Digital Design Verification

Lab # 04

ARRAYS

Submitted by:

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TASK # 01:

FLOW CHART:

Terminal output:

```
File  Edit  View  Search  Terminal  Help
[cc@ncdc-0087 lab4]$ gcc task1.c -o task1
[cc@ncdc-0087 lab4]$ ./task1
Enter Character: Khalil Rehman
Length of the Sentence: 13

LowerCase:k
LowerCase:h
LowerCase:a
LowerCase:l
LowerCase:i
LowerCase:l
LowerCase:
LowerCase:r
LowerCase:e
LowerCase:h
LowerCase:m
LowerCase:a
LowerCase:n

UpperCase:K
UpperCase:H
UpperCase:A
UpperCase:L
UpperCase:I
UpperCase:L
UpperCase:
UpperCase:R
UpperCase:E
UpperCase:H
UpperCase:M
UpperCase:A
UpperCase:N
No of Words in the sentence: 2
Total Vowels: 4
Vowel Frequencies:
A/a: 2
E/e: 1
I/i: 1
O/o: 0
U/u: 0
[cc@ncdc-0087 lab4]$
```
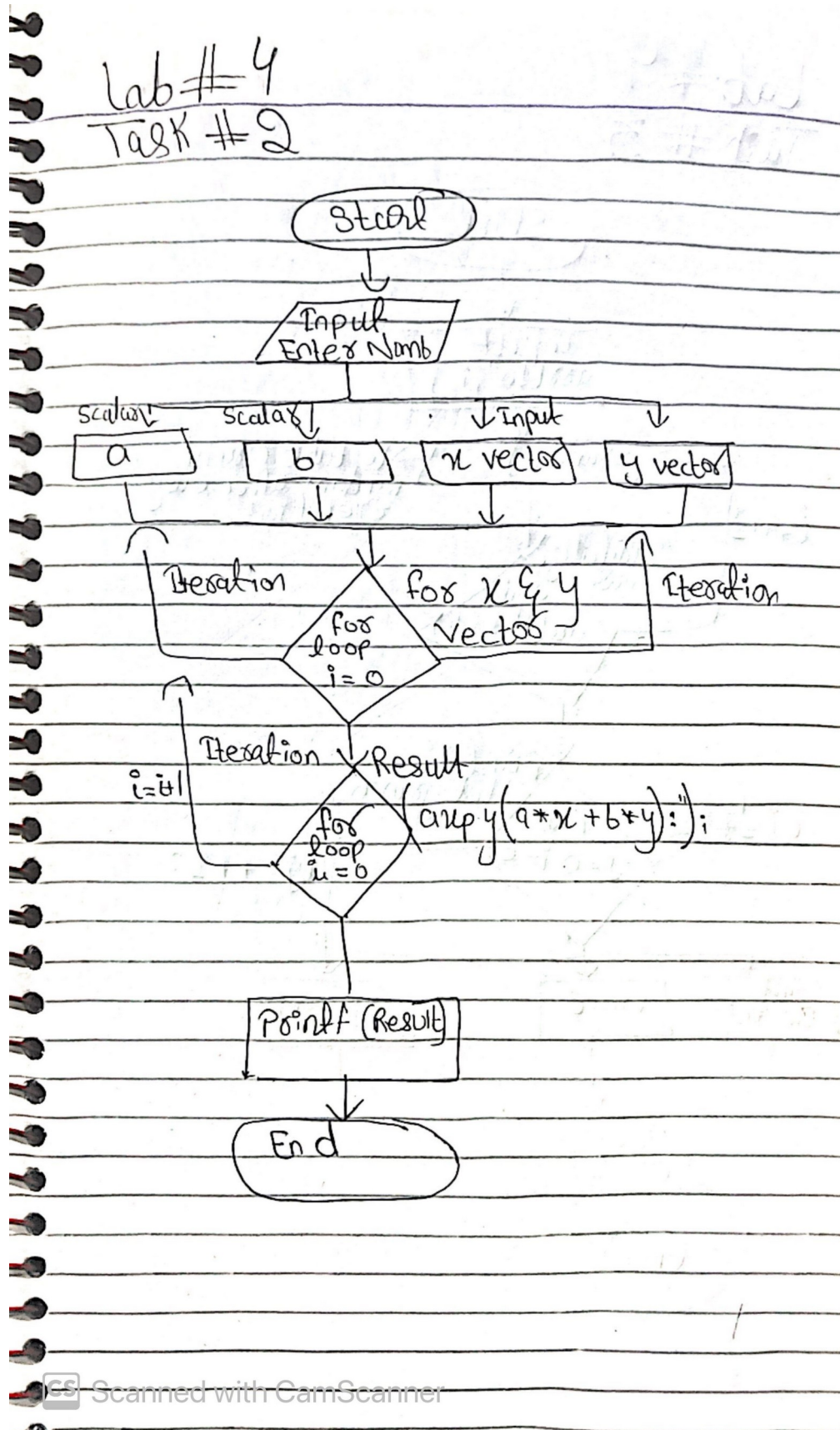
Flow Chart:

Lab # 4
Task # 2

Start

Input
Enter Numb

Scalar — a
Scalar — b
Input — x vector
y vector

Iteration — for loop i = 0 — for x & y Vector — Iteration

Iteration
i = i+1 — for loop i = 6 — Result — `anp.y(a*x + b*y):");`
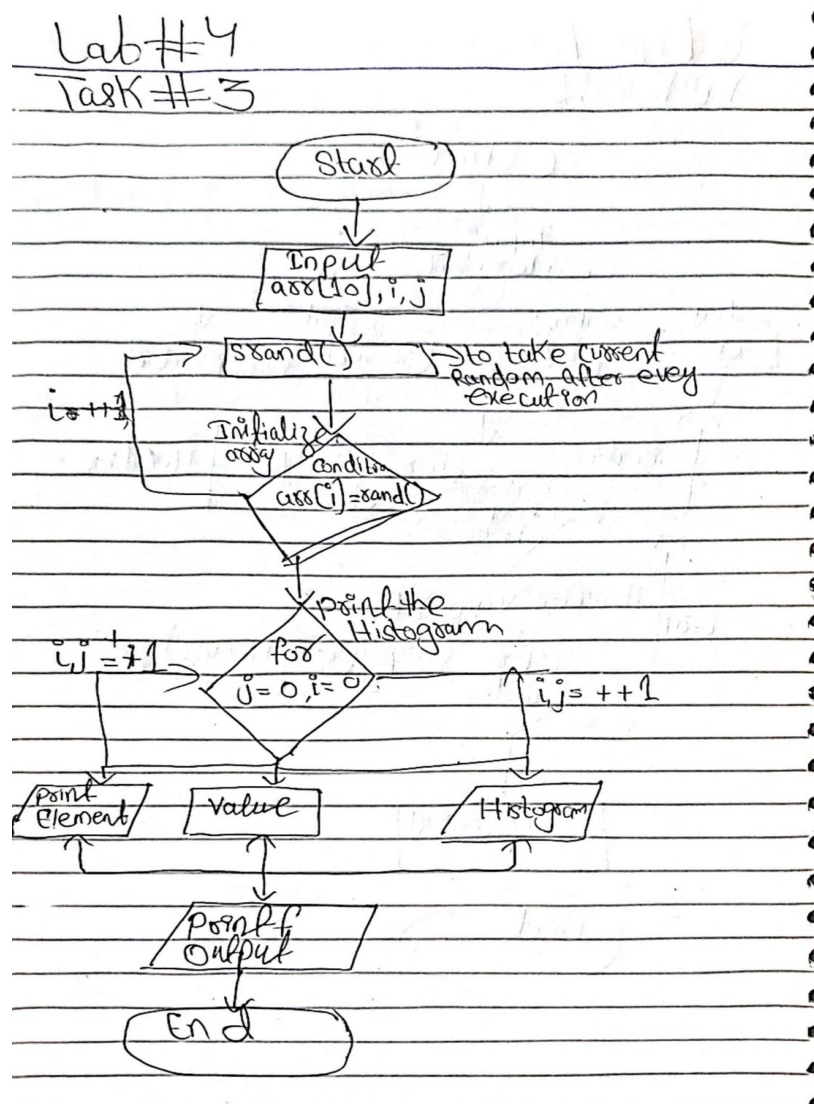
Printf (Result)

End

TERMINAL OUTPUT:


```
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1: ~/Documents/LAB4
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB4$ gcc task2.c -o ta
sk2
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB4$ ./task2
Enter Number:2
Enter scalar a: 1
Enter scalar b: 2
Enter element for vector a:3
2
Enter element for vector b:2
3
Result of axpy (a*x + b*y):
7.000000

8.000000
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB4$
```
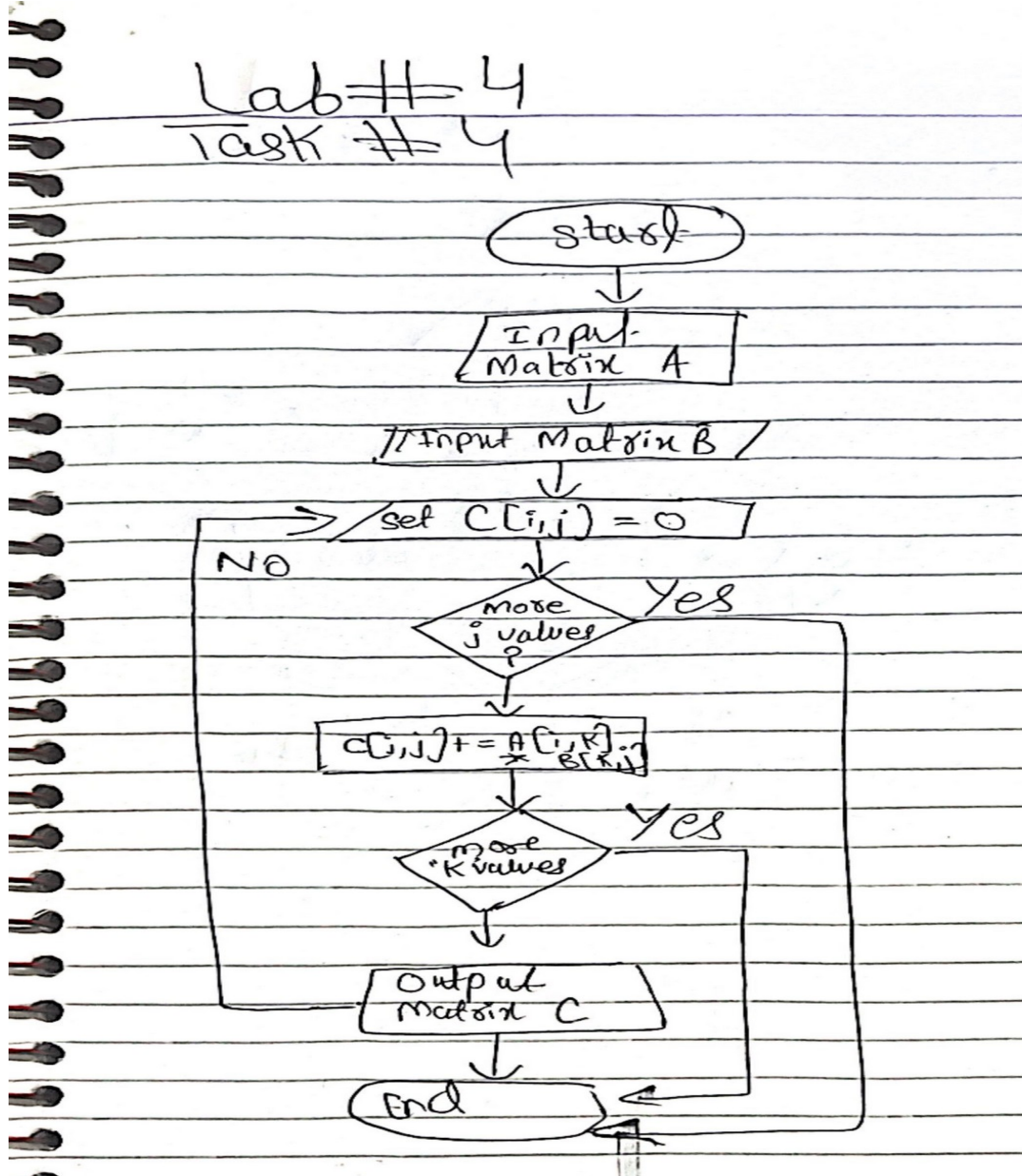
TASK # 03:

Flow Chart:

Terminal output:


```
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB4$ ./task3
Element Value    Histogram
0        6       ******
1        12      ************
2        2       **
3        18      ******************
4        15      ***************
5        10      **********
6        6       ******
7        7       *******
8        7       *******
9        5       *****
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB4$
```

TASK # 04:

Flow Chart:

TERMINAL OUTPUT:


```
cc@ncdc-0087:~/Documents/KR/lab4

File  Edit  View  Search  Terminal  Help
[cc@ncdc-0087 lab4]$ ./task4
Enter 4 elements of Matrix A (2x2):
2
1
2
3
Enter 4 elements of Matrix B (2x2):
2
3
4
5

Result Matrix C = A x B:
8 11
16 21
[cc@ncdc-0087 lab4]$
```
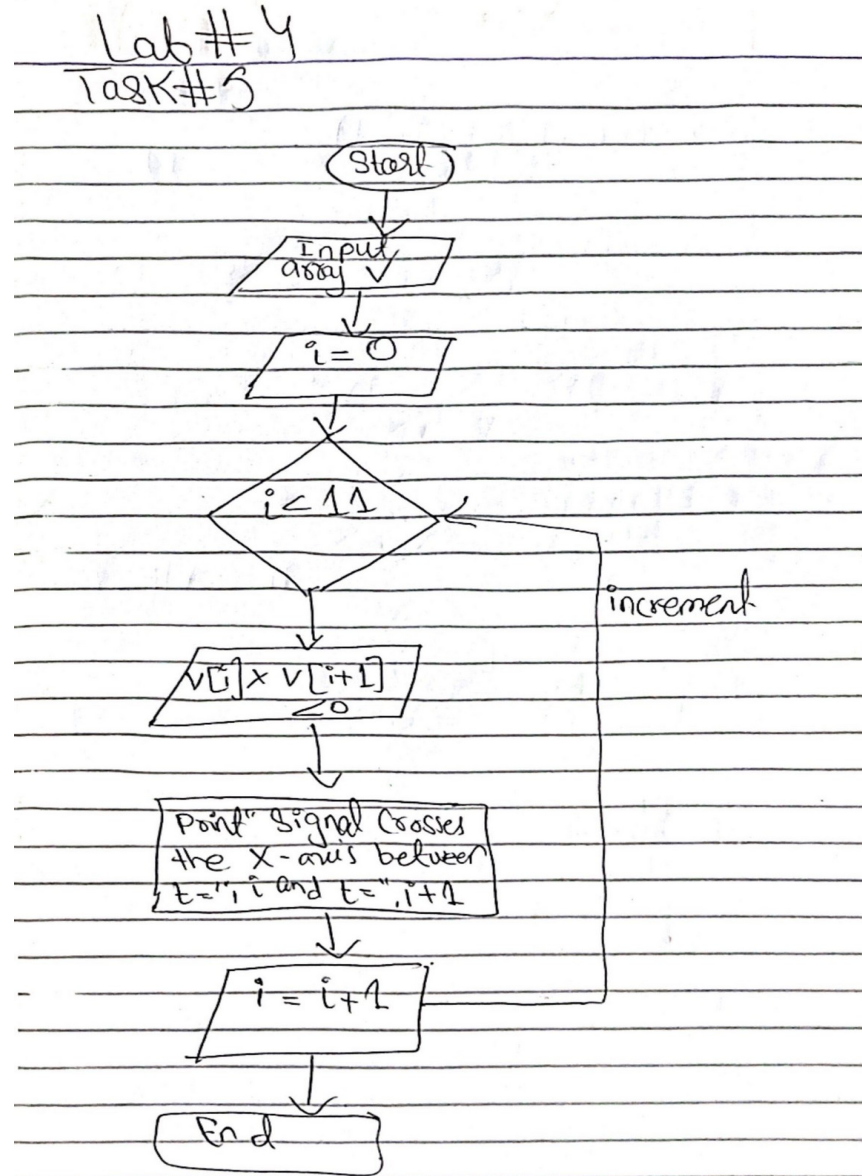
TASK # 05:

I   For decimal values, we used Float data type.

II   Output shows the DC value, as attached below.

III & IV:

FLOW CHART:

Lab #4
Task #5

Start

Input array

$i = 0$

$i < 11$

$V[i] \times V[i+1] < 0$

increment

Point" Signal crosses the X-axis between $t = "; i$ and $t = "; i+1$

$i = i+1$

End

TERMINAL OUTPUT:


```
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB4$ ./task5
bash: ./task5: Permission denied
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB4$ ./task5
bash: ./task5: Permission denied
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB4$ gcc task5.c -o ta
sk5
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB4$ ./task5
DC (Average):-0.008333
Signal Crosses the X-axis between t =5 and t = 6

Glitch Detection:
  Glitch detected at t = 2 (drop = 0.40)
  Glitch detected at t = 6 (drop = 1.00)
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB4$
```