2020 - ESS 112 Programming in Python

Assignment 1

November 2020

Instructions to submit the assignment:

- Answer all the theory questions in a text file and name it "theory.txt"
- For every coding question, write your program in a separate file and name it as *question_num.py*. For question 2, name it **"2.py"**
- Make a submission folder and put the theory.txt and all the python files inside it.
- Name your submission folder as RollNumber_a*(assignment number)*.
  For example, IMT2020001_a1.
- Compress your submission folder as a zip file and submit it on the LMS submission link.
- For questions that ask you to take an input, you can either write the input yourself or take an input from the terminal.

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1. Explain briefly the data types in python - *int, float, string.*
   Show what the "+" operator does, with examples, when used as -
   (a) *int* + *int*
   (b) *float* + *float*
   (c) *string* + *string*
   (d) *int* + *float*
   (e) *int* + *string*
   (f) *float* + *string*
2. Answer the following briefly:
   (a) What are *boolean* expressions in python?
   (b) What are relational operators? List the different relational operators. Give one example of its use for each.
   (c) What are logical operators? List the different logical operators.
   Give one example of its use for each.
3. What is the precedence of operators in Python? For example, given the expression

   2 + 6 / 3 >= 4 * 2 - 1.8 `or` "python" == "is fun"

   In what order are the operators evaluated (feel free to look it up)? What will the output of this expression be?

4. Write a program that takes a number as input (that represents the length of the side of a square), and prints out the length of the diagonal, perimeter and area of the square.
   Sample Input/Output:
   Input:
   6
   Output:
   Diagonal length = 8.49
   Perimeter = 24
   Area = 36

5. Write a program that takes two numbers a and b as input, and outputs the remainder obtained on performing the operation a/b.
   Sample Input/Output:
   Input:
   27
   5
   Output:
   2

6. Write a program to swap two numbers.
   (a) With temporary variable
   (b) Without temporary variable
   Sample Input/Output:
   Input:
   a = 9
   b = 3
   Output:
   a = 3
   b = 9

7. Write a Python program that accepts an integer (n) and computes the value of expression : $n + (n * n) + (n * n * n)$.
   Sample Input/Output:
   Input:
   5
   Output:
   155

8. Write a Python program that converts km to miles
   Sample Input/Output:
   Input:
   1 km
   Output:
   0.621 miles

9. Write a Python program to find
   (a) The greatest integer smaller than or equal to number n
   (b) The smallest integer greater than number n
   Sample Input/Output 1:
   Input:
   $n = 3.455$
   Output:
   (a) 3
   (b) 4

   Sample Input/Output 2:
   Input:
   $n = 3$
   Output:
   (a) 3
   (b) 4

10. Given a float x and an integer y, print the statement "The result of x to the power y is x^y"
    Sample Input/Output:
    Input:
    $x = 2.7$
    $y = 2$
    Output:
    The result of 2.7 to the power 2 is 7.29