CHAPMAN University
Department of Computational and Data Sciences
CS501 Introductory Computation for Scientists
Fall 2019
Homework#3

Date Given: Sep 4, 2019   Due Date: Sep 10, 2019
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There are 7 problems in this homework assignment. Write a program in Python to solve these problems.
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1. Create a Python script to do the following
   - Create a vector 'x' with values from 100 to 109.
   - Create a vector 'y' with values 34, 28, 45, 67, 89, 93, 24, 49, 11, 7
   - Add vector 'x' and 'y'

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2. Assuming that variables a, b, c, d, and f are scalars, write Python statements to compute and display the following expressions. Test your statements for the following values.
   a = 1.12,   b = 2.34,   c = 0.72,   d = 0.81,   f = 19.83

$$x = 1 + \frac{a}{b} + \frac{c}{f^2}$$ x = 1.4805

$$s = \frac{b-a}{d-c}$$ s = 13.5556

$$r = \frac{1}{\dfrac{1}{a} + \dfrac{1}{b} + \dfrac{1}{c} + \dfrac{1}{d}}$$ r = 0.2536

$$y = ab\frac{1}{c}\frac{f^2}{2}$$ y = 715.6766

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3. Use Python NumPy to calculate the following expressions. Check your answers with a calculator.

                                                           Correct Answer

a) $e^{(-2.1)^3} + 3.47\log(14) + \sqrt[4]{287}$ 8.09311

b) $(3.4)^7 \log(14) + \sqrt[4]{287}$ 6023.96436

c) $\cos^2\left(\dfrac{4.12\pi}{6}\right)$ 0.30624

d) $\cos\left(\dfrac{4.12\pi}{6}\right)^2$ -0.05872

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4. Write a program which will find all such numbers which are divisible by 7 but are not a multiple of 5, between 2000 and 3200 (both included). The numbers obtained should be printed in a comma-separated sequence on a single line.

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5. Write a program which can compute the factorial of a given numbers. The results should be printed in a comma-separated sequence on a single line.

   Suppose the following input is supplied to the program:
   8
   Then, the output should be:
   40320

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6. With a given integral number n, write a program to generate a dictionary that contains (i, i*i) such that is an integral number between 1 and n (both included). and then the program should print the dictionary.

   Suppose the following input is supplied to the program:
   8
   Then, the output should be:
   {1: 1, 2: 4, 3: 9, 4: 16, 5: 25, 6: 36, 7: 49, 8: 64}

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7. Write a program which accepts a sequence of comma-separated numbers from console and generate a list and a tuple which contains every number.

   Suppose the following input is supplied to the program:
   34,67,55,33,12,98

   Then, the output should be:
   ['34', '67', '55', '33', '12', '98']
   ('34', '67', '55', '33', '12', '98')