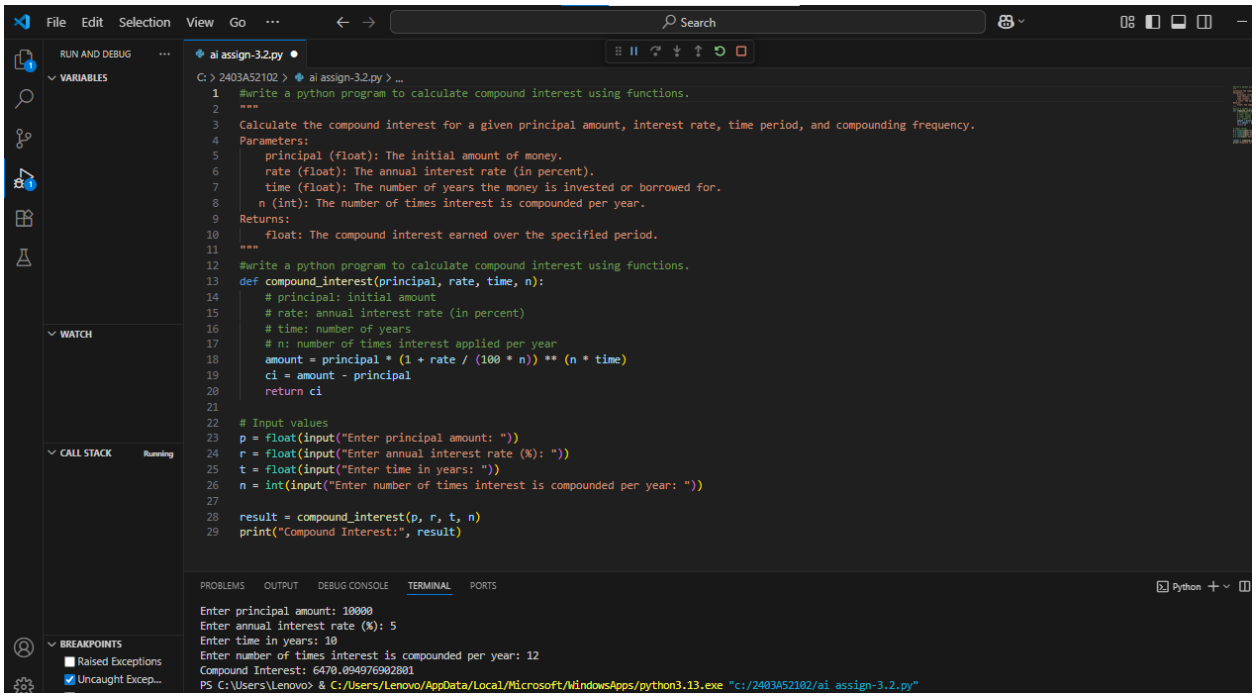
ASSIGNMENT-3.2

TASK-1:

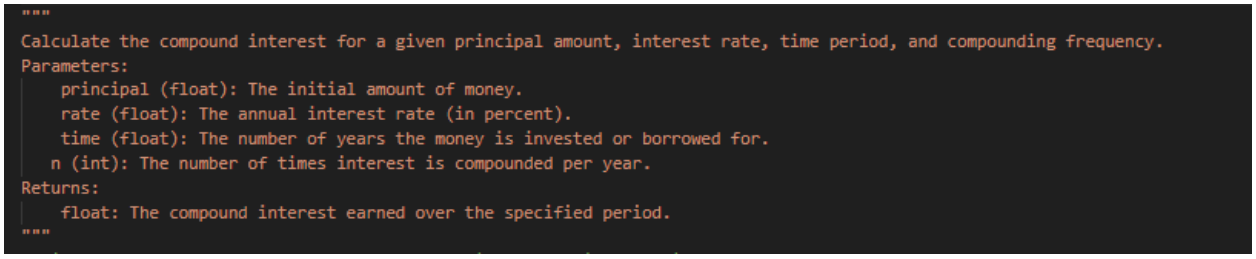
Prompt:

#write a python program to calculate compound interest using function.

Code and Output:



Explanation:



TASK-2:

Prompt:

#write a python program that calculates average, median, mode using functions.

Code and Output:

```python
def calculate_average(numbers):
  """Calculates the average of a list of numbers."""
  if not numbers:
    return 0  # Return 0 for an empty list
  return sum(numbers) / len(numbers)

def calculate_median(numbers):
  """Calculates the median of a list of numbers."""
  if not numbers:
    return 0  # Return 0 for an empty list
  sorted_numbers = sorted(numbers)
  n = len(sorted_numbers)
  mid_index = n // 2
  if n % 2 == 0:
    # Even number of elements, median is the average of the middle two
    return (sorted_numbers[mid_index - 1] + sorted_numbers[mid_index]) / 2
  else:
    # Odd number of elements, median is the middle element
    return sorted_numbers[mid_index]

def calculate_mode(numbers):
  """Calculates the mode(s) of a list of numbers."""
  if not numbers:
    return []  # Return an empty list for an empty list

  from collections import Counter
  counts = Counter(numbers)
  max_count = max(counts.values())
  modes = [number for number, count in counts.items() if count == max_count]
  return modes
```

```python
# Example usage
my_list = [1, 2, 3, 4, 5, 5, 6, 7, 8, 8, 8]

average = calculate_average(my_list)
median = calculate_median(my_list)
mode = calculate_mode(my_list)

print(f"The list is: {my_list}")
print(f"The average is: {average}")
print(f"The median is: {median}")
print(f"The mode(s) is/are: {mode}")
```

```
The list is: [1, 2, 3, 4, 5, 5, 6, 7, 8, 8, 8]
The average is: 5.181818181818182
The median is: 5
The mode(s) is/are: [8]
```

Explanation:

explain the code step by step

Certainly! Here's a step-by-step explanation of the provided Python code:

1. `def calculate_average(numbers):` : This defines a function named `calculate_average` that takes one argument, `numbers`, which is expected to be a list of numbers.
2. `if not numbers:` : Inside the `calculate_average` function, this checks if the input list `numbers` is empty.
3. `return 0` : If the list is empty, the function returns `0` as the average.
4. `return sum(numbers) / len(numbers)` : If the list is not empty, this line calculates the sum of all numbers in the list using `sum()` and divides it by the number of elements in the list using `len()`, returning the calculated average.
5. `def calculate_median(numbers):` : This defines a function named `calculate_median` that also takes a list of `numbers` as input.
6. `if not numbers:` : Similar to the average function, this checks if the input list is empty.
7. `return 0` : If the list is empty, it returns `0` as the median.
8. `sorted_numbers = sorted(numbers)` : If the list is not empty, this line creates a new list called `sorted_numbers` by sorting the input `numbers` list in ascending order.
9. `n = len(sorted_numbers)` : This gets the number of elements in the sorted list and stores it in the variable `n`.
10. `mid_index = n // 2` : This calculates the middle index of the sorted list using integer division (`//`).
11. `if n % 2 == 0:` : This checks if the number of elements (`n`) is even.
12. `(sorted_numbers[mid_index - 1] + sorted_numbers[mid_index]) / 2` : If `n` is even, the median is the average of the two middle elements. This line calculates that average.
13. `else:` : This is executed if the number of elements (`n`) is odd.
14. `return sorted_numbers[mid_index]` : If `n` is odd, the median is the middle element. This line returns the element at the `mid_index`.
15. `def calculate_mode(numbers):` : This defines a function named `calculate_mode` that takes a list of `numbers` as input.

16. `if not numbers:` : Checks if the input list is empty.
17. `return []` : If the list is empty, it returns an empty list as there is no mode.
18. `from collections import Counter` : This imports the `Counter` class from the `collections` module, which is useful for counting hashable objects.
19. `counts = Counter(numbers)` : This creates a `Counter` object named `counts` that stores the frequency of each number in the input list.
20. `max_count = max(counts.values())` : This finds the highest frequency among all the numbers in the list and stores it in `max_count`.
21. `modes = [number for number, count in counts.items() if count == max_count]` : This uses a list comprehension to create a list called `modes` containing all the numbers that have a frequency equal to `max_count`. These are the modes of the list.
22. `return modes` : The function returns the list of modes.
23. `my_list = [1, 2, 3, 4, 5, 5, 6, 7, 8, 8, 8]` : This line creates a list named `my_list` with some example numbers.
24. `average = calculate_average(my_list)` : This calls the `calculate_average` function with `my_list` and stores the result in the `average` variable.
25. `median = calculate_median(my_list)` : This calls the `calculate_median` function with `my_list` and stores the result in the `median` variable.
26. `mode = calculate_mode(my_list)` : This calls the `calculate_mode` function with `my_list` and stores the result in the `mode` variable.
27. `print(f"The list is: {my_list}")` : This prints the original list.
28. `print(f"The average is: {average}")` : This prints the calculated average.
29. `print(f"The median is: {median}")` : This prints the calculated median.
30. `print(f"The mode(s) is/are: {mode}")` : This prints the calculated mode(s).

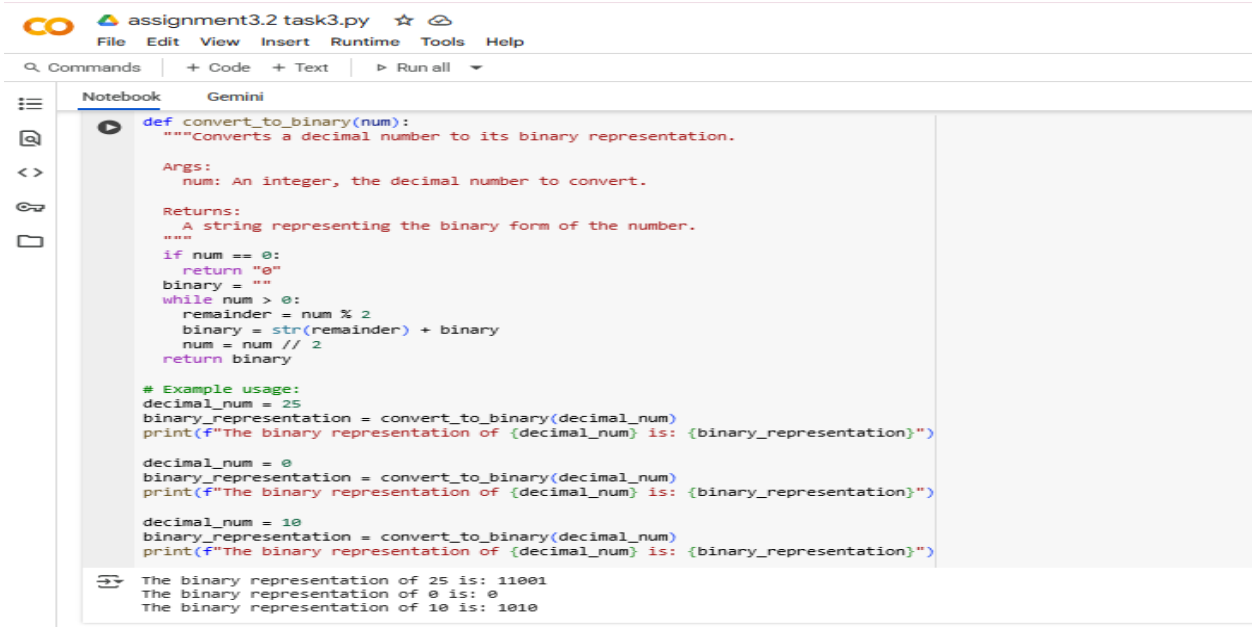
The output below the code cell shows the results of these print statements for the example list `my_list`.

TASK-3

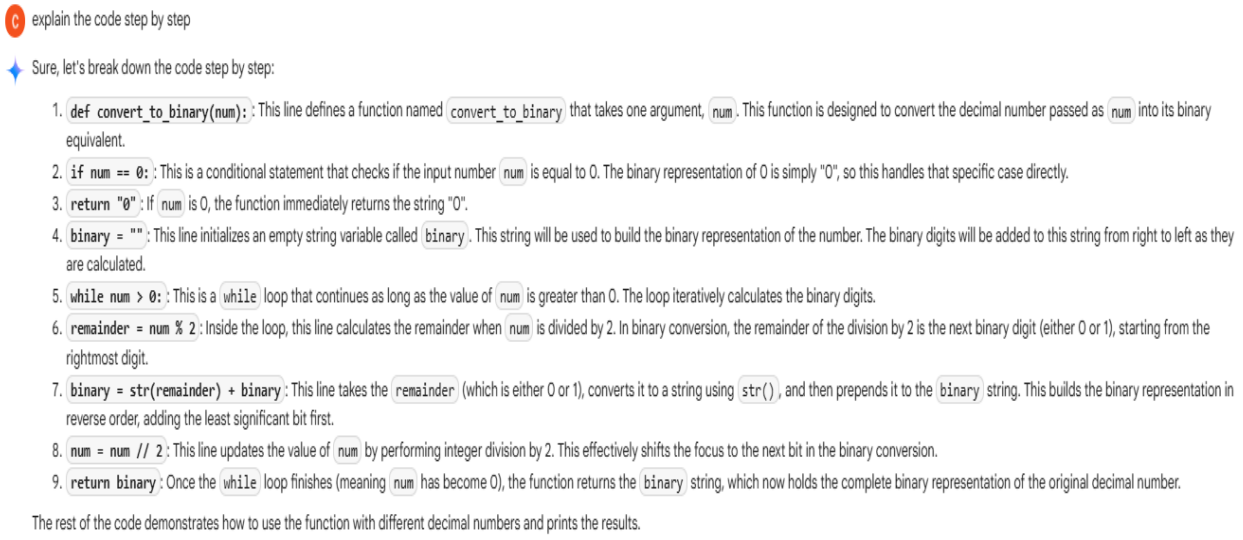
Prompt:

#write a python program to convert number into binary using functions.

Code and Output:



Explanation:

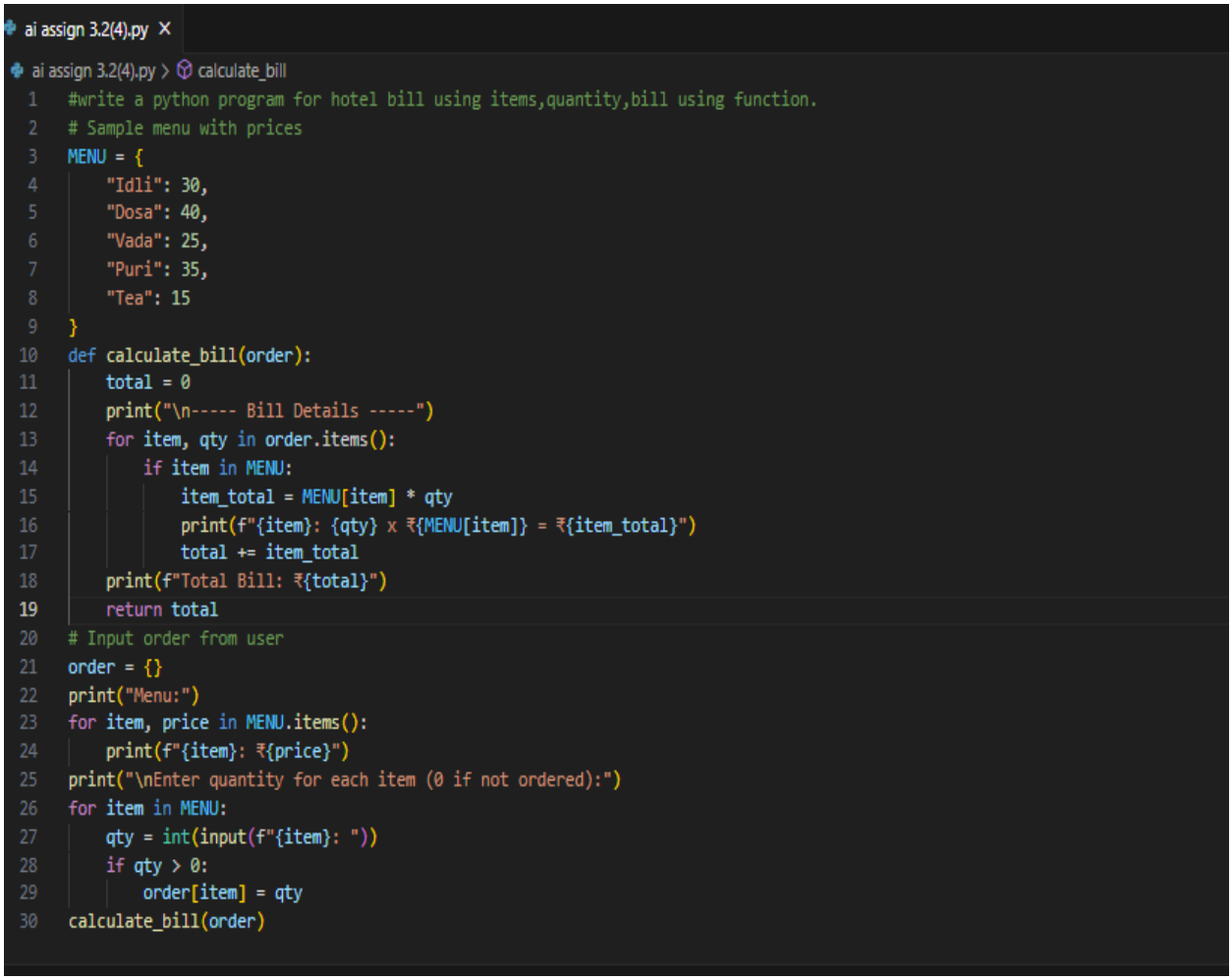


TASK-4

Prompt:

#write a python program for hotel billing using items, quantity, bill using functions.

Code :



```python
#write a python program for hotel bill using items,quantity,bill using function.
# Sample menu with prices
MENU = {
    "Idli": 30,
    "Dosa": 40,
    "Vada": 25,
    "Puri": 35,
    "Tea": 15
}
def calculate_bill(order):
    total = 0
    print("\n----- Bill Details -----")
    for item, qty in order.items():
        if item in MENU:
            item_total = MENU[item] * qty
            print(f"{item}: {qty} x ₹{MENU[item]} = ₹{item_total}")
            total += item_total
    print(f"Total Bill: ₹{total}")
    return total
# Input order from user
order = {}
print("Menu:")
for item, price in MENU.items():
    print(f"{item}: ₹{price}")
print("\nEnter quantity for each item (0 if not ordered):")
for item in MENU:
    qty = int(input(f"{item}: "))
    if qty > 0:
        order[item] = qty
calculate_bill(order)
```

Output:

```
Menu:
Idli: ₹30
Dosa: ₹40
Vada: ₹25
Puri: ₹35
Tea: ₹15

Enter quantity for each item (0 if not ordered):
Idli: 2
Dosa: 1
Vada: 4
Puri: 2
Tea: 3

----- Bill Details -----
Idli: 2 x ₹30 = ₹60
Dosa: 1 x ₹40 = ₹40
Vada: 4 x ₹25 = ₹100
Puri: 2 x ₹35 = ₹70
Tea: 3 x ₹15 = ₹45
Total Bill: ₹315
PS C:\2403A52102>
```

Explanation:

```
"""
This program simulates a hotel billing system using a predefined menu of items and their prices.
It allows the user to input the quantity of each item ordered, calculates the total bill, and displays a detailed bill summary.
Functions:
    calculate_bill(order):
        Calculates and prints the bill details for the given order.
        Args:
            order (dict): Dictionary with item names as keys and quantities as values.
        Returns:
            int: The total bill amount.
Variables:
    MENU (dict): Dictionary containing menu items as keys and their prices as values.
Usage:
    The user is prompted to enter the quantity for each menu item.
    The program then calculates and displays the bill details and total amount.
"""
```

TASK-5:

Prompt:

Compare how different prompts affect the quality of code output, using a simple function (like temperature conversion) as an example. give me simpler and shorter code.

Code:

```
[7]  def c_to_f(celsius):
       """Converts Celsius to Fahrenheit."""
       return (celsius * 9/5) + 32

     # Example usage:
     celsius_temp = 25
     fahrenheit_temp = c_to_f(celsius_temp)
     print(f"{celsius_temp}°C is equal to {fahrenheit_temp}°F")

     celsius_temp_2 = 0
     print(f"{celsius_temp_2}°C is equal to {c_to_f(celsius_temp_2)}°F")
```

Output:

```
25°C is equal to 77.0°F
0°C is equal to 32.0°F
```

Explanation:

This code defines a simple function c_to_f. It takes a temperature in Celsius as input. The formula (celsius * 9/5) + 32 is used for the conversion. This formula multiplies the Celsius temperature by 9/5 and adds 32. The function then returns the calculated Fahrenheit temperature. The code also includes example usage. It calls the function with 25°C and 0°C. Finally, it prints the original Celsius temperature and the converted Fahrenheit temperature. This provides a clear demonstration of the function's usage and output.