Digital Design Verification

Lab # 05

FUNCTIONS AND WORKING WITH MULTIPLE FILES

Submitted by:

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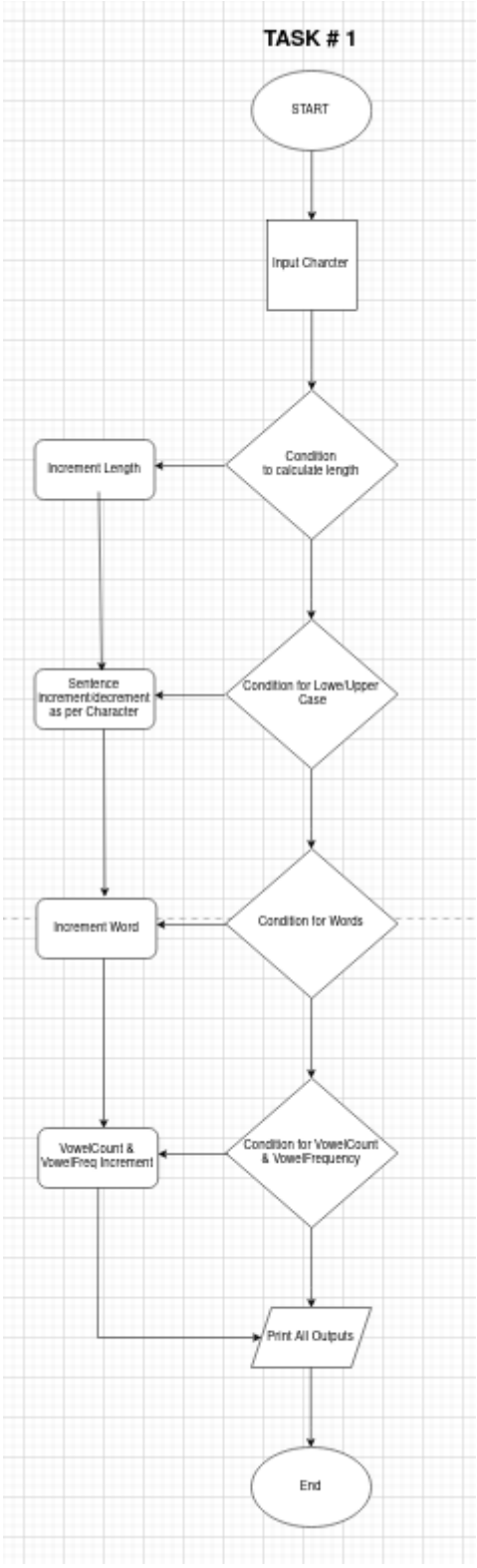
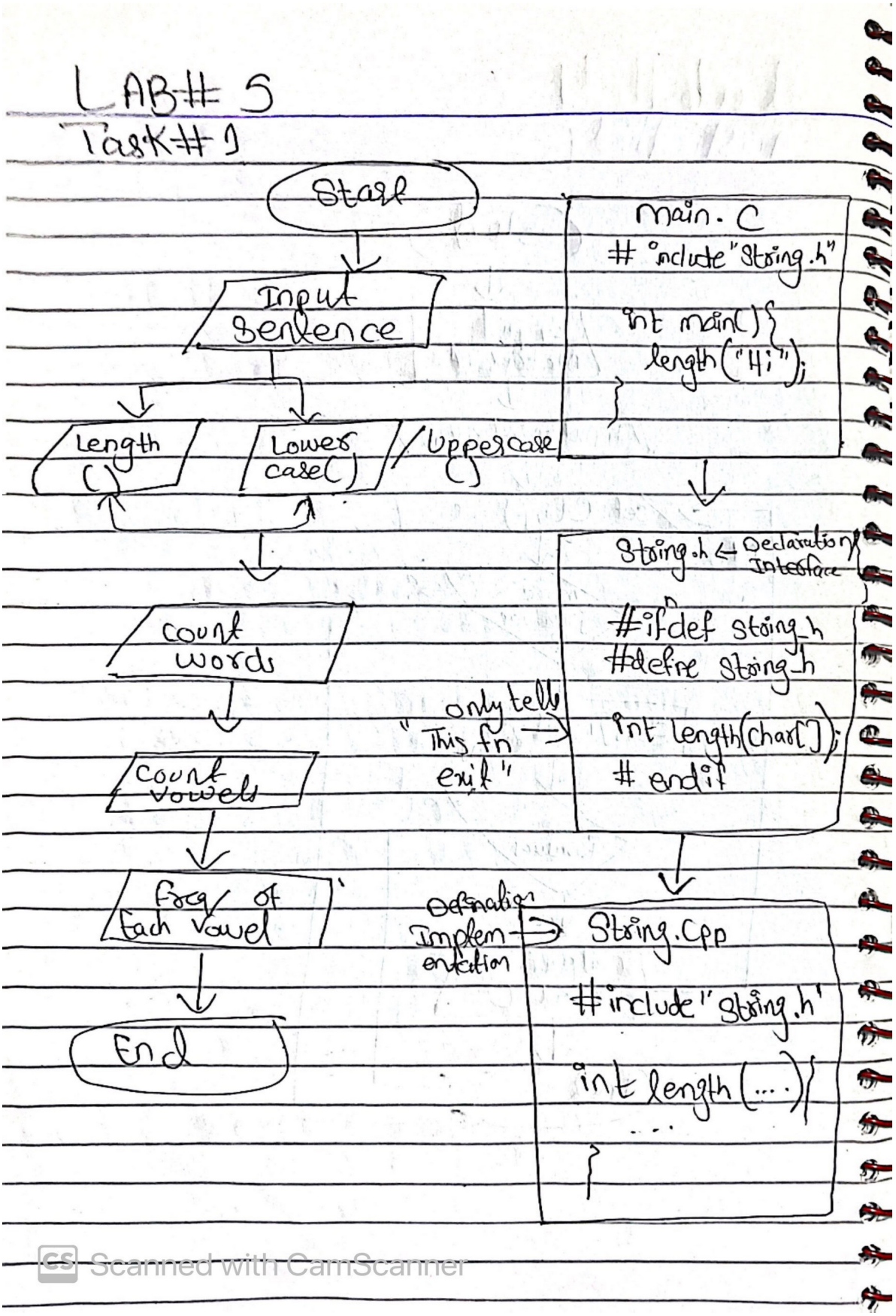
TASK # 01:

FLOW CHART:





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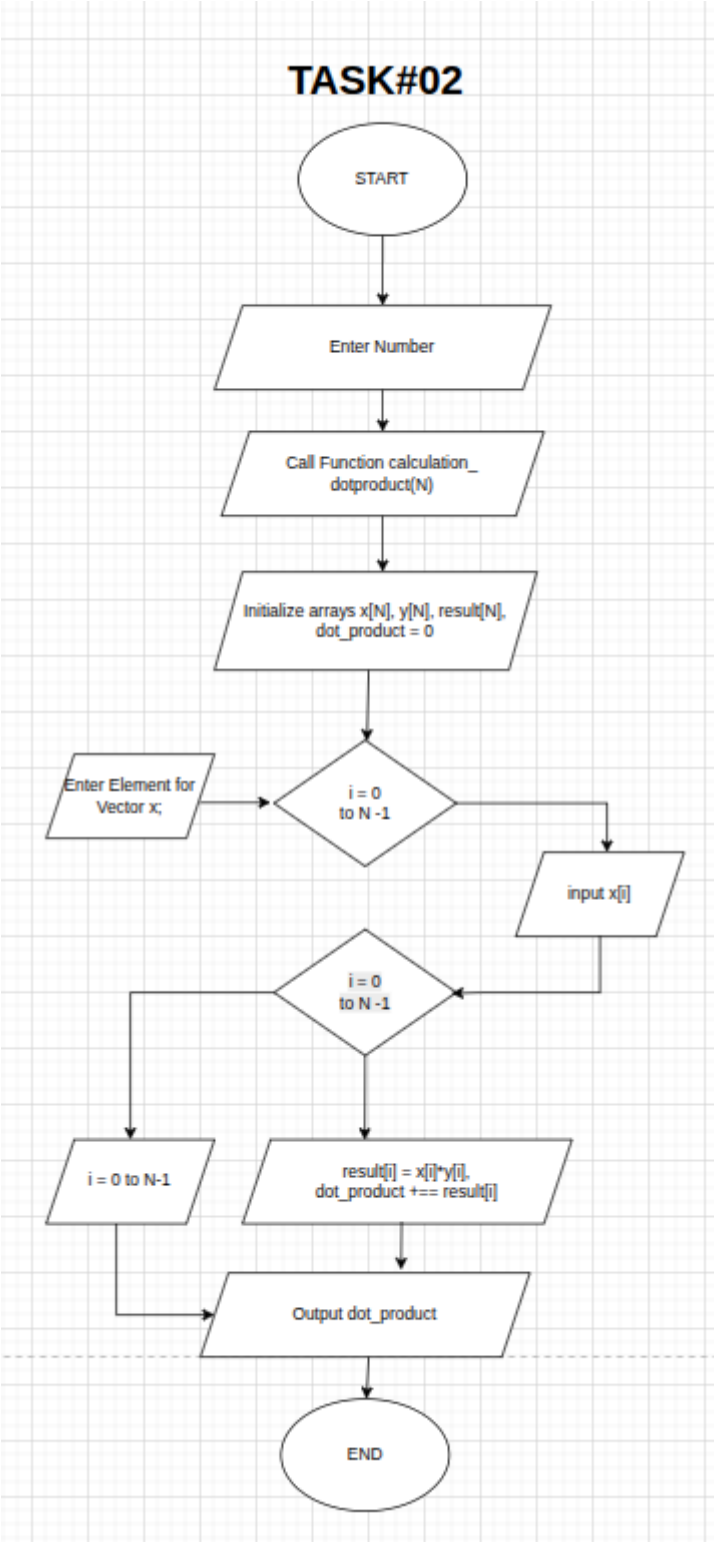
Terminal Output

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$ gcc task1.c string.cpp -o task1
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$ ./task1
Enter Sentence: khalil rehman khalil
Length of the Sentence: 20

LowerCase: khalil rehman khalil

UpperCase: KHALIL REHMAN KHALIL

No of Words in the sentence: 3

Total Vowels: 6
Vowel Frequencies:

Total Vowels: 6
Vowel Frequencies:
A/a: 3
E/e: 1
I/i: 2
O/o: 0
U/u: 0
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$
```

TASK # 02:

Flow Chart:

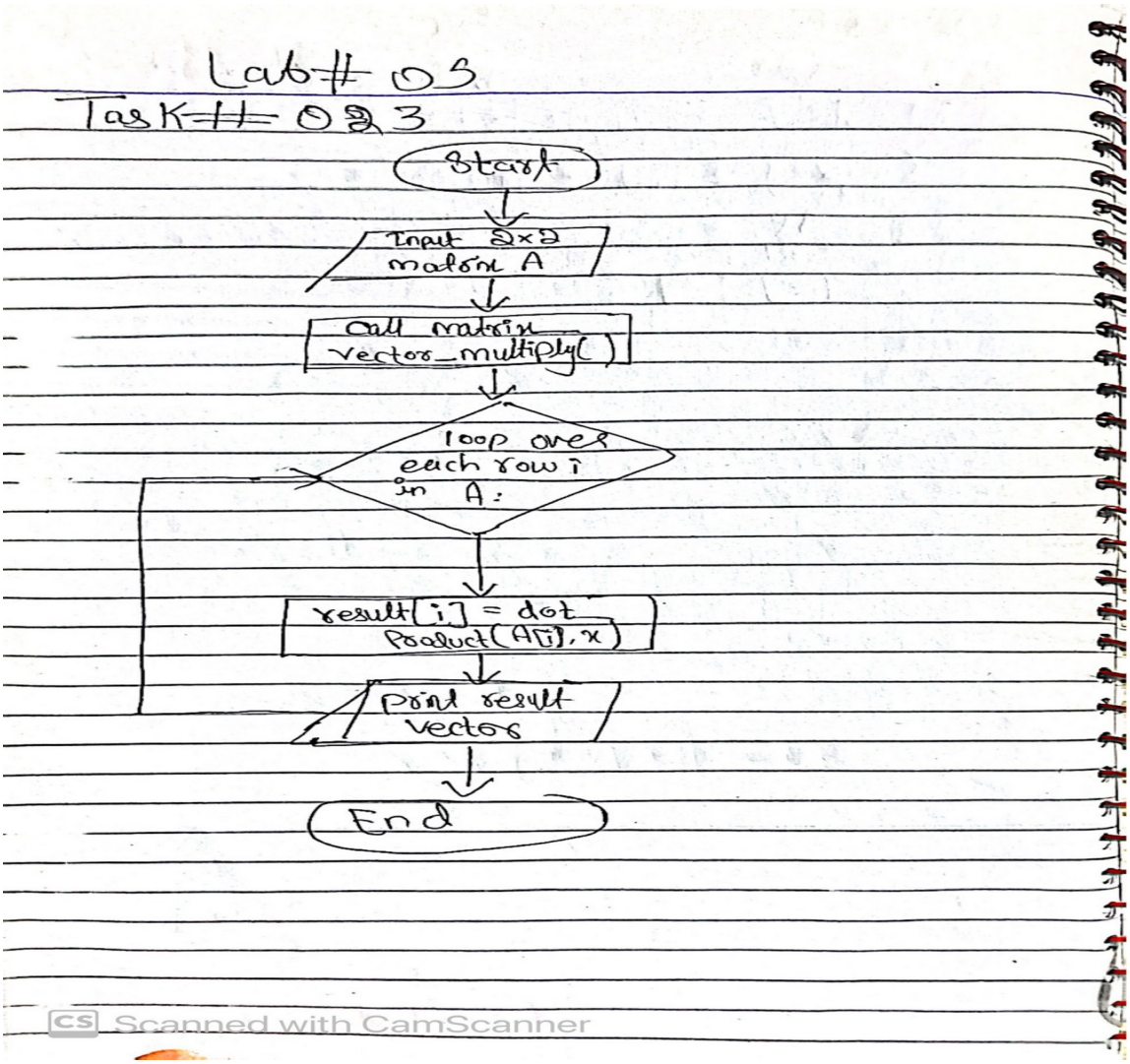


Terminal Output:

```
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$ gcc task2.c -o task2
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$ ./task2
Enter Number:2
Enter element for vector x:2
2
Enter element for vector y:2
2
Result of Dot Product (x[i] * y[i]): 8.000000
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$
```

TASK # 03:

Flow Chart:

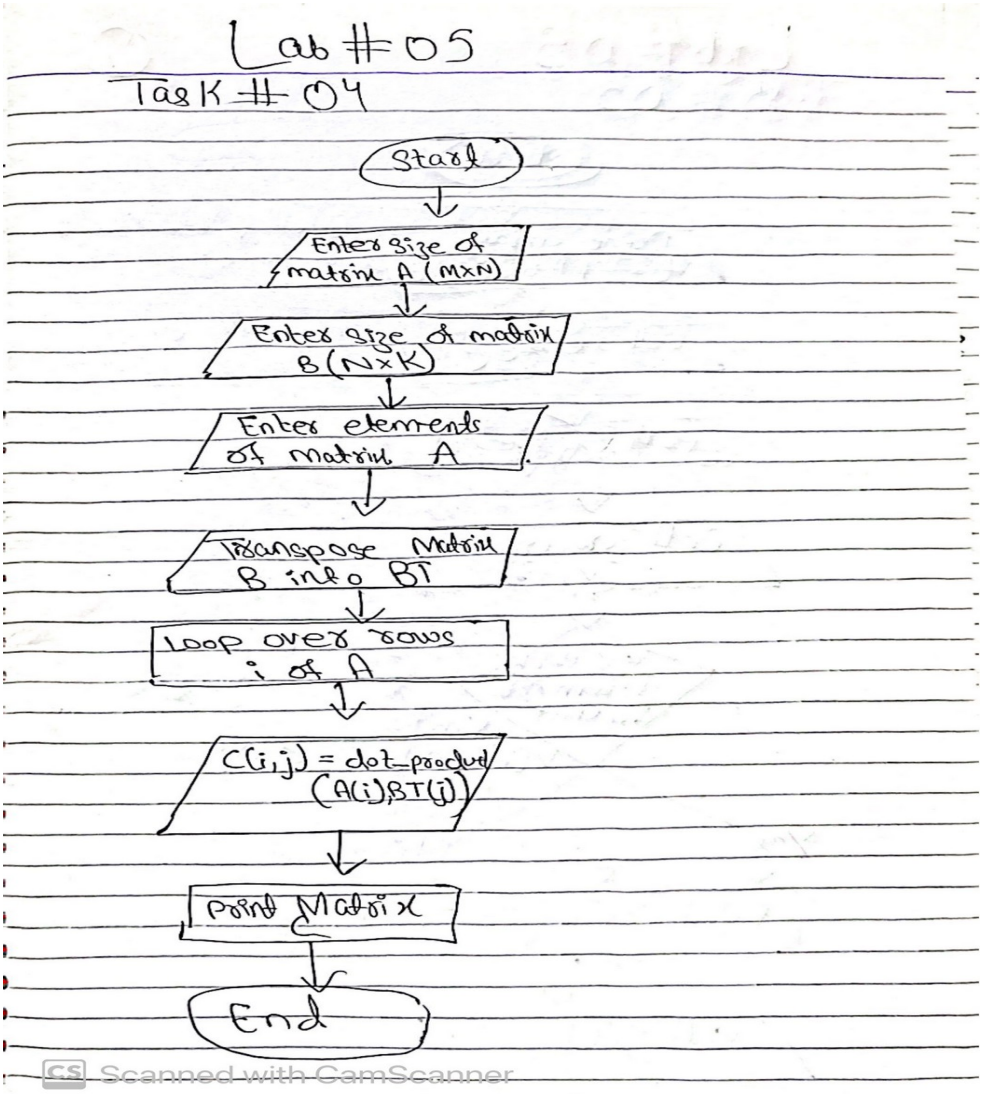


Terminal output:

```
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$ gcc task_3.c -o task_3
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$ ./task_3
Enter number of rows (M): 2
Enter number of columns (N): 2
Enter elements of 2x2 matrix A:
A[0][0]: 2
A[0][1]: 3
A[1][0]: 3
A[1][1]: 2
Enter elements of 2x1 vector x:
x[0]: 2
x[1]: 2

Result of A * x:
result[0] = 10.00
result[1] = 10.00
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$
```

TASK # 04:

Flow Chart:

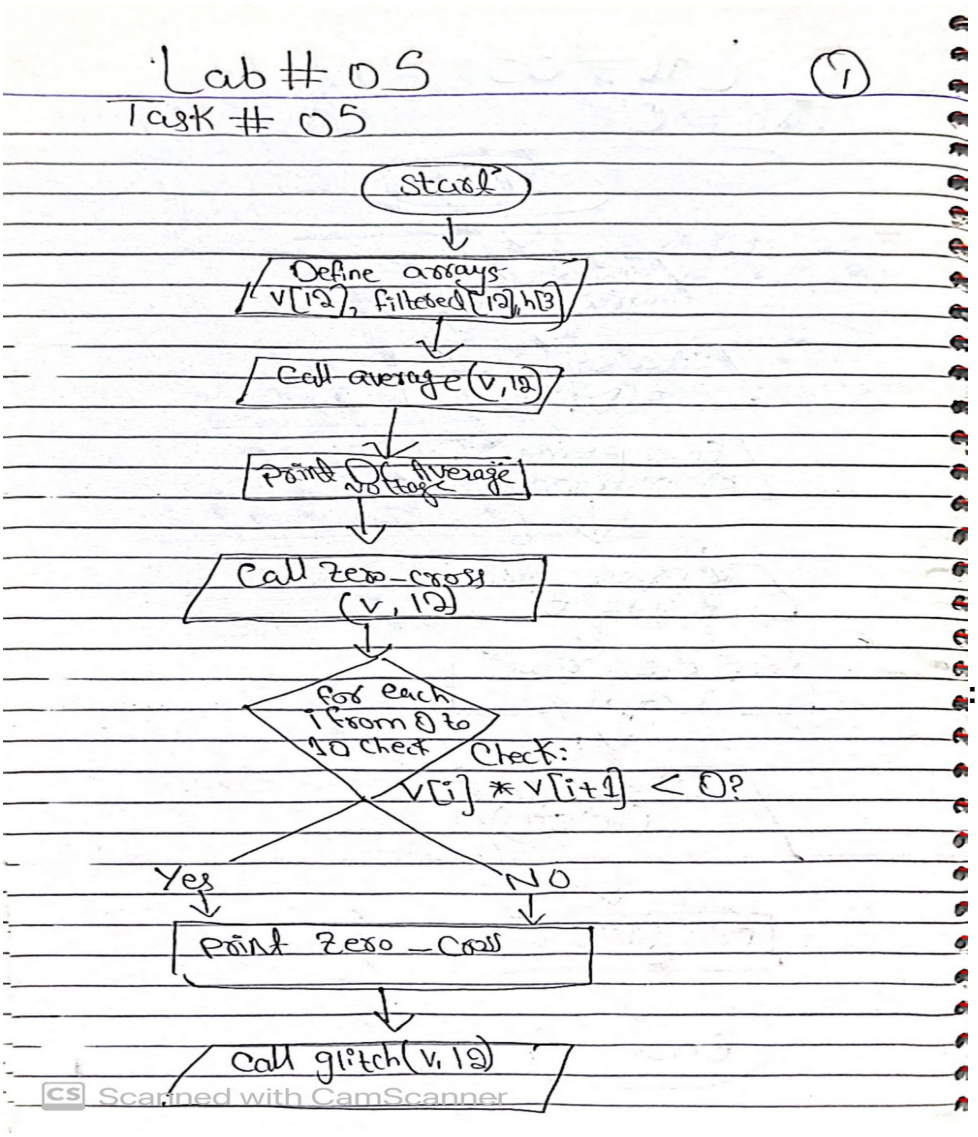


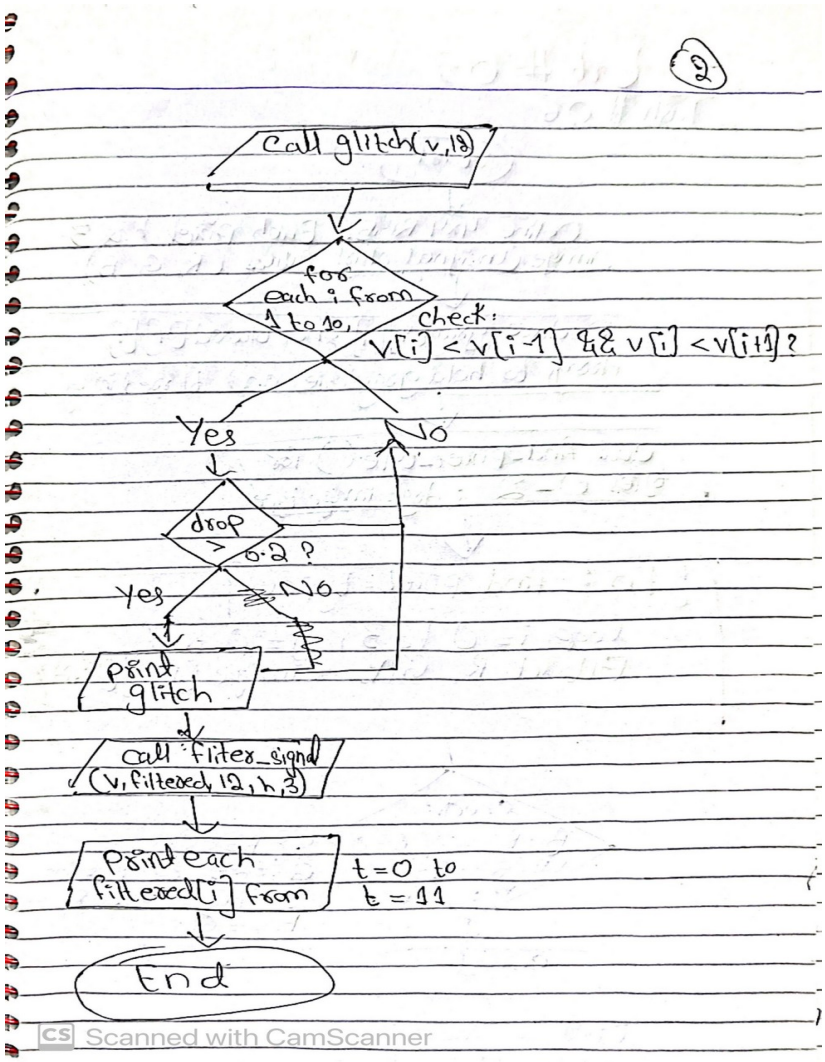
Terminal Output:

```
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$ gcc task4.c -o task4
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$ ./task4
Enter size of Matrix A (MxN): 3
3
Enter size of Matrix B (NxK): 3
3
Enter elements of Matrix A (3x3):
2
3
4
2
4
2
4
25
67
Enter elements of Matrix B (3x3):
3
4
5
6
7
8
9
1
2
Resultant Matrix C = A x B:
60.00 33.00 42.00
48.00 38.00 46.00
Manage 0 258.00 354.00
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$
```

TASK # 05:

Flow Chart:



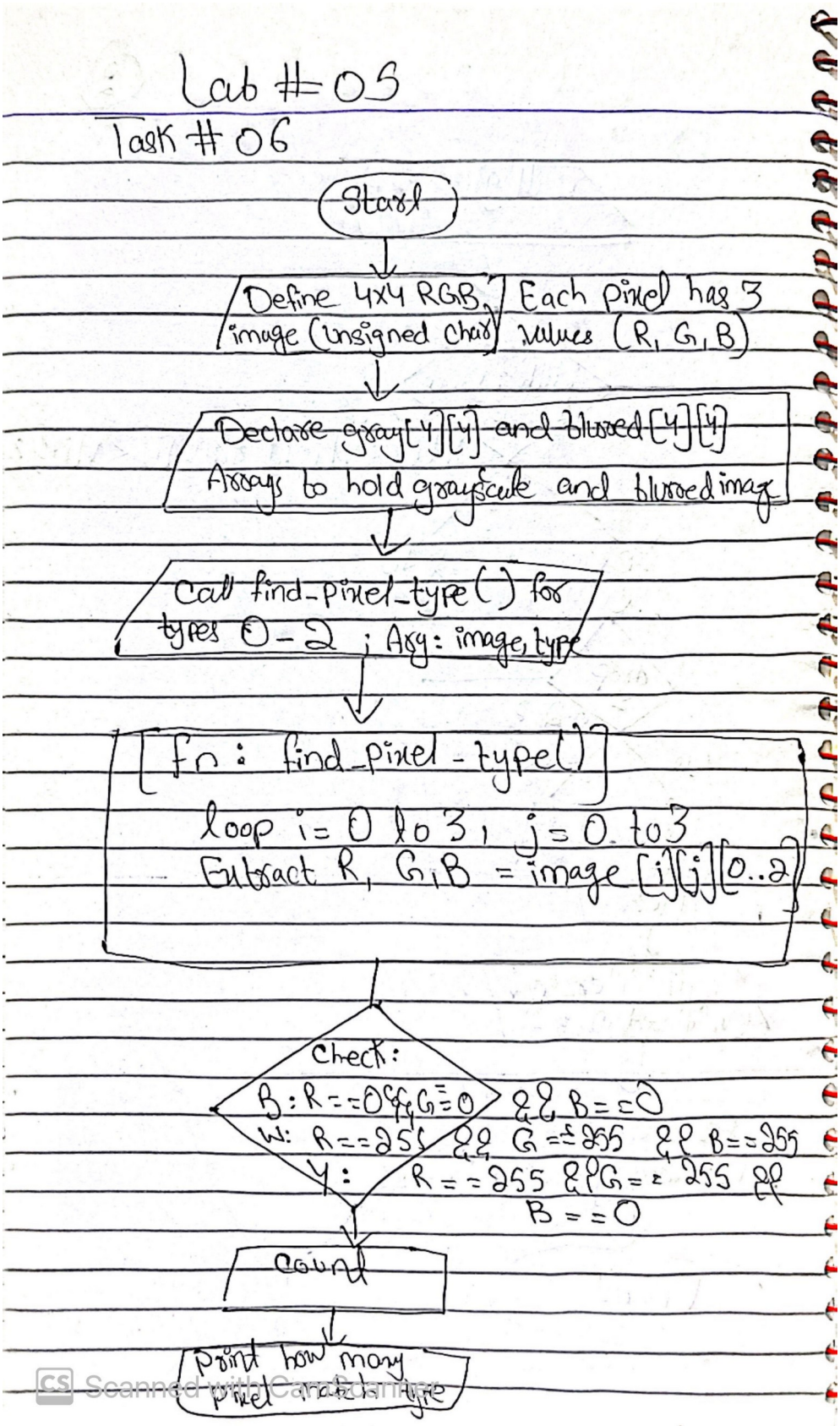


Terminal Output

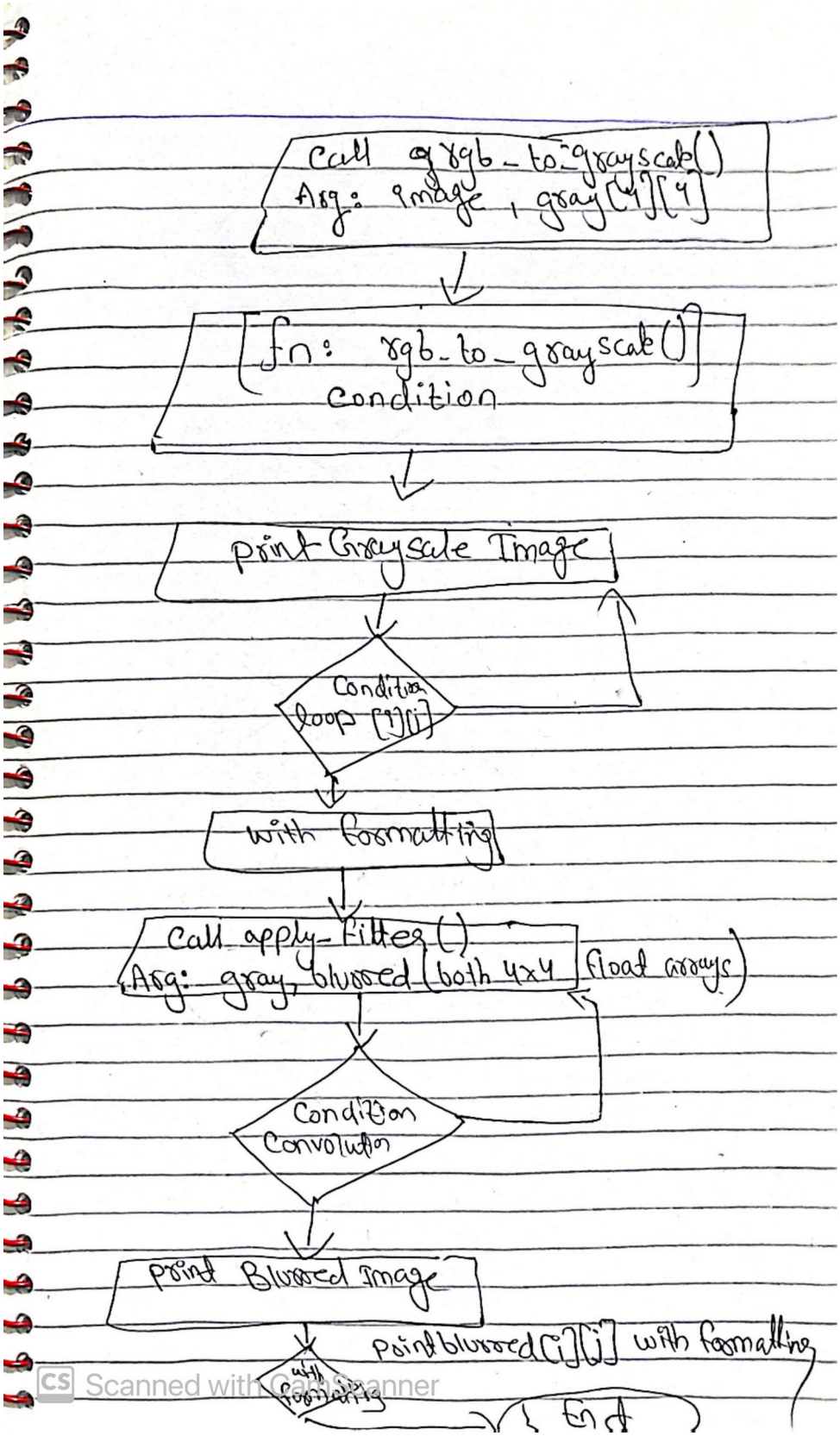
```
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$ gcc task5.c -o task5
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$ ./task5
DC (Average) Voltage: -0.05

Zero Crossing Detection:
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)

Filtered Signal (Moving Average):
t = 0, Filtered Value = 0.08
t = 1, Filtered Value = 0.25
t = 2, Filtered Value = 0.28
t = 3, Filtered Value = 0.53
t = 4, Filtered Value = 0.62
t = 5, Filtered Value = 0.75
t = 6, Filtered Value = 0.25
t = 7, Filtered Value = -0.07
t = 8, Filtered Value = -0.48
t = 9, Filtered Value = -0.65
t = 10, Filtered Value = -0.83
t = 11, Filtered Value = -0.75
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$
```

TASK # 06

Flow Chart:



Scanned with CamScanner



Scanned with CamScanner

Terminal Output:

```
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$ gcc task6.c -o task6
khalilrehman@khalilrehman-ThinkPad-T14-Gen-1:~/Documents/LAB5$ ./task6
Black pixels: 4
White pixels: 4
Yellow pixels: 4

Grayscale Image:
0.0     255.0   225.9   100.0
225.9   0.0     255.0   200.0
255.0   225.9   0.0     50.0
225.9   100.0   0.0     255.0

Blurred Image (Mean Filter):
0.0     0.0     0.0     0.0
0.0     160.3   145.7   0.0
0.0     143.1   120.6   0.0
0.0     0.0     0.0     0.0
```