

Question 5:

PAC Chart:

<u>DATA GIVEN</u>	<u>REQUIRED RESULT(S)</u>
→ Series of numbers/digits	→ Number of times each digit between 0 and 9 inclusive was entered.
<u>REQUIRED PROCESSING</u>	<u>SOLUTION ALTERNATIVE(S)</u>
<ul style="list-style-type: none">→ 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.	<ul style="list-style-type: none">→ 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:

<u>INPUT</u>	<u>PROCESS</u>	<u>MODULE REFERENCE</u>	<u>OUTPUT</u>
→ Number(s)	<ul style="list-style-type: none">→ 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.	<ul style="list-style-type: none">→ 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
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Flowchart:

