CSE100 Fundamentals of Computer Programming

Programming Assignment – 1

Submission Date: On or Before December 10, 2022

Instructions

- First design algorithms or flowchart for the following problems and then implement the same using 'Python' programming language. Create flowchart and algorithms related to any 10 problems.
- Use meaningful and descriptive variable/identifier names.
- Every Program should have header and footer having required information in multi-line comments.

Submission details: Submit your assignment on lms.ahduni.edu.in before given submission date.

Topics covered: Problem Solving, Algorithms, Flowcharts, Programming Foundations, Basics of Python - Data types, Operators, Expression evaluation, Decision Making, Loops, break/continue, series, list, dataframe, etc.

Write a Python program to solve the following problem definition. [Develop dynamic programs and read required inputs from users at runtime.]

1. Write a Python program to print your ID – Card (Concept to learn: Formatted output).

2. Write a Python program to input a number and check whether the entered number is even or odd.

3. Write a Python program to check whether a number is divisible by 5 or not.

4. Write a Python program to read a month number and print corresponding month name.

   Sample output:
   Enter Month Number: 11
   November

5. Write a Python program to find the Square Root of a given number.

6. Write a Python program to input angles of a triangle and check whether triangle is valid or not.

7. Write a Python program to calculate the Area of a Triangle.

8. Make a program that asks the number between 1 and 10. If the number is out of range the program should display “invalid number”.

9. Write a Python program that generates and prints 100 random numbers.

10. Write a Python program to check whether a person is eligible to vote or not.

11. Write a program to accept two numbers and one mathematical operator. Calculate and display appropriate answer as shown below:

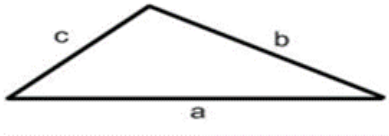
Sample output:
Enter first number : 5
Enter mathematical operator : +
Enter second number : 6
5 + 6 = 11

12. Write a program called ExtractDigits to extract each digit from an int in the reverse order. For example, if the int is 12345, the output shall be "5 4 3 2 1", with a space separating the digits.

13. Accept a number N from the user and print the first N elements of the Fibonacci series.

Hint: *The Fibonacci sequence: 0, 1, 1, 2, 3, 5, 8, 13, 21*
Fibonacci series is defined as a sequence of numbers in which the first two numbers are 1 and 1, or 0 and 1, depending on the selected beginning point of the sequence, and each subsequent number is the sum of the previous two. So, in this series, the nth term is the sum of (n-1)th term and (n-2)th term.
Mathematically, the nth term of the Fibonacci series can be represented as:
tn = tn-1 + tn-2

14. Calculate the area of triangle given its three sides. The formula or algorithm used is:
Area = sqrt(s(s – a)(s – b)(s – c)), where s = (a + b + c) / 2 or perimeter / 2 and a, b & c are the sides of triangle.



The area is calculated by

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

Where s is the semi perimeter

I.e., $s = \frac{a+b+c}{2}$

15. Calculate income tax for the given income by following the given rules:

Income	**Rate (in %)**
upto Rs 5,00,000	0%
upto Rs 10,00,000	10% (of income above 5,00,000)
above Rs 10,00,000	20% (of income above 10,00,000)

Expected Output:

Enter your income (Rs): 600000

Income tax payable by you (Rs) = 10000/-

16. Write a program to calculate the electricity bill (accept the number of electricity units used from user) using following details:

Units	**Price/unit**
Up to 100 units	No charge
After 100 units	Rs 5 per unit
After 500 units	Rs 8 per unit

17. Write to program to print following series using looping concept (use *while* or *for* loop).

A. 1, 2, 3, 4 100

B. 100, 99, 98.....1

C. 1, 3, 5, 7.....99

D. 2, 4, 8, 16, 32, 64

18. Write a python program to store telephone directory record of a person using a dictionary type variable. Print the stored details using get().

19. Write a python program to check whether the entered number is an Armstrong number or not.

20. Write a python program to declare and define a list variable with 10 values. Moreover, print the 5th element of the list using a positive and negative index value.

21. Write a python program to print date and time being shown in your computer.

22. Create a .csv file which has ten students' marks in seven subjects. Write a python program to import this file in your code. Print the data which is stored in the 4th column and 3rd row.

23. Create a .csv file which has ten students' marks in seven subjects. Write a python program to print the names of the students who have achieved the maximum marks in each subject.

24. Create a .csv file which has ten students' marks in seven subjects. Write a python program to find mean marks for each subject. Moreover, visualize the marks of all students in each subject using a box plot.

25. Write a python program using conditional statements to allocate multiple grades as per the marks range. For example, a student having marks greater than or equal to 95 should get an A+ grade.

26. Write a python program using a loop to go through a list of elements. For each element, check if the number is even or odd. Store the output for each element in a separate list and merge both the lists together.

27. Create a .csv file of ten students' marks in seven subjects. Read that file as a list in python program. Then, convert the list as Pandas dataframe and print the dataframe.

28. Create a .csv file of ten students' marks in seven subjects. Read the .csv file as a Series in python program. Then, convert the list as Pandas dataframe and print the dataframe.

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