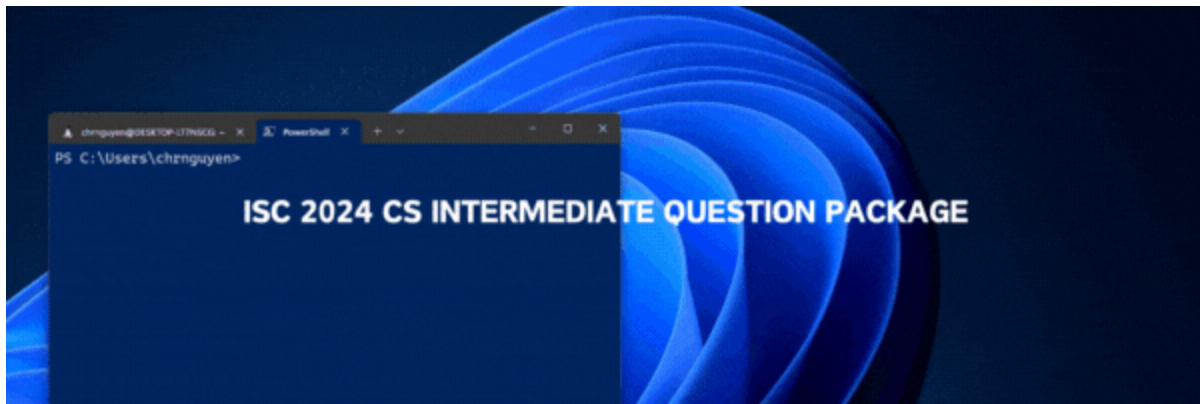


Name 1:

Group #:

Name 2:

<i>Question #</i>	<i>Number of Points</i>
1 – T/F and MC	/5
2 – Scope	/15
3 – Recursion	/15
4 – Problem Solving	/10
Total	45



Question #1

Total Points: (5) | .5 marks each

- a) In Python, a class can be used to bundle data and functionality together.
 - a. True
 - b. False

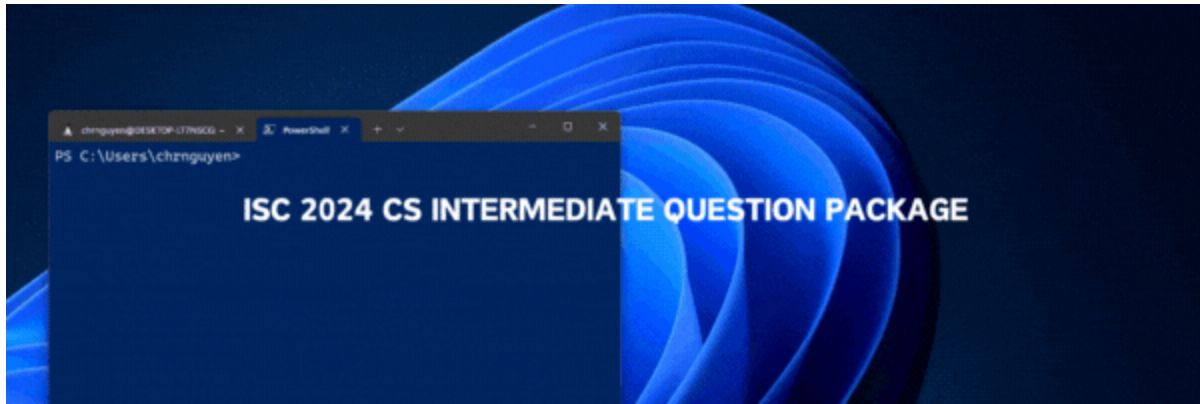
- b) Which statement is correct regarding file input/output in Python?
 - a. readline() reads the entire file at once.
 - b. write() is used for reading from a file.
 - c. open() is only used for creating new files.
 - d. close() is not necessary when working with files.
 - e. None of the above.

- c) In Python, the while loop is used for definite iteration, while the for loop is used for indefinite iteration.
 - a. True
 - b. False

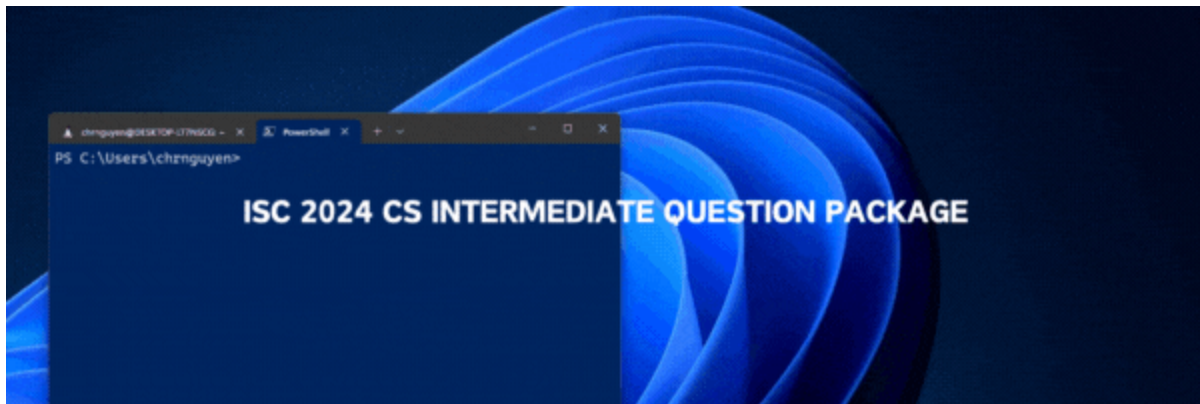
- d) Which of the following is a mutable data type in Python?
 - a. int
 - b. float
 - c. tuple
 - d. list
 - e. str

- e) In Python, dictionaries can only store values of the same data type.
 - a. True
 - b. False

- f) What is the purpose of the str() function in Python?
 - a. Convert a value to a string
 - b. Convert a string to an integer
 - c. Check if a string contains only alphabetic characters
 - d. Retrieve the length of a string
 - e. None of the above



- g) In Python, the pass statement is used for ending a loop prematurely.
a. True b. False
- h) Which of the following is used to define a function in Python?
a. func b. define c. function d. def e. define_function
- i) In Python, single-line comments are created using the /* ... */ syntax.
a. True b. False
- j) What is the purpose of the pop() method in Python?
a. Remove the last element from a list
b. Remove an element from a specific index in a list
c. Add an element to the end of a list
d. Retrieve the first element of a list
e. None of the above



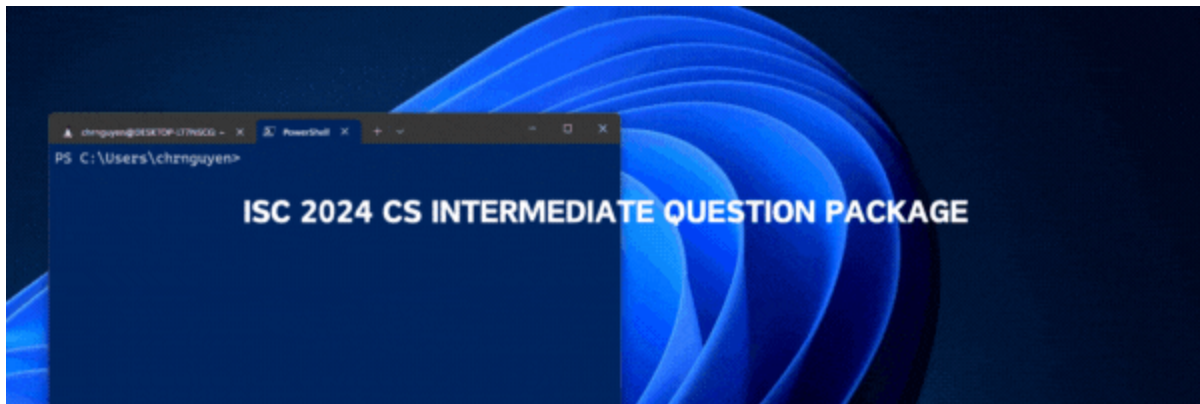
Question #2

Total Points: (15)

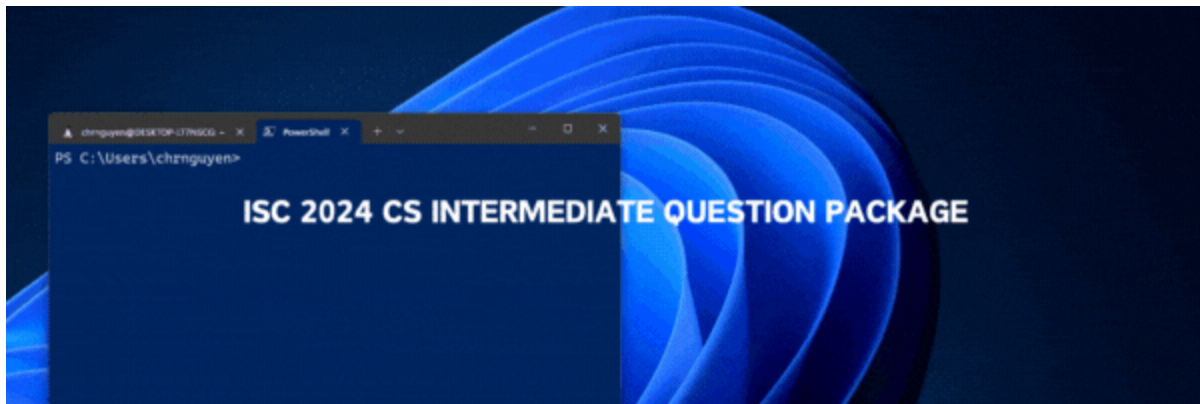
Consider the following Python code:

```
1  x = 10
2
3  def my_function():
4      y = 5
5      print(f"Inside the function: x = {x}, y = {y}")
6
7  my_function()
8  print(f"Outside the function: x = {x}")
9
```

- a) Explain the concept of scope in Python and differentiate between local and global scope (3)
- b) In the given code, what is the scope of the variable x? Is it accessible inside the my_function function?
(2)
- c) What is the scope of the variable y? Can you access it outside the my_function function?
(2)



- d) If you try to print the value of `y` outside the function (e.g., replace the last print statement with `print(f"Outside the function: x = {x}, y = {y}")`), what will happen, and why?
(3)
- e) Modify the code to create a new variable `z` inside the `my_function` function and print its value outside the function. What will be the output, and why?
(5)



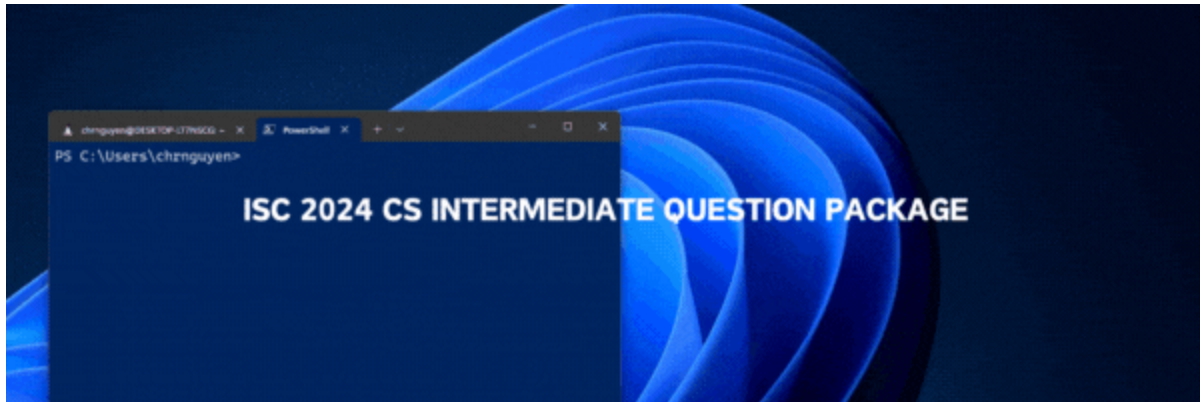
Question #3

Total Points: (15)

- a) Define recursion in the context of programming and briefly explain how it works. (2)
- b) Consider the following recursive function in Python (4)

```
1  def digit_sum(n):  
2      if n < 10:  
3          return n  
4      else:  
5          return n % 10 + digit_sum(n // 10)  
6  
7  # Example usage:  
8  number = 12345  
9  result = digit_sum(number)  
10 print(f"The sum of the digits of {number} is {result}")
```

- i) What is the base case in this recursive function? (1)
- ii) Describe the behavior of this function and how it calculates the result. (3)
- c) Write a recursive function in Python that calculates the sum of all even numbers in a given list. Provide the function definition and an example of its usage. (5)



Question #4

Total Points: (10)

Write a program in Python to solve the following problem:

Given a string `s` containing just the characters '(', ')', '{', '}', '[', and ']', determine if the input string is valid.

An input string is valid if:

- Open brackets must be closed by the same type of brackets.
- Open brackets must be closed in the correct order.
- Every close bracket has a corresponding open bracket of the same type.

Example 1:

Input: `s = "()"`

Output: true

Example 2:

Input: `s = "()[]{}"`

Output: true

Example 3:

Input: `s = "()["`

Output: false

Constraints:

- $1 \leq s.length \leq 104$
- `s` consists of parentheses only '()[]{}'