

Python Programming

Homework 1

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Teaching, Training and Coaching since more than a decade!

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Homework 1: Is increasing array?

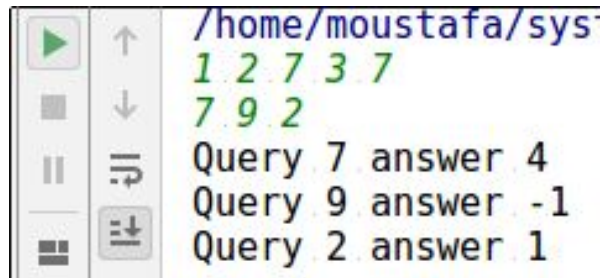
- Read a line of N integers
- Print YES if the list is increasing.
 - List is increasing if every element is \geq the previous number
- Inputs
 - 1 2 2 5 \Rightarrow YES
 - 1 0 7 8 9 \Rightarrow NO [0 is $<$ 1, the previous number]
 - -10 10 \Rightarrow YES

Homework 2: Replace MinMax

- Read a line of N integers
- Print the numbers after doing the following operations:
 - Find minimum number in these numbers.
 - Find maximum number in these numbers.
 - Replace **each** minimum number with maximum number and Vice Versa.
- Input \Rightarrow Output
 - 4 **1** 3 10 8 **10 10** \Rightarrow 4 10 3 1 8 1 1
- Create function `def replace_min_max_inplace(lst):`
 - The function doesn't return a list. It makes in-place modification

Homework 3: Search for a number

- Read a line of N integers, where $0 \leq \text{value in a list} \leq 500$
- Then read a line of Q integer, each one is a query: $[0, 500]$
 - For each integer, print the index of the **last occurrence** in the list or -1 if it doesn't exist
- Output Explanation
 - 4 [7 exists in 2 positions (2 and 4). The last is 4)
 - -1 [9 doesn't exist)
 - 1 [2 exists only in position 1]
- Do it first in 2 loops
- Can you do it in 1 loop using the Frequency Trick?



```
/home/moustafa/sys
1 2 7 3 7
7 9 2
Query 7 answer 4
Query 9 answer -1
Query 2 answer 1
```

Homework 4: Unique Numbers of unordered

- Read a line of N integers. They are not ordered.
- Print the unique list of the numbers, but preserve the given order
- Input: 1 5 5 2 5 7 2 3 3 3 5 2 7
- Output: 1 5 2 7 3
 - Observe: input is not sorted list
 - Observe: output preserves the original order: e.g. 5 appears before 2

Homework 5: Unique Numbers of ordered

- Read a line of N integers. They are ordered.
 - Previous solution can work. But can we make a faster code?
- Print the unique list of the numbers, but preserve the given order
- Input: 1 1 2 2 2 5 6 6 7 8 9 9
- Output: 1 2 5 6 7 8 9
 - Observe: input is sorted list

Homework 6: Smallest pair

- Read a line of N integers.
- Print the smallest possible result of $A[i] + A[j] + j - i$
 - where $0 \leq i < j \leq N-1$.
- Input \Rightarrow Output
 - 20 1 9 4 \Rightarrow 7

Homework 7: Find the 3 minimum values

- Read a line of N integers.
- Find the 3 lowest numbers. If there are less than 3, just consider them.
 - Don't change the list content or create equivalent memory (e.g. .copy)
 - Don't iterate on the list more than once
- Input \Rightarrow Output
 - 4 1 3 10 8 \Rightarrow 1 3 4
 - 7 9 -2 \Rightarrow -2 7 9
 - 1 -5 \Rightarrow -5 1 [< 3 nums: just use them, print sorted]

“Acquire knowledge and impart it to the people.”

“Seek knowledge from the Cradle to the Grave.”