Lecture 12: Introduction to Computer Programming Course - CS1010

DEPARTMENT OF COMPUTER SCIENCE | 10/18/2019

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Goals for today

- Lists
- Problems
- In Class Exercise

Object Types

Name	Type (representation)	Example
Integers	int	Whole Numbers: 1, 5 , 7500
Floating Point	float	Decimal: 2.3, 4.6, 23.15
Strings	str	Ordered sequence of characters: “hello” “Sam” “2000”
Lists	list	Ordered sequence of objects: [10, “hello”, 500.5]
Tuples	tup	Ordered immutable sequence of objects: (100,”Hello”, 20.5)
Booleans	bool	Logical Value: True, False

A few More Methods

- .strip()
- .split()
- .join()

Problem 1

- Given a List of ints, return True if the list is length 1 or more, and the first element and the last element are equal.
- Test cases
  same_first_last([1, 2, 3]) → False
  same_first_last([1, 2, 3, 1]) → True
  same_first_last([1, 2, 1]) → True

Problem 2

- Given a List of ints length 3, return the sum of all the elements.
- Test Cases:
  sum3([1, 2, 3]) → 6
  sum3([5, 11, 2]) → 18
  sum3([7, 0, 0]) → 7

Problem 3

- Given a List of integers, figure out which is larger, the first or last element in the array, and set all the other elements to be that value. Return the changed array.
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  max_end3([1, 2, 4,3]) → [3, 3, 3,3]
  max_end3([11, 5, 9]) → [11, 11, 11]
  max_end3([2, 11, 3]) → [3, 3, 3]

Problem 4

- Given 2 int Lists, a and b, each length 3, return a new list of length 2 containing their middle elements.
- Test Cases:
  middle_way([1, 2, 3], [4, 5, 6]) → [2, 5]
  middle_way([7, 7, 7], [3, 8, 0]) → [7, 8]
  middle_way([5, 2, 9], [1, 4, 5]) → [2, 4]

Problem 5

- Given two matrices of size 3X3. Return a list/array that sums each element of the first row of the first matrix with each element of the first column of second matrix.
- Test Case:
- Result: [10,8,6]

```
X = [[1,2,3],
     [4 ,5,6],
     [7 ,8,9]]

Y = [[9,8,7],
     [6,5,4],
     [3,2,1]]
```

Problem 6

- Given 2 integer lists, check if the first element of the sub-list is present in the original list
- Test cases:
- List=[3,6,1,9,10], sub_list=[1,10]→ True
- List=[1,2,3,4], sub_list=[5,7] → False

Problem 7

- Check if all values in a list are smaller than a given value.
- Test cases:
- List=[20,12,31, 15]; Value = 22 ; result = False
- List=[35,42,68,10]; Value = 75 ; result = True
- List=[57,29,6,100]; Value = 100 ; result = True

Problem 8

- Check if a list has a given number. If the number exists return its index, if not then return False.
- List = [1,2,3,4,5]; Number=6; Result= False
- List = [3,4,6,8]; Number = 6; Result = 2
- List = [9,12,13,15]; Number = 15; Result=3

Problem 9

- Given a list that has a student’s record:
- L = [‘Sam', 3.75, ['MATH', 'CSCI', 'PHYS'], ‘NY']
- The list has student name, GPA, List of courses and State.
- Write code to print the courses, next: change the ‘MATH’ course to a ‘STAT’ course, and append a zipcode=12180 to the main list.

In Class Exercise

- Given In Class

Next Week

- While Loops