Question 5:

PAC Chart:

DATA GIVEN	REQUIRED RESULT(S)
• A series of numbers or digits.	• The total count for each digit from 0 to 9.
REQUIRED PROCESSING	**SOLUTION ALTERNATIVE(S)**
• Create a separate counter for each digit. • Initialize all counters to zero. • Repeatedly ask the user to enter a number. • For each number entered, check if it's between 0 and 9. • If it is, increment the corresponding counter. • If the input is not a number between 0 and 9, stop the process. • Display the final count for each digit from 0 to 9.	• An array can be used instead of ten separate variables to make the code cleaner and more efficient. • The processing can be handled within a loop that continues until a non-digit is entered.

IPO Chart:

INPUT	PROCESS	MODULE REF	OUTPUT
• A series of numbers.	• Initialize ten counter variables for each digit (0-9) with a value of 0. • Start a loop. • Take a number as input. • Check if the number is between 0 and 9. If it is, increment the corresponding counter. • Exit the loop otherwise. • Output the count for each number along with the corresponding digit.	INIT REPEAT INPUT IF-THEN END-LOOP OUTPUT	A list showing how many times each number was entered.

Algorithm:

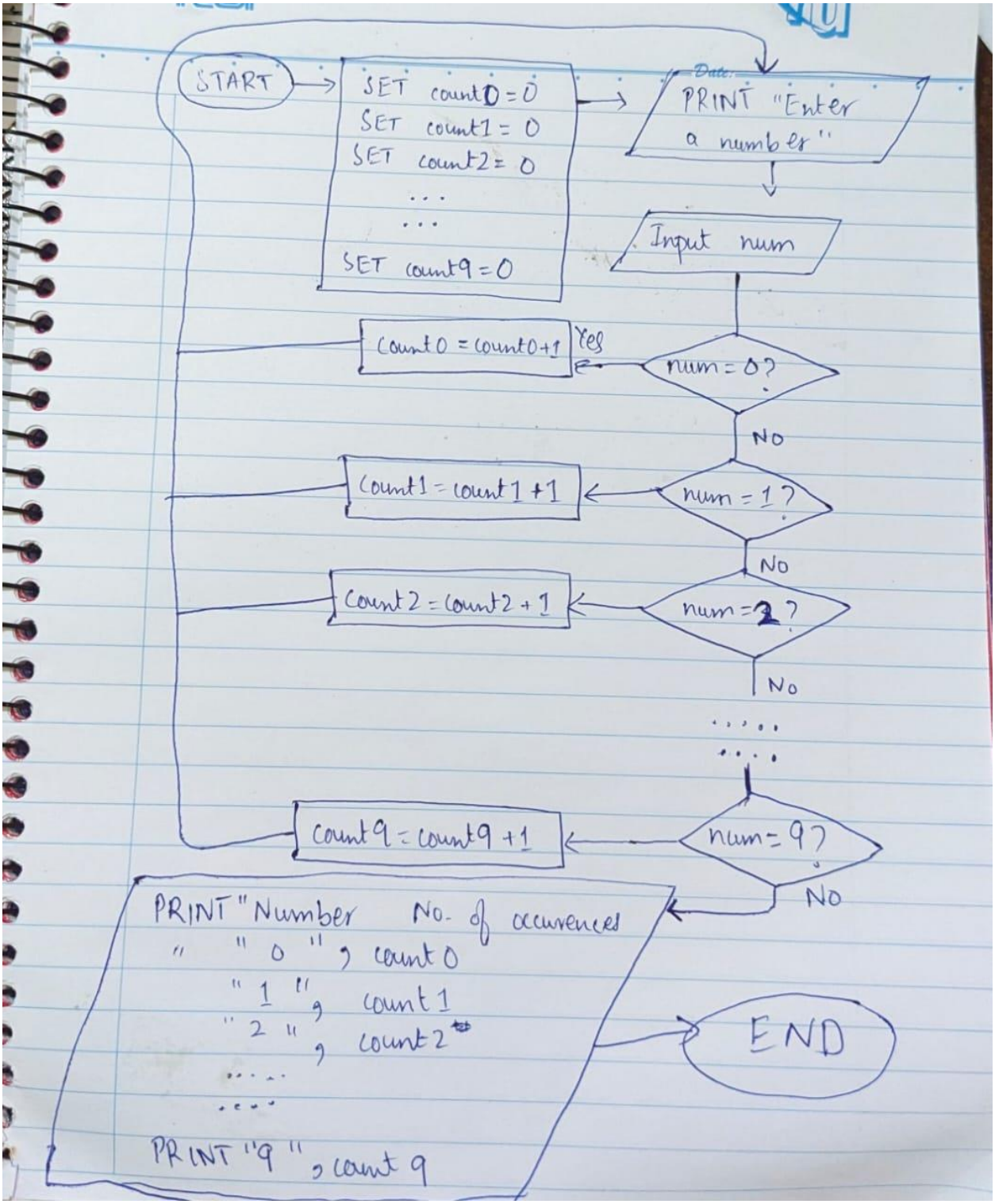
1. Initialize ten separate counter variables, one for each digit from 0 to 9, and set their initial value to 0.
2. Prompt the user to begin entering a series of single-digit numbers.
3. Accept a number as input.
4. Verify if the entered number is a digit between 0 and 9, inclusive.
5. If the number is valid, find the corresponding counter variable and increment its value by one. Then, return to step 2 to ask for the next number.
6. If the number is not valid, the process ends. Display the final count for each digit from 0 to 9.

Pseudo Code:

```
START
SET count0 = 0, count1 = 0, count2 = 0, count3 = 0, count4 = 0, count5 = 0, count6 = 0, count7 = 0, count8 = 0, count9 = 0
REPEAT
    PRINT "Enter a number between 0 and 9 inclusive. Enter any other character to stop."
    INPUT num
    IF num = 0 THEN
        count0 = count0 + 1
    ELSEIF num = 1 THEN
        count1 = count1 + 1
    ELSEIF num = 2 THEN
        count2 = count2 + 1
    ELSEIF num = 3 THEN
        count3 = count3 + 1
    ELSEIF num = 4 THEN
        count4 = count4 + 1
    ELSEIF num = 5 THEN
        count5 = count5 + 1
    ELSEIF num = 6 THEN
        count6 = count6 + 1
    ELSEIF num = 7 THEN
        count7 = count7 + 1
    ELSEIF num = 8 THEN
        count8 = count8 + 1
    ELSEIF num = 9 THEN
        count9 = count9 + 1
    ELSE
        BREAK (Exit the loop)
    ENDIF
UNTIL the loop is broken.
```

```
30. PRINT "--- Final Counts ---"
31. PRINT "Number 0 was entered", count0, "time(s)."
32. PRINT "Number 1 was entered", count1, "time(s)."
33. PRINT "Number 2 was entered", count2, "time(s)."
34. PRINT "Number 3 was entered", count3, "time(s)."
35. PRINT "Number 4 was entered", count4, "time(s)."
36. PRINT "Number 5 was entered", count5, "time(s)."
37. PRINT "Number 6 was entered", count6, "time(s)."
38. PRINT "Number 7 was entered", count7, "time(s)."
39. PRINT "Number 8 was entered", count8, "time(s)."
40. PRINT "Number 9 was entered", count9, "time(s)."
41. END
```

Flowchart:


START
SET count0 = 0
SET count1 = 0
SET count2 = 0
...
...
SET count9 = 0
PRINT "Enter a number"
Input num
num = 0?
Yes
count0 = count0+1
No
num = 1?
count1 = count1 +1
No
num = 2?
count2 = count2 + 1
No
num = 9?
count9 = count9 +1
No
PRINT "Number No. of occurences
" " 0 ", count0
" 1 ", count1
" 2 ", count2
...
...
PRINT "9", count9
END