Question 5:

PAC Chart:

DATA GIVEN	REQUIRED RESULT(S)
→ Series of numbers/digits	→ Number of times each digit between 0 and 9 inclusive was entered.
REQUIRED PROCESSING	**SOLUTION ALTERNATIVE(S)**
→ Keep a separate counter variable for each digit. → Initialize each counter to 0. → Ask user to enter a number. → Check if number is between 0-9. → If so, increment the corresponding counter and move back to step 3 (Asking user to enter a number) → Otherwise, output each number from 0-9 with number of times it was entered.	→ Array may be used instead of separate variables. → Use of a loop will make the job easier. → Exit the loop when anything is entered which is not a number between 0 and 9.

IPO Chart:

INPUT	PROCESS	MODULE REFERENCE	OUTPUT
→ Number(s)	→ Initialize 10 counter variables with 0 → Start the loop → Take number as input → Check if number is between 0-9 → Increment counter if it is → Exit loop otherwise → Output each counter along with corresponding number.	→ SET → REPEAT → INPUT → IF-ELSEIF → INC → UNTIL → PRINT	→ How many times was each number entered

Algorithm:

Step 1: Take 10 variables, each to store the number of time each digit from 0 to 9 was entered.

Step 2: Initialise all 10 variables with 0.

Step 3: Ask user to enter a number.

Step 4: Check if number entered by the user falls between 0 and 9.

Step 5: If number satisfies the condition above, increment the relevant counter variable (e.g if number is 5, increment the counter variable for 5) and move back to Step 3.

Step 6: If number entered is not between 0 and 9, then display the values of all the counter variables in the required format.

Pseudocode:

```
01. START
02. SET count0 = 0, count1 = 0, count2 = 0, count3 = 0, count4 = 0, count5 = 0, count6 = 0, count7 = 0, count8 = 0, count9 = 0
03. REPEAT
04.     PRINT "Enter a number between 0 and 9 inclusive"
05.     INPUT num
06.     IF num = 0 THEN
07.         count0 = count0 + 1
08.     ELSEIF num = 1 THEN
09.         count1 = count1 + 1
10.     ELSEIF num = 2 THEN
11.         count2 = count2 + 1
12.     ELSEIF num = 3 THEN
13.         count3 = count3 + 1
```

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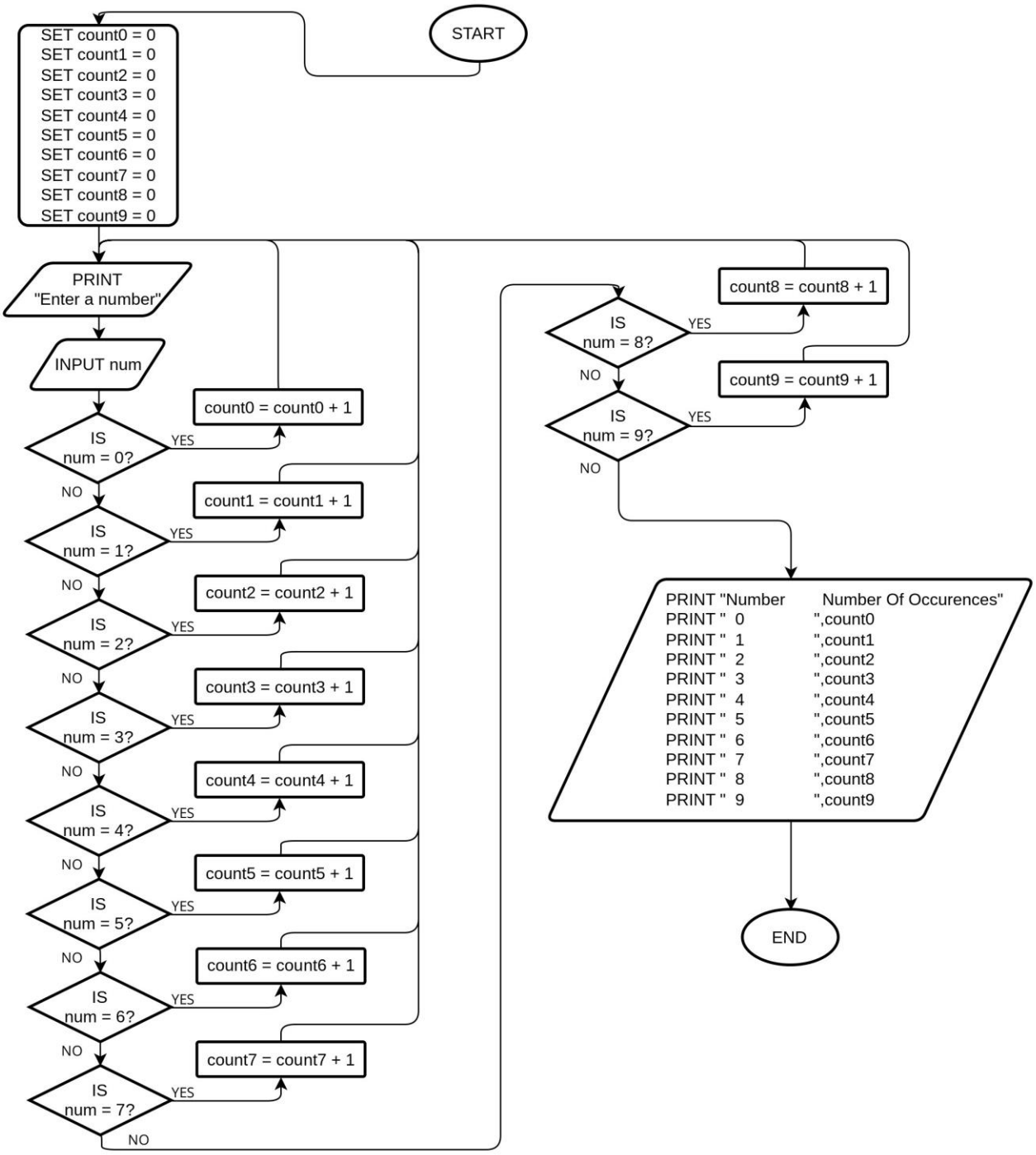
14.     ELSEIF num = 4 THEN
15.             count4 = count4 + 1
16.     ELSEIF num = 5 THEN
17.             count5 = count5 + 1
18.     ELSEIF num = 6 THEN
19.             count6 = count6 + 1
20.     ELSEIF num = 7 THEN
21.             count7 = count7 + 1
22.     ELSEIF num = 8 THEN
23.             count8 = count8 + 1
24.     ELSEIF num = 9 THEN
25.             count9 = count9 + 1
26.     ENDIF
27. UNTIL (num < 0 OR num > 9)
28. PRINT "Number      Number Of Occurrences"
29. PRINT "      0            ",count0
30. PRINT "      1            ",count1
31. PRINT "      2            ",count2
32. PRINT "      3            ",count3
33. PRINT "      4            ",count4
34. PRINT "      5            ",count5
35. PRINT "      6            ",count6
36. PRINT "      7            ",count7
37. PRINT "      8            ",count8
38. PRINT "      9            ",count9
39. END
```

Flowchart:


START
SET count0 = 0
SET count1 = 0
SET count2 = 0
SET count3 = 0
SET count4 = 0
SET count5 = 0
SET count6 = 0
SET count7 = 0
SET count8 = 0
SET count9 = 0
PRINT "Enter a number"
INPUT num
IS num = 0?
YES
count0 = count0 + 1
NO
IS num = 1?
YES
count1 = count1 + 1
NO
IS num = 2?
YES
count2 = count2 + 1
NO
IS num = 3?
YES
count3 = count3 + 1
NO
IS num = 4?
YES
count4 = count4 + 1
NO
IS num = 5?
YES
count5 = count5 + 1
NO
IS num = 6?
YES
count6 = count6 + 1
NO
IS num = 7?
YES
count7 = count7 + 1
NO
IS num = 8?
YES
count8 = count8 + 1
NO
IS num = 9?
YES
count9 = count9 + 1
NO
PRINT "Number Number Of Occurences"
PRINT " 0 ",count0
PRINT " 1 ",count1
PRINT " 2 ",count2
PRINT " 3 ",count3
PRINT " 4 ",count4
PRINT " 5 ",count5
PRINT " 6 ",count6
PRINT " 7 ",count7
PRINT " 8 ",count8
PRINT " 9 ",count9
END