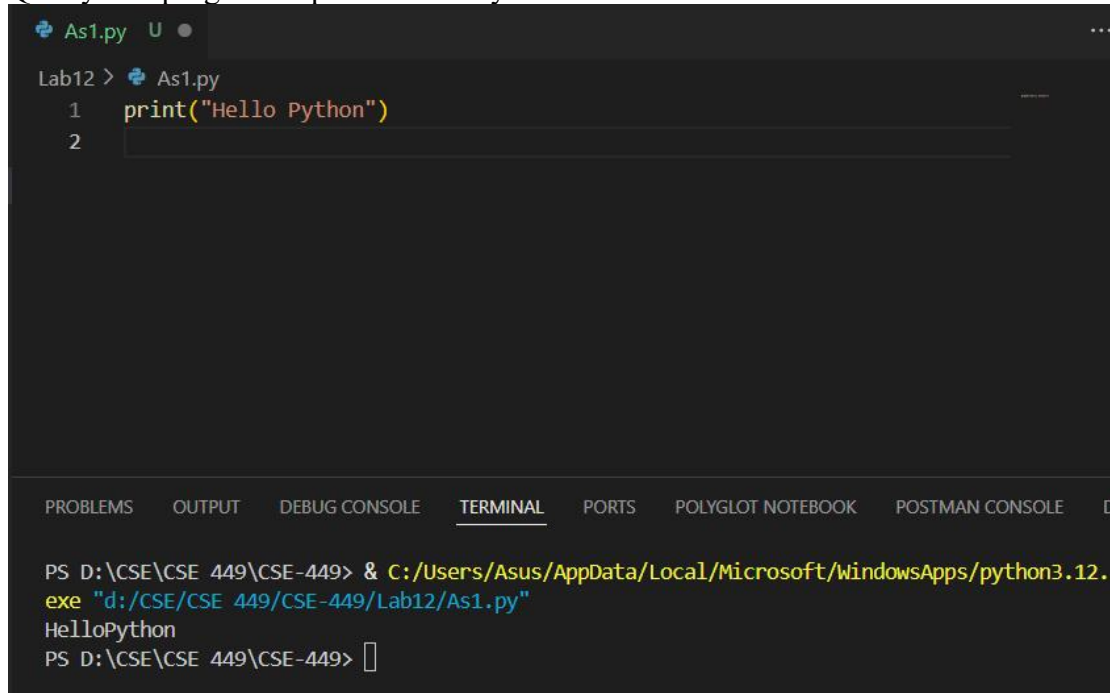


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Student ID: 2031200078

Q1. Python program to print “Hello Python”



The screenshot shows a code editor with a file named 'As1.py' open. The code contains a single line: `print("Hello Python")`. Below the code editor, the 'TERMINAL' tab is active, showing the command `PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.exe "d:/CSE/CSE 449/CSE-449/Lab12/As1.py"` and its output, `HelloPython`.

```
As1.py U
Lab12 > As1.py
1  print("Hello Python")
2
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE D
PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.
exe "d:/CSE/CSE 449/CSE-449/Lab12/As1.py"
HelloPython
PS D:\CSE\CSE 449\CSE-449> 
```

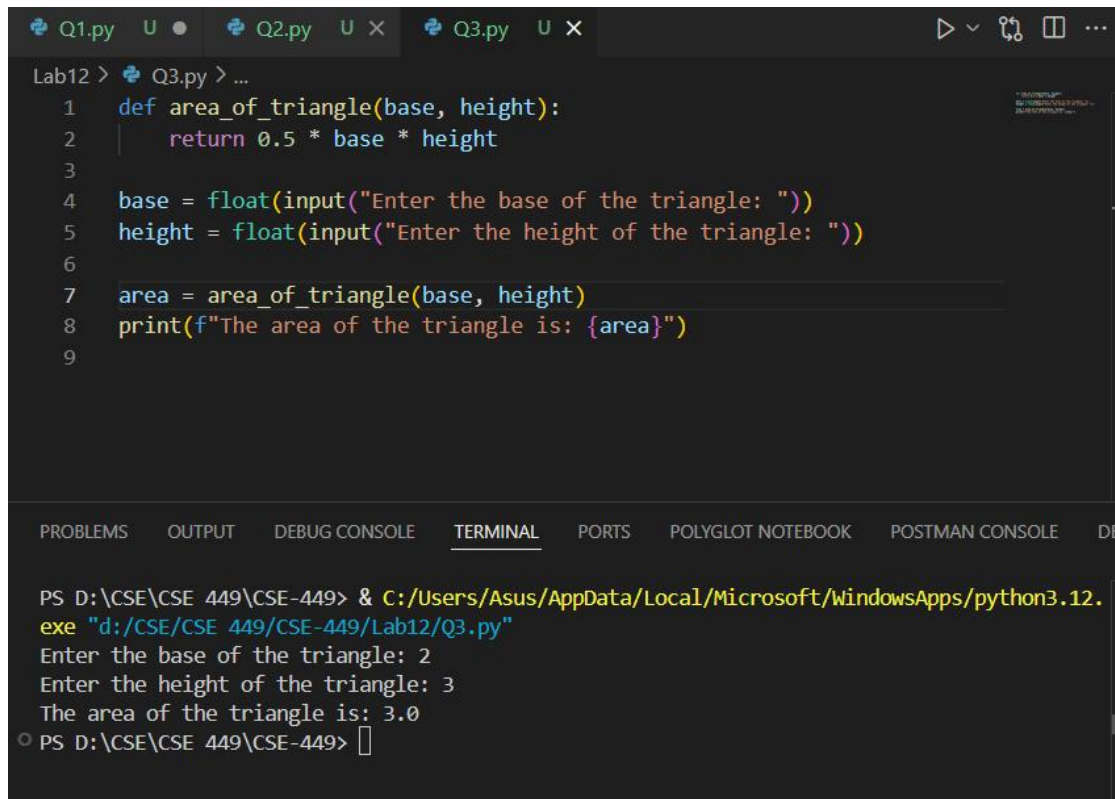
Q2. Python program to do arithmetical operations

```
Lab12 > Q2.py > divide
1  def add(x, y):
2      return x + y
3
4  def subtract(x, y):
5      return x - y
6
7  def multiply(x, y):
8      return x * y
9
10 def divide(x, y):
11     if y != 0:
12         return x / y
13     else:
14         return "Cannot divide by zero"
15
16 print("Select operation:")
17 print("1. Add")
18 print("2. Subtract")
19 print("3. Multiply")
20 print("4. Divide")
21
22 choice = input("Enter choice (1/2/3/4): ")
23
24 num1 = float(input("Enter first number: "))
25 num2 = float(input("Enter second number: "))
26
27 if choice == '1':
28     result = add(num1, num2)
29     print(f"{num1} + {num2} = {result}")
30 elif choice == '2':
31     result = subtract(num1, num2)
32     print(f"{num1} - {num2} = {result}")
33 elif choice == '3':
34     result = multiply(num1, num2)
35     print(f"{num1} * {num2} = {result}")
36 elif choice == '4':
37     result = divide(num1, num2)
38     print(f"{num1} / {num2} = {result}")
39 else:
40     print("Invalid choice")
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE

```
2. Subtract
3. Multiply
4. Divide
Enter choice (1/2/3/4): 1
Enter first number: 1
Enter second number: 1
1.0 + 1.0 = 2.0
PS D:\CSE\CSE 449\CSE-449>
```

Q3. Python program to find the area of a triangle



The image shows a code editor with three tabs: Q1.py, Q2.py, and Q3.py. The Q3.py tab is active, displaying a Python program. The program defines a function `area_of_triangle` that takes `base` and `height` as arguments and returns the area calculated as `0.5 * base * height`. Below the function definition, the program prompts the user to enter the base and height of a triangle, converts these inputs to floats, calls the `area_of_triangle` function, and prints the result.

```
Lab12 > Q3.py > ...
1  def area_of_triangle(base, height):
2      return 0.5 * base * height
3
4  base = float(input("Enter the base of the triangle: "))
5  height = float(input("Enter the height of the triangle: "))
6
7  area = area_of_triangle(base, height)
8  print(f"The area of the triangle is: {area}")
9
```

Below the code editor is a terminal window with the following output:

```
PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.
exe "d:/CSE/CSE 449/CSE-449/Lab12/Q3.py"
Enter the base of the triangle: 2
Enter the height of the triangle: 3
The area of the triangle is: 3.0
PS D:\CSE\CSE 449\CSE-449>
```

Q4. Python program to generate a random number

```
Q1.py U • Q2.py U Q3.py U Q4.py U X
Lab12 > Q4.py > main
1 # Q4. Python program to generate a random number
2 import random
3 import time
4
5 def generate_random_number():
6     return random.randint(1, 100)
7
8 def main():
9     print("Welcome to the Random Number Generator!")
10    time.sleep(1)
11    print("Generating a random number between 1 and 100...")
12    time.sleep(2)
13    random_number = generate_random_number()
14    print(f"The generated random number is: {random_number}")
15    time.sleep(1)
16    print("Thank you for using the Random Number Generator!")
17    time.sleep(1)
18
19 if __name__ == "__main__":
20     main()

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE D
exe "d:/CSE/CSE 449/CSE-449/Lab12/Q4.py"
Welcome to the Random Number Generator!
Generating a random number between 1 and 100...
The generated random number is: 86
Thank you for using the Random Number Generator!
PS D:\CSE\CSE 449\CSE-449>
```

Q5. Python program to Find the Factorial of a Number

```
1.py U • Q2.py U × Q3.py U Q4.py U Q5.py U × ▸ ▾ 🔍 □ ...
Lab12 > Q5.py > ...
1  # Q5. Python program to Find the Factorial of a Number
2  def factorial(n):
3      if n == 0:
4          return 1
5      else:
6          return n * factorial(n-1)
7
8  def main():
9      num = int(input("Enter a number: "))
10     result = factorial(num)
11     print(f"The factorial of {num} is: {result}")
12
13 if __name__ == "__main__":
14     main()
15
16

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE DEV
PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.
exe "d:/CSE/CSE 449/CSE-449/Lab12/Q5.py"
Enter a number: 5
The factorial of 5 is: 120
○ PS D:\CSE\CSE 449\CSE-449> 
```

Q6. Python program to Find LCM

```
2.py U Q3.py U Q4.py U Q5.py U Q6.py U x
Lab12 > Q6.py > ...
1 # Q6. Python program to Find LCM
2 def gcd(a, b):
3     while b:
4         a, b = b, a % b
5     return a
6
7 def lcm(a, b):
8     return abs(a * b) // gcd(a, b)
9
10 def main():
11     num1 = int(input("Enter first number: "))
12     num2 = int(input("Enter second number: "))
13     result = lcm(num1, num2)
14     print(f"The LCM of {num1} and {num2} is: {result}")
15
16 if __name__ == "__main__":
17     main()

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE D
PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.
exe "d:/CSE/CSE 449/CSE-449/Lab12/Q6.py"
Enter first number: 5
Enter second number: 10
The LCM of 5 and 10 is: 10
PS D:\CSE\CSE 449\CSE-449> 
```

Q7. Python program to Find HCF

```
3.py U Q4.py U Q5.py U Q6.py U Q7.py U x ▾ ↻ □ ...
Lab12 > Q7.py > main
1 # Q7. Python program to Find HCF
2 def hcf(a, b):
3     while b:
4         a, b = b, a % b
5     return a
6
7
8 def main():
9     num1 = int(input("Enter first number: "))
10    num2 = int(input("Enter second number: "))
11    result = hcf(num1, num2)
12    print(f"The HCF of {num1} and {num2} is: {result}")
13    return result
14
15 if __name__ == "__main__":
16     main()

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE DEV
PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.
exe "d:/CSE/CSE 449/CSE-449/Lab12/Q7.py"
Enter first number: 5
Enter second number: 6
The HCF of 5 and 6 is: 1
● PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.
exe "d:/CSE/CSE 449/CSE-449/Lab12/Q7.py"
Enter first number: 4
Enter second number: 6
The HCF of 4 and 6 is: 2
○ PS D:\CSE\CSE 449\CSE-449> |
```

Q8. Python program to Convert Decimal to Binary, Octal and Hexadecimal



```
4.py U Q5.py U Q6.py U Q7.py U Q8.py U x ▾ ↺ □ ...
Lab12 > Q8.py > main
1  # Q8. Python program to Convert Decimal to Binary, Octal and Hexadecim
2  def convert_decimal(number):
3      binary = bin(number)
4      octal = oct(number)
5      hexadecimal = hex(number)
6      return binary, octal, hexadecimal
7
8
9  def main():
10     number = int(input("Enter a decimal number: "))
11     binary, octal, hexadecimal = convert_decimal(number)
12     print(f"Binary: {binary[2:]}")
13     print(f"Octal: {octal[2:]}")
14     print(f"Hexadecimal: {hexadecimal[2:].upper()}")
15     return binary, octal, hexadecimal
16
17     main()
18

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE D
PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.
exe "d:/CSE/CSE 449/CSE-449/Lab12/Q8.py"
Enter a decimal number: 15
Binary: 1111
Octal: 17
Hexadecimal: F
○ PS D:\CSE\CSE 449\CSE-449> □
```

Q9. Python program to Find Factorial of Number Using Recursion



```
5.py U Q6.py U Q7.py U Q8.py U Q9.py U X ▶ 🔍 📄 ...
Lab12 > Q9.py > main
1 # Q9. Python program to Find Factorial of Number Using Recursion
2 def factorial(n):
3     if n == 0:
4         return 1
5     else:
6         return n * factorial(n-1)
7
8 def main():
9     num = int(input("Enter a number: "))
10    result = factorial(num)
11    print(f"The factorial of {num} is: {result}")
12
13 if __name__ == "__main__":
14    main()

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE DEV
PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/windowsApps/python3.12.
exe "d:/CSE/CSE 449/CSE-449/Lab12/Q9.py"
Enter a number: 5
The factorial of 5 is: 120
○ PS D:\CSE\CSE 449\CSE-449> █
```

Q10. Python program to print the elements of an array

```
6.py U Q7.py U Q8.py U X Q9.py U Q10.py U X ▶ 🔍 📄 ...
Lab12 > Q10.py > ...
1 # Q10. Python program to print the elements of an array
2 def print_array(arr):
3     for element in arr:
4         print(element, end=" ")
5     print()
6
7 def main():
8     arr = [1, 2, 3, 4, 5]
9     print("Elements of the array:")
10    print_array(arr)
11    return arr
12
13 main()

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE D
PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/windowsApps/python3.12.
exe "d:/CSE/CSE 449/CSE-449/Lab12/Q9.py"
Enter a number: 5
● The factorial of 5 is: 120
PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/windowsApps/python3.12.
exe "d:/CSE/CSE 449/CSE-449/Lab12/Q10.py"
Elements of the array:
○ 1 2 3 4 5
PS D:\CSE\CSE 449\CSE-449> █
```

Q11. Python program to print the element of an array in reverse order

```
7.py U Q8.py U X Q9.py U Q10.py U Q11.py U X
Lab12 > Q11.py > ...
1 # Q11. Python program to print the element of an array in reverse order
2 def print_array_reverse(arr):
3     for element in reversed(arr):
4         print(element, end=" ")
5     print()
6
7 def main():
8     arr = [1, 2, 3, 4, 5]
9     print("Elements of the array in reverse order:")
10    print_array_reverse(arr)
11    return arr
12
13 main()

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE D
PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.
exe "d:/CSE/CSE 449/CSE-449/Lab12/Q11.py"
Elements of the array in reverse order:
5 4 3 2 1
PS D:\CSE\CSE 449\CSE-449> 
```

Q12. Python program to Add two Matrices

```
py U Q8.py U X Q9.py U Q10.py U Q11.py U Q12.py U X ..
Lab12 > Q12.py > main
1 # Q12. Python program to Add two Matrices
2 def add_matrices(matrix_a, matrix_b):
3     result = [[0 for _ in range(len(matrix_a[0]))] for _ in range(len(matrix_a))]
4     for i in range(len(matrix_a)):
5         for j in range(len(matrix_a[0])):
6             result[i][j] = matrix_a[i][j] + matrix_b[i][j]
7     return result
8
9 def main():
10     # Define two matrices
11     matrix_a = [[1, 2, 3], [4, 6, 6], [7, 8, 9]]
12     matrix_b = [[9, 8, 7], [6, 5, 4], [3, 2, 1]]
13     # Add the matrices
14     result = add_matrices(matrix_a, matrix_b)
15     # Print the result
16     print("Resultant Matrix after Addition:")
17     for row in result:
18         print(row)
19     return result
20
21 main()

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE DEVTOOLS
• PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.exe "d:/CSE/CSE
449/CSE-449/Lab12/Q12.py"
Resultant Matrix after Addition:
[10, 10, 10]
[10, 10, 10]
[10, 10, 10]
• PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.exe "d:/CSE/CSE
449/CSE-449/Lab12/Q12.py"
Resultant Matrix after Addition:
[10, 10, 10]
[10, 11, 10]
[10, 10, 10]
○ PS D:\CSE\CSE 449\CSE-449> 
```

Q13. Python program to Multiply Two Matrices





```
py U Q10.py U Q11.py U Q12.py U Q13.py U Q14.py U X
Lab12 > Q14.py > main
1 # Q14. Python program to append element in the list and update list with insertion
2 def append_element(lst, element):
3     lst.append(element)
4     return lst
5 def insert_element(lst, index, element):
6     lst.insert(index, element)
7     return lst
8 def remove_element(lst, element):
9     lst.remove(element)
10    return lst
11 def compare_lists(lst1, lst2):
12    return lst1 == lst2
13 def main():
14    lst = [1, 2, 3, 4, 5]
15    print("Original List:", lst)
16    lst = append_element(lst, 6)
17    print("List after appending 6:", lst)
18    lst = insert_element(lst, 2, 10)
19    print("List after inserting 10 at index 2:", lst)
20    lst = remove_element(lst, 3)
21    print("List after removing 3:", lst)
22    lst2 = [1, 10, 2, 4, 5, 6]
23    are_equal = compare_lists(lst, lst2)
24    print("Are the two lists equal?", are_equal)
25    return lst, lst2, are_equal
26    main()

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE DEVTOOLS

PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.exe "d:/CSE/CSE
449/CSE-449/Lab12/Q14.py"
• Original List: [1, 2, 3, 4, 5]
List after appending 6: [1, 2, 3, 4, 5, 6]
List after inserting 10 at index 2: [1, 2, 10, 3, 4, 5, 6]
List after removing 3: [1, 2, 10, 4, 5, 6]
Are the two lists equal? False
○ PS D:\CSE\CSE 449\CSE-449>
```

### Q15. Python program to create a dictionary

```
Lab12 > Q15.py > ...
1 # Q15. Python program to create a dictionary
2 telephone_directory = {
3     "John": "123-456-7890",
4     "Jane": "987-654-3210",
5     "Alice": "555-555-5555",
6     "Bob": "444-444-4444"
7 }
8
9 def print_telephone_directory(directory):
10    for name, number in directory.items():
11        print(f"{name}: {number}")
12
13 print_telephone_directory(telephone_directory)

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE DEVTOOLS

PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.exe "d:/CSE/CSE
449/CSE-449/Lab12/Q15.py"
• John: 123-456-7890
Jane: 987-654-3210
Alice: 555-555-5555
Bob: 444-444-4444
○ PS D:\CSE\CSE 449\CSE-449>
```

### Q16. Python program to convert list to dictionary

```
l.py U Q12.py U Q13.py U Q14.py U Q15.py U Q16.py U x ▾ 🔍 □ ...
Lab12 > Q16.py > main
1 # Q16. Python program to convert list to dictionary
2 def list_to_dict(lst):
3     return {i: lst[i] for i in range(len(lst))}
4
5 def main():
6     lst = ['a', 'b', 'c', 'd']
7     result_dict = list_to_dict(lst)
8     print("List:", lst)
9     print("Dictionary:", result_dict)
10    return result_dict
11
12    main()

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE DEVTOOLS

PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.exe "d:/CSE/CSE
449/CSE-449/Lab12/Q16.py"
• List: ['a', 'b', 'c', 'd']
  Dictionary: {0: 'a', 1: 'b', 2: 'c', 3: 'd'}
○ PS D:\CSE\CSE 449\CSE-449>
```

### Q17. Python program to sort a dictionary

```
Lab12 > Q17.py > ...
1 # Q17. Python program to sort a dictionary
2 def sort_dict_by_value(d):
3     return dict(sorted(d.items(), key=lambda item: item[1]))
4
5 def main():
6     d = {'a': 5, 'b': 1, 'c': 9, 'd': 3}
7     sorted_dict = sort_dict_by_value(d)
8     print("Original Dictionary:", d)
9     print("Sorted Dictionary:", sorted_dict)
10    return sorted_dict
11
12    main()

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE DEVTOOLS

• PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.exe "d:/CSE/CSE
449/CSE-449/Lab12/Q17.py"
  Original Dictionary: {'a': 5, 'b': 1, 'c': 9, 'd': 3}
  Sorted Dictionary: {'b': 1, 'd': 3, 'a': 5, 'c': 9}
○ PS D:\CSE\CSE 449\CSE-449>
```

### Q18. Python program to Merge two Dictionaries

```
Lab12 > Q18.py > main
1 # Q18. Python program to Merge two Dictionaries
2 def merge_dicts(dict1, dict2):
3     return {**dict1, **dict2}
4
5 def main():
6     dict1 = {'a': 1, 'b': 2}
7     dict2 = {'c': 3, 'd': 4}
8     merged_dict = merge_dicts(dict1, dict2)
9     print("Merged Dictionary:", merged_dict)
10    return merged_dict
11
12    main()

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE DEVTOOLS

● PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.exe "d:/CSE/CSE
449/CSE-449/Lab12/Q18.py"
Merged Dictionary: {'a': 1, 'b': 2, 'c': 3, 'd': 4}
○ PS D:\CSE\CSE 449\CSE-449> 
```

### Q19. Binary Search in Python

```
Lab12 > Q19.py > ...
1 # Q19. Binary Search in Python
2 def binary_search(arr, target):
3     low, high = 0, len(arr) - 1
4     while low <= high:
5         mid = (low + high) // 2
6         if arr[mid] == target:
7             return mid
8         elif arr[mid] < target:
9             low = mid + 1
10        else:
11            high = mid - 1
12    return -1
13
14 def main():
15     arr = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
16     target = 71
17     result = binary_search(arr, target)
18     if result != -1:
19         print(f"Element found at index: {result}")
20     else:
21         print("Element not found in the array")
22     return result
23
24    main()

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE DEVTOOLS

● PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.exe "d:/CSE/CSE
449/CSE-449/Lab12/Q19.py"
Element found at index: 0
PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.exe "d:/CSE/CSE
449/CSE-449/Lab12/Q19.py"
● Element found at index: 6
● PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.exe "d:/CSE/CSE
449/CSE-449/Lab12/Q19.py"
Element not found in the array
○ PS D:\CSE\CSE 449\CSE-449> 
```

### Q20. Linear Search in Python



```
py U  Q16.py U  Q17.py U  Q18.py U  Q19.py U  Q20.py U x  ▸ ▾ 🔍 □ ...

Lab12 > Q20.py > main
1  # Q20. Linear Search in Python
2  def linear_search(arr, target):
3      for index, element in enumerate(arr):
4          if element == target:
5              return index
6      return -1
7
8  def main():
9      arr = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
10     target = 10
11     result = linear_search(arr, target)
12     if result != -1:
13         print(f"Element found at index: {result}")
14     else:
15         print("Element not found in the array")
16     return result
17
18     main()

PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  POLYGLOT NOTEBOOK  POSTMAN CONSOLE  DEVTOOLS

PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/windowsApps/python3.12.exe "d:/CSE/CSE
449/CSE-449/Lab12/Q20.py"
• Element not found in the array
PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/windowsApps/python3.12.exe "d:/CSE/CSE
449/CSE-449/Lab12/Q20.py"
• Element found at index: 0
PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/windowsApps/python3.12.exe "d:/CSE/CSE
449/CSE-449/Lab12/Q20.py"
• Element found at index: 9
○ PS D:\CSE\CSE 449\CSE-449> 
```

## Q21. Bubble Sort in Python

```
py U  Q17.py U  Q18.py U  Q19.py U  Q20.py U  Q21.py U x  ▸ ▾ 🔍 □ ...

Lab12 > Q21.py > main
1  # Q21. Bubble Sort in Python
2  def bubble_sort(arr):
3      n = len(arr)
4      for i in range(n):
5          for j in range(0, n-i-1):
6              if arr[j] > arr[j+1]:
7                  arr[j], arr[j+1] = arr[j+1], arr[j]
8      return arr
9
10 def main():
11     arr = [64, 34, 25, 12, 22, 11, 90]
12     print("Original array:", arr)
13     sorted_arr = bubble_sort(arr)
14     print("Sorted array:", sorted_arr)
15     return sorted_arr
16
17     main()

PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  POLYGLOT NOTEBOOK  POSTMAN CONSOLE  DEVTOOLS

PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/windowsApps/python3.12.exe "d:/CSE/CSE
449/CSE-449/Lab12/Q21.py"
• Original array: [64, 34, 25, 12, 22, 11, 90]
  Sorted array: [11, 12, 22, 25, 34, 64, 90]
○ PS D:\CSE\CSE 449\CSE-449> 
```

## Q22. Insertion Sort in Python

Q22.py U

Q18.py U

Q19.py U

Q20.py U

Q21.py U

Q22.py U X

▶

⌵

🔗

📄

⋮

Lab12 > Q22.py > main

```
1 # Q22. Insertion Sort in Python
2 def insertion_sort(arr):
3     for i in range(1, len(arr)):
4         key = arr[i]
5         j = i - 1
6         while j >= 0 and key < arr[j]:
7             arr[j + 1] = arr[j]
8             j -= 1
9         arr[j + 1] = key
10    return arr
11
12 def main():
13     arr = [12, 11, 13, 5, 6]
14     print("Original array:", arr)
15     sorted_arr = insertion_sort(arr)
16     print("Sorted array:", sorted_arr)
17     return sorted_arr
18
19 main()
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POLYGLOT NOTEBOOK POSTMAN CONSOLE DEVTOOLS

PS D:\CSE\CSE 449\CSE-449> & C:/Users/Asus/AppData/Local/Microsoft/WindowsApps/python3.12.exe "d:/CSE/CSE 449/CSE-449/Lab12/Q22.py"

● Original array: [12, 11, 13, 5, 6]  
Sorted array: [5, 6, 11, 12, 13]

○ PS D:\CSE\CSE 449\CSE-449>