

CSI 33 Lecture 1

We will review:

- assignment statements
- loops and control structures
- arrays and vector class in C++, lists in Python

#1 The product and the average of three numbers

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 - Where to output the answer to?
 -?

The product and the average of three numbers

- Let's write a program that finds the product and the average of three numbers.
 - What clarifying questions would you ask?
 - What type of numbers should we expect? **decimals**
 - Should we define a function? **not now, but may be later**
 - Should we do input checks? How do we get the input?
prompt the user to enter the values, no checks
 - **Output the answer as soon as you get it by displaying on the screen**

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 - Should we check type/value of entered n?
 - Should we define a function? **whatever you prefer**
 - Where to output the answer to? **output the answer as soon as you get it by displaying on the screen**

#3 Linear Search

- Let's implement the following algorithm that performs *linear search* of a value *target* in the list/array/sequence of *items*.
- If the *target* is present, it returns its position, otherwise it returns -1:

```
LinearSearch(items, target):  
    i = 0  
    while i < len(items):  
        if items[i] == target: return i  
        i += 1  
    return -1
```

#4 Binary Search

- Let's implement the *binary search* of a value **target** in the ordered sequence of **items**.
- If the **target** is present, it returns its position, and -1 otherwise.

```
def binarySearch(items, target):  
    low = 0, high = len(items) - 1  
    while low <= high:  
        mid =  $\left\lfloor \frac{low+high}{2} \right\rfloor$   
        midItem = items[mid]  
        if target == midItem:  
            return mid  
        else if target < item:  
            high = mid - 1  
        else:  
            low = mid + 1  
    return -1
```