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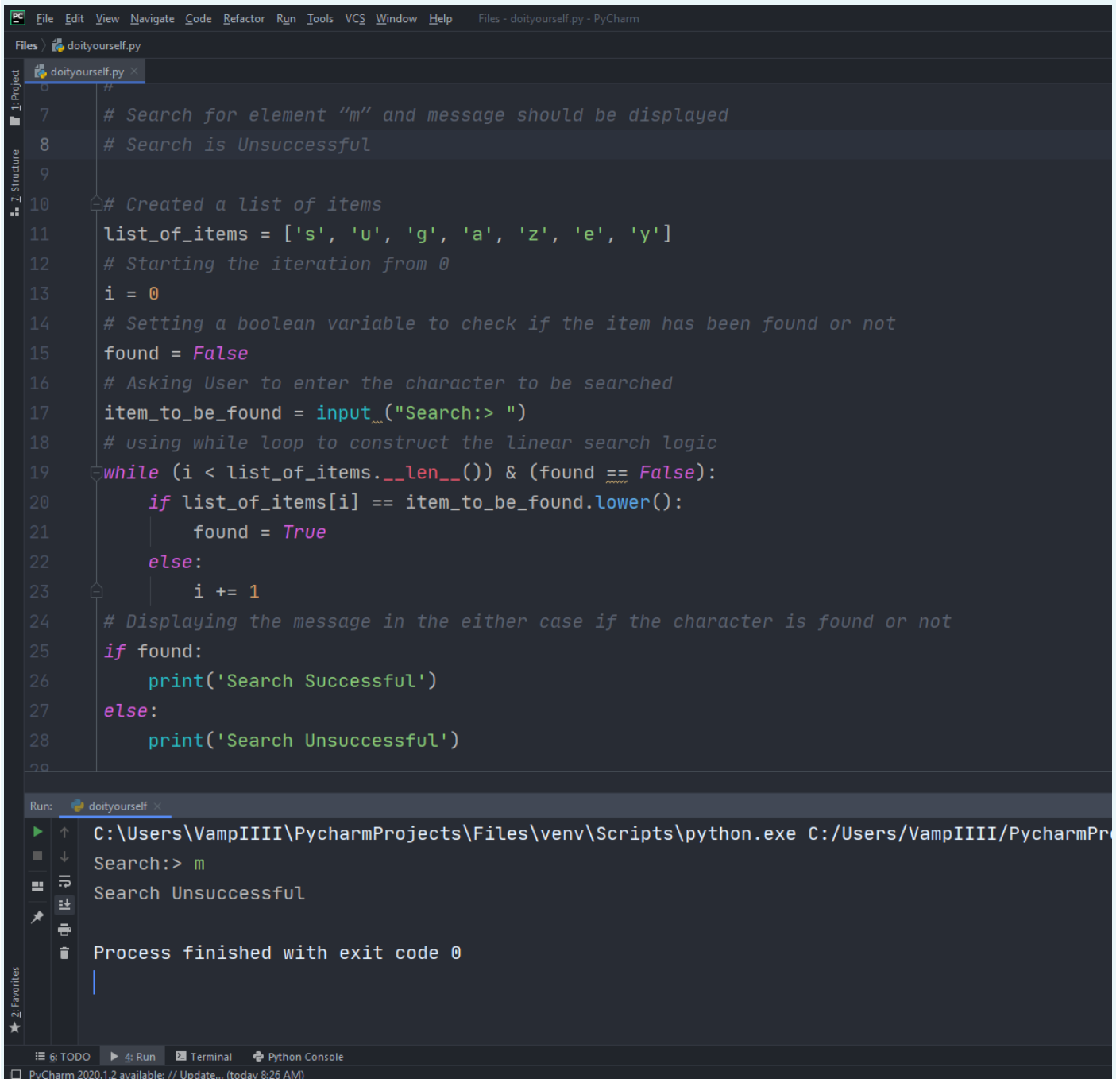## S, U, G, A, Z, E, Y

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

```python
# Implement the Linear Search Algorithm on it to find "g" and display the message
# Element g is found successfully

# Created a list of items
list_of_items = ['s', 'u', 'g', 'a', 'z', 'e', 'y']
# Starting the iteration from 0
i = 0
# Setting a boolean variable to check if the item has been found or not
found = False
# Asking User to enter the character to be searched
item_to_be_found = input("Search:> ")
# using while loop to construct the linear search logic
while (i < list_of_items.__len__()) & (found == False):
    if list_of_items[i] == item_to_be_found.lower():
        found = True
    else:
        i += 1
# Displaying the message in the either case if the character is found or not
if found:
    print('Search Successful')
else:
    print('Search Unsuccessful')
```

```
C:\Users\VampIIII\PycharmProjects\Files\venv\Scripts\python.exe C:/Users/VampIIII/Pyc
Search:> g
Search Successful


Process finished with exit code 0
```

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

```python
# Search for element "m" and message should be displayed
# Search is Unsuccessful

# Created a list of items
list_of_items = ['s', 'u', 'g', 'a', 'z', 'e', 'y']
# Starting the iteration from 0
i = 0
# Setting a boolean variable to check if the item has been found or not
found = False
# Asking User to enter the character to be searched
item_to_be_found = input("Search:> ")
# using while loop to construct the linear search logic
while (i < list_of_items.__len__()) & (found == False):
    if list_of_items[i] == item_to_be_found.lower():
        found = True
    else:
        i += 1
# Displaying the message in the either case if the character is found or not
if found:
    print('Search Successful')
else:
    print('Search Unsuccessful')
```

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


Process finished with exit code 0
```

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.

```python
# Python program for implementation of Insertion Sort

# Creating the given list/array
given_list_of_elements = [15, 10, 12, 11, 9, 10]
# Printing the given list
print(f"given array is: {given_list_of_elements}")
# using nested for and while loops the construct the logic for insertion Sorting
for i in range(1, len(given_list_of_elements)):
    key = given_list_of_elements[i]
    j = i - 1
    while j >= 0 and key < given_list_of_elements[j]:
        given_list_of_elements[j + 1] = given_list_of_elements[j]
        j -= 1
    given_list_of_elements[j + 1] = key

# Printing the sorted array in comparison to the given array
print(f"Sorted array is: {given_list_of_elements}")
```

```
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
```