Lecture 11: Introduction to Computer Programming Course - CS1010

DEPARTMENT OF COMPUTER SCIENCE | 02/21/2019

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Goals for today

- Lists
- Problems
- In Class Exercise

Object Types (Lecture 2)

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]
Dictionary	dict	Unordered Key Value pairs: {“mykey”:”Value”, “place”: “New York”}
Tuples	tup	Ordered immutable sequence of objects: (100,”Hello”, 20.5)
Sets	set	Unordered collection of unique objects: {“a”,”b”}
Booleans	bool	Logical Value: True, False

Problem 1

- Given an array of ints, return True if the array 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

Solution

- Check for length greater than 0
- Compare the first and last element
  - Return True if yes
  - Return False if not

Problem 2

- Given an array 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 an array 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.
- Test cases
  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 arrays, a and b, each length 3, return a new array 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]]
```

Solution

- Think of Nested Lists
- Index the correct element

Problem 6

- Given 2 integer arrays, check if the first element of the sublist 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

Solution

- Check for first element of sub-list in original list

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

Solution

- Use one built-in function

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

Solution

- Use the built in method index()

In Class Exercise

- Given In Class

Next Week

- While Loops