



DATA STRUCTURES LAB

Lab Assignment
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Csc-201

TASK 1: DESIGN A LINEAR ARRAY B [] OF SIZE 7 ELEMENTS. PUT THE FOLLOWING ELEMENTS IN IT.

S, U, G, A, Z, E, Y

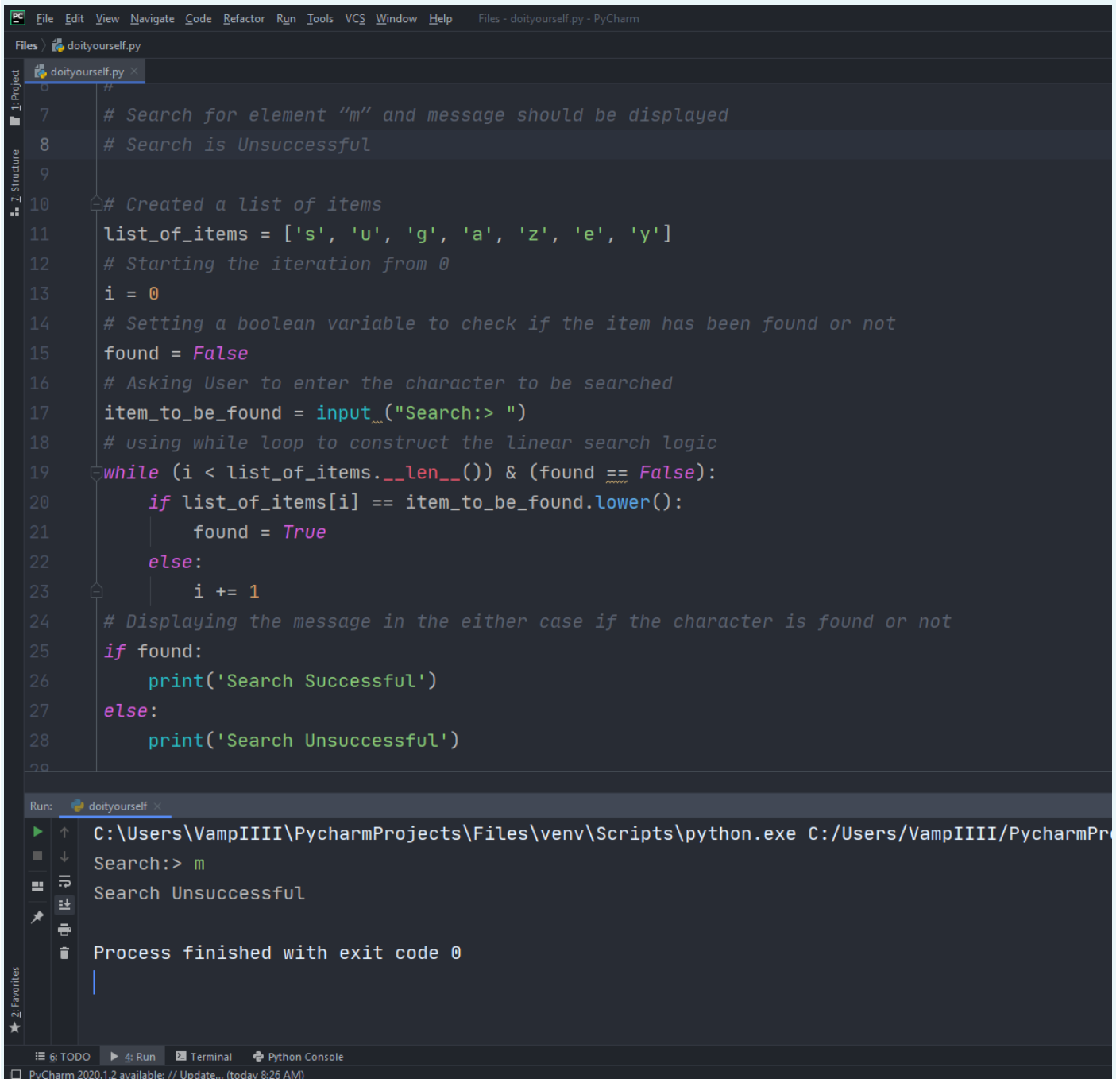
(A). IMPLEMENT THE LINEAR SEARCH ALGORITHM ON IT TO FIND "G" AND DISPLAY THE MESSAGE
ELEMENT G IS FOUND SUCCESSFULLY

```
File Edit View Navigate Code Refactor Run Tools VCS Window Help Files - doityourself.py - PyCharm
Files > doityourself.py
doityourself.py x
1 # Implement the Linear Search Algorithm on it to find "g" and display the message
2 # Element g is found successfully
3
4 # Created a list of items
5 list_of_items = ['s', 'u', 'g', 'a', 'z', 'e', 'y']
6 # Starting the iteration from 0
7 i = 0
8 # Setting a boolean variable to check if the item has been found or not
9 found = False
10 # Asking User to enter the character to be searched
11 item_to_be_found = input("Search:> ")
12 # using while loop to construct the linear search logic
13 while (i < list_of_items.__len__()) & (found == False):
14     if list_of_items[i] == item_to_be_found.lower():
15         found = True
16     else:
17         i += 1
18 # Displaying the message in the either case if the character is found or not
19 if found:
20     print('Search Successful')
21 else:
22     print('Search Unsuccessful')
23
24 while (i < list_of_items.__len__()) & if list_of_items[i] == item_to_...
```

```
Run: doityourself x
C:\Users\VampIIII\PycharmProjects\Files\venv\Scripts\python.exe C:/Users/VampIIII/Py
Search:> g
Search Successful
Process finished with exit code 0
```

PyCharm 2020.1.2 available: // Update... (50 minutes ago)

(B). SEARCH FOR ELEMENT "M" AND MESSAGE SHOULD BE DISPLAYED SEARCH IS UNSUCCESSFUL



The screenshot displays the PyCharm IDE interface. The main editor window shows a Python script named `doityourself.py`. The script's logic is as follows:

```
7 # Search for element "m" and message should be displayed
8 # Search is Unsuccessful
9
10 # Created a list of items
11 list_of_items = ['s', 'u', 'g', 'a', 'z', 'e', 'y']
12 # Starting the iteration from 0
13 i = 0
14 # Setting a boolean variable to check if the item has been found or not
15 found = False
16 # Asking User to enter the character to be searched
17 item_to_be_found = input("Search:> ")
18 # using while loop to construct the linear search logic
19 while (i < list_of_items.__len__()) & (found == False):
20     if list_of_items[i] == item_to_be_found.lower():
21         found = True
22     else:
23         i += 1
24 # Displaying the message in the either case if the character is found or not
25 if found:
26     print('Search Successful')
27 else:
28     print('Search Unsuccessful')
```

The Run window at the bottom shows the execution of the script. The command prompt displays the following output:

```
C:\Users\VampIIII\PycharmProjects\Files\venv\Scripts\python.exe C:/Users/VampIIII/PycharmPr
Search:> m
Search Unsuccessful

Process finished with exit code 0
```

The status bar at the bottom of the IDE indicates "PyCharm 2020.1.2 available: // Update... (today 8:26 AM)".

TASK 2: SUPPOSE THERE IS A LIST OF 6 UNSORTED ELEMENTS.

15, 10, 12, 11, 9, 10

DESIGN A PROGRAM TO CREATE AN ARRAY A [] AND STORE THIS LIST IN IT, AND THEN APPLY INSERTION SORT ALGORITHM TO SORT THE LIST.

```
6 # Python program for implementation of Insertion Sort
7
8 # Creating the given list/array
9 given_list_of_elements = [15, 10, 12, 11, 9, 10]
10 # Printing the given list
11 print(f"given array is: {given_list_of_elements}")
12 # using nested for and while loops the construct the logic for insertion Sorting
13 for i in range(1, len(given_list_of_elements)):
14     key = given_list_of_elements[i]
15     j = i - 1
16     while j >= 0 and key < given_list_of_elements[j]:
17         given_list_of_elements[j + 1] = given_list_of_elements[j]
18         j -= 1
19     given_list_of_elements[j + 1] = key
20
21 # Printing the sorted array in comparison to the given array
22 print(f"Sorted array is: {given_list_of_elements}")
23
```

Run: doityourself

```
C:\Users\VampIIII\PycharmProjects\Files\venv\Scripts\python.exe C:/Users/VampIIII/Pycharm
given array is: [15, 10, 12, 11, 9, 10]
Sorted array is: [9, 10, 10, 11, 12, 15]

Process finished with exit code 0
```