsius temperature, converts and stores it into Fahrenheit. Display both temperatures on the screen. Use the following conversion formula: **(9/5) x TempCelsius + 32**

Task 2

A milk carton can hold 3.78 liters of milk. Each morning, a dairy farm ships cartons of milk to a local grocery store. The cost of producing one liter of milk is $0.38 and profit of each carton of milk is $0.27. Write a program that does the following:

- Prompt the user to enter the total amount of milk produced in the Moring
- Outputs the number of milk cartons needed to hold milk
- Output the cost of producing milk
- Outputs the profit for producing milk

Task 3

The day of year is a number between 1 and 365 (January 1 is day 1) for a common (i.e. non leap) year. Today is 14th December which is day number 348. Write a Program that asks the user to enter month and date and displays the corresponding day number.

Sample Run 1:

Enter Month: **2**
Enter Date: **2**
`The day number for 2-2 is 33.`

Sample Run 2:

Enter Month: **3**
Enter Date: **1**
`The day number for 1-3 is 60.`

Task 4

Extend *Task 3* in a way that now it finds the day (i.e. Monday, Tuesday etc.) against the date entered by the user. Suppose it was Saturday on January 1.

Sample Run 1:

Enter Month: **2**
Enter Date: **2**
`The day number on 2-2 is Wednesday.`

Sample Run 2:

Enter Month: **3**
Enter Date: **1**
`The day number on 1-3 is Tuesday.`

Task 5

The area of a rectangle is the rectangle's length multiplied by its width. Write a program that asks for the length and width of two rectangles. The program should tell the user which rectangle has the greater area, or if the areas are the same.

Task 6

Write a Program that takes your average obtained marks of the courses and calculates and then displays your GPA according to the following Grading System. Also mention that whether the student is on probation or not.

GRADING SYSTEM **For Fall 2008 batch**	
AVERAGE MARKS	**GRADE POINTS**
85-100	4.00
80-84	3.70
75-79	3.30
70-74	3.00
65-69	2.70
61-64	2.30
58-60	2.00
55-57	1.70
50-54	1.00
Below 50	0.00
A student attains **Probation Status** if his/her CGPA becomes **1.70** or more but less than **2.00.**	

Task 7

Write a program that should take two numbers (that is, *first* and *last*) from user and display all the numbers and their squares in the form of an ordered pair between *first* and *last* numbers.

Sample Run 1:
Enter first: **2**
Enter last: **5**
```
(2,4) (3,9) (4,16) (4,25)
```

Sample Run 2:
Enter first: **-3**
Enter last: **1**
```
(-3,9) (-2,4) (-1,1) (0,0) (1,1)
```

Sample Run 3:
Enter first: **10**
Enter last: **7**
```
Invalid range as 10 is not less than or equal to 7.
```

Note: The following task is **mandatory for PhD students.** However, MPhil students can perform this task as a bonus task.

Task 8

Write a program that calculates the balance of a savings account at the end of a period of time. It should ask the user for the annual interest rate, the starting balance, and the number of months that have passed since the account was established. A loop should then iterate once for every month, performing the following:

A. Ask the user for the amount deposited into the account during the month. (Do not accept negative numbers.) This amount should be added to the balance.
B. Ask the user for the amount withdrawn from the account during the month. (Do not accept negative numbers.) This amount should be subtracted from the balance.
C. Calculate the monthly interest. The monthly interest rate is the annual interest rate divided by twelve. Multiply the monthly interest rate by the balance and add the result to the balance.

After the last iteration, the program should display the ending balance, the total amount of deposits, the total amount of withdrawals, and the total interest earned.

NOTE: If a negative balance is calculated at any point, a message should be displayed indicating the account has been closed and the loop should terminate.