

VARUN BHARGAVA – 241010282

DATA STRUCTURES TASK-1

SECTION 1:

(<https://github.com/varunnnb/dsa-sem3-iiitnr/blob/main/lab1-1.c>)

Write a program to perform the following operations on an array:

- Take user input to create the array
- Traverse and display all elements of the array

```
1 #include <stdio.h>
2 int main()
3 {
4     printf("No of elements in array: ");
5     int n;
6     scanf("%d", &n);
7     int arr[n];
8     printf("Enter the elements of the array:\n");
9     for (int i = 0; i < n; i++)
10     {
11         scanf("%d", &arr[i]);
12     }
13
14     printf("The elements of the array are:\n");
15     for (int i = 0; i < n; i++)
16     {
17         printf("%d, ", arr[i]);
18     }
19 }
```

TERMINAL

```
PS C:\Users\varun\Desktop\VB\College\IIITNR\assignments\sem3\dsa> cd "c:\Users\varun\Desktop\VB\College\IIITNR\assignments\sem3\dsa\" ; if ($?) { gcc lab1-1.c -o lab1-1 } ; if ($?) { .\lab1-1 }
No of elements in array: 5
Enter the elements of the array:
2
4
1
4
7
The elements of the array are:
2, 4, 1, 4, 7,
Enter element to insert: 
```

- Insert an element at a specified index

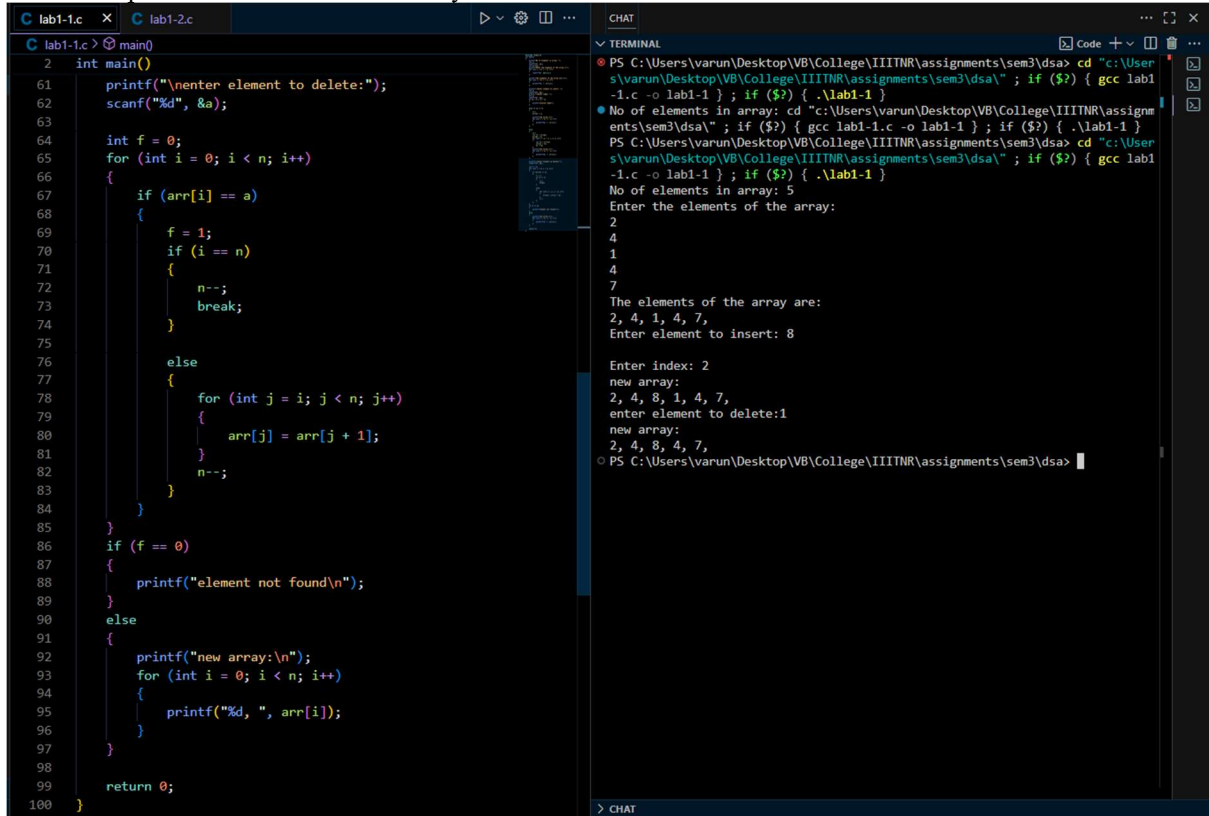
```
2 int main()
20 printf("\nEnter element to insert: ");
21 int a;
22 scanf("%d", &a);
23 printf("\nEnter index: ");
24 int p;
25 scanf("%d", &p);
26 if (p < 0 || p > n)
27 {
28     printf("invalid index");
29 }
30
31 else if (p == n)
32 {
33     n++;
34     arr[n] = a;
35
36     printf("new array:\n");
37     for (int i = 0; i < n; i++)
38     {
39         printf("%d, ", arr[i]);
40     }
41 }
42
43 else
44 {
45     n++;
46     int t1 = arr[p];
47     arr[p] = a;
48     for (int i = p + 1; i <= n; i++)
49     {
50         int t2 = arr[i];
51         arr[i] = t1;
52         t1 = t2;
53     }
54     printf("new array:\n");
55     for (int i = 0; i < n; i++)
56     {
57         printf("%d, ", arr[i]);
58     }
59 }
```

TERMINAL

```
PS C:\Users\varun\Desktop\VB\College\IIITNR\assignments\sem3\dsa> cd "c:\Users\varun\Desktop\VB\College\IIITNR\assignments\sem3\dsa\" ; if ($?) { gcc lab1-1.c -o lab1-1 } ; if ($?) { .\lab1-1 }
No of elements in array: 5
Enter the elements of the array:
2
4
1
4
7
The elements of the array are:
2, 4, 1, 4, 7,
Enter element to insert: 8

Enter index: 2
new array:
2, 4, 8, 1, 4, 7,
enter element to delete: 
```

- Delete a specified element from the array



```
lab1-1.c x lab1-2.c
2 int main()
61 printf("\nEnter element to delete:");
62 scanf("%d", &a);
63
64 int f = 0;
65 for (int i = 0; i < n; i++)
66 {
67     if (arr[i] == a)
68     {
69         f = 1;
70         if (i == n)
71         {
72             n--;
73             break;
74         }
75     }
76     else
77     {
78         for (int j = i; j < n; j++)
79         {
80             arr[j] = arr[j + 1];
81         }
82         n--;
83     }
84 }
85
86 if (f == 0)
87 {
88     printf("element not found\n");
89 }
90 else
91 {
92     printf("new array:\n");
93     for (int i = 0; i < n; i++)
94     {
95         printf("%d, ", arr[i]);
96     }
97 }
98
99 return 0;
100 }
```

CHAT

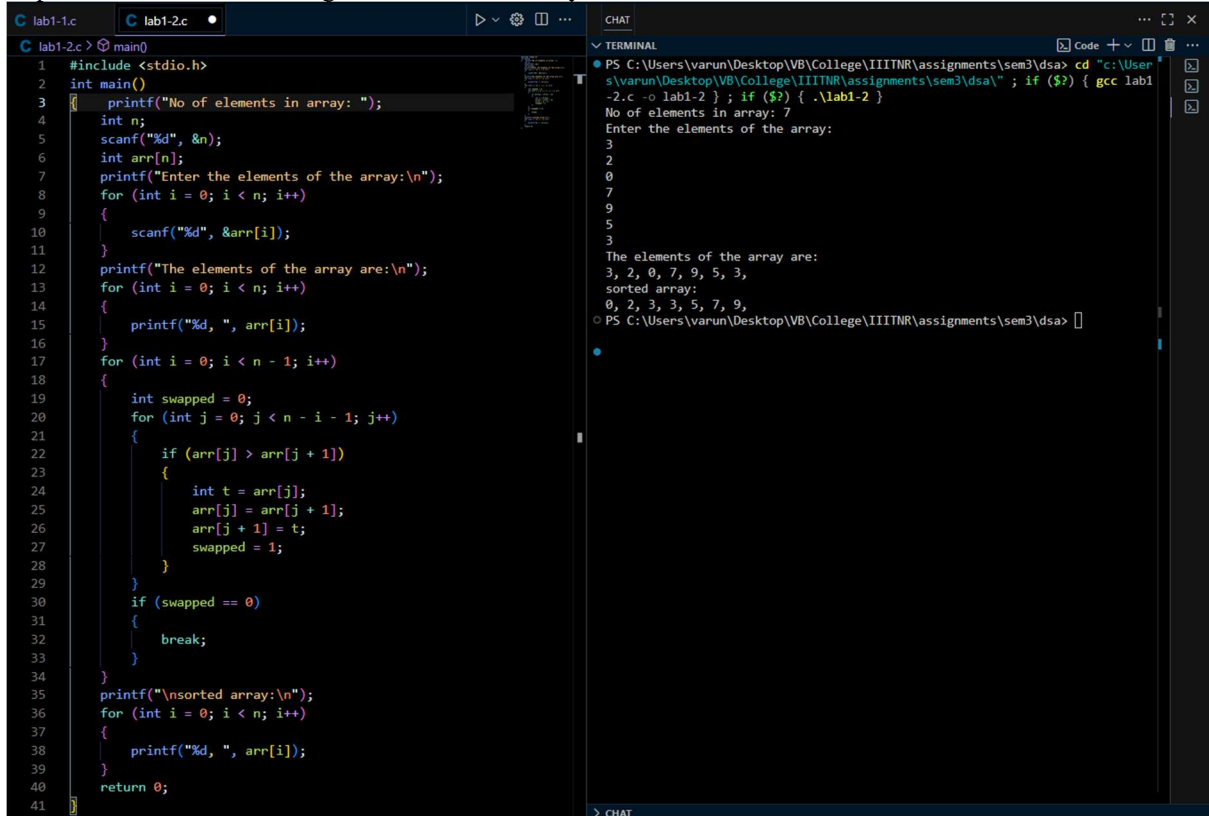
PS C:\Users\varun\Desktop\VB\College\IIITNR\assignments\sem3\dsa> cd "c:\Users\varun\Desktop\VB\College\IIITNR\assignments\sem3\dsa" ; if (\$?) { gcc lab1-1.c -o lab1-1 ; if (\$?) { .\lab1-1 }
No of elements in array: 5
Enter the elements of the array:
2
4
1
4
7
The elements of the array are:
2, 4, 1, 4, 7,
Enter element to insert: 8
Enter index: 2
new array:
2, 4, 8, 1, 4, 7,
enter element to delete: 1
new array:
2, 4, 8, 4, 7,
PS C:\Users\varun\Desktop\VB\College\IIITNR\assignments\sem3\dsa>

> CHAT

SECTION 2:

(<https://github.com/varunnnb/dsa-sem3-iiitnr/blob/main/lab1-2.c>)

Implement the Bubble Sort algorithm to sort the array.



```
1 #include <stdio.h>
2 int main()
3 {
4     printf("No of elements in array: ");
5     int n;
6     scanf("%d", &n);
7     int arr[n];
8     printf("Enter the elements of the array:\n");
9     for (int i = 0; i < n; i++)
10     {
11         scanf("%d", &arr[i]);
12     }
13     printf("The elements of the array are:\n");
14     for (int i = 0; i < n; i++)
15     {
16         printf("%d, ", arr[i]);
17     }
18     for (int i = 0; i < n - 1; i++)
19     {
20         int swapped = 0;
21         for (int j = 0; j < n - i - 1; j++)
22         {
23             if (arr[j] > arr[j + 1])
24             {
25                 int t = arr[j];
26                 arr[j] = arr[j + 1];
27                 arr[j + 1] = t;
28                 swapped = 1;
29             }
30         }
31         if (swapped == 0)
32         {
33             break;
34         }
35     }
36     printf("\nsorted array:\n");
37     for (int i = 0; i < n; i++)
38     {
39         printf("%d, ", arr[i]);
40     }
41     return 0;
42 }
```

PS C:\Users\varun\Desktop\VB\College\IIITNR\assignments\sem3\dsa> cd "c:\Users\varun\Desktop\VB\College\IIITNR\assignments\sem3\dsa\" ; if (\$?) { gcc lab1-2.c -o lab1-2 } ; if (\$?) { .\lab1-2 }

No of elements in array: 7

Enter the elements of the array:

3
2
0
7
9
5
3

The elements of the array are:
3, 2, 0, 7, 9, 5, 3,
sorted array:
0, 2, 3, 3, 5, 7, 9,

PS C:\Users\varun\Desktop\VB\College\IIITNR\assignments\sem3\dsa>