

CS1101_Assignment 3_2021

The challenge problems (Q4, Q7.3) are for your practice. You should attempt to solve them even though they will not be graded.

1. Write a python code that calculates the following sums in a single loop

$$\sum_{i=1}^n i^2 \text{ and } \sum_{i=1}^n i^3$$

Also calculate the expected answers by using the following:

$$\sum_{i=1}^n i^2 = \frac{1}{6}n(n+1)(2n+1) \quad \text{and} \quad \sum_{i=1}^n i^3 = \frac{1}{4}n^2(n+1)^2$$

2. Create a list of numbers having following pattern
[1,0,3,0,5,0,7,0,9,: :].

3. Create a list of integers where nth item of the list is given by $S_n = \sum_{i=1}^n i^2$

4. **Challenge problem:** Calculate (using for loop) the value of

$$1 + \frac{n}{1 + \frac{n-1}{1 + \frac{n-2}{1 + \frac{\dots}{1 + \frac{2}{1 + \frac{1}{1}}}}} \quad \square$$

5. Write a program which prints the elements of a Fibonacci series 1, 1, 2, 3, 5, 8, 13,, where each element is the sum of the two previous elements (the first two numbers are defined to be 1).

6. Write a program that will compute the square root of a given number. If the input is a negative number, the program should print an error message that invalid input is provided and continue to take the inputs until a valid (positive) input is provided.

Sample output:

Enter a positive integer and compute its square root:-23

Invalid input: -23

Enter a positive integer and compute its square root:-12

Invalid input: -12

7.1 Take the name and age of a student as input and store them in a tuple.

7.2. Take the same information (name and age) of 10 students and make a list of tuples.

7.3. *Challenge problem:* Search: take a name from the user as input and output the corresponding age.

8. Write a program to find the digits which are absent in a given mobile number.

9. Consider a list (rollnos) containing roll numbers of 20MS students in the format 20MSid (e.g. 20MS145, here id = 145). Use list comprehension to store the rollnos in a list 'GroupA' where id < 150 and store the rest in another list 'GroupB'. Print the contents of GroupA and GroupB.

10. Given the temperatures in Fahrenheit in a list 'fahrenheit', store the celsius equivalents in another list 'celsius' using list comprehension. You can choose the temperatures in the list fahrenheit. Take the length of the list to be 5.

11. Store the marks of five courses CS1101, CH2201, CS3201, CS3202 and LS2201 in a tuple 'marks'. Update 'marks' by adding grace marks of 5 for the marks less than 50.