

# LAB #04

## Introduction to C Programming



Spring 2023

### **CSE-204L Operating Systems Lab**

Submitted by: MUHAMMAD SADEEQ

Registration No.: 21PWCSE2028

Section: C

“On my honor, as a student of the University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work”

Submitted to:

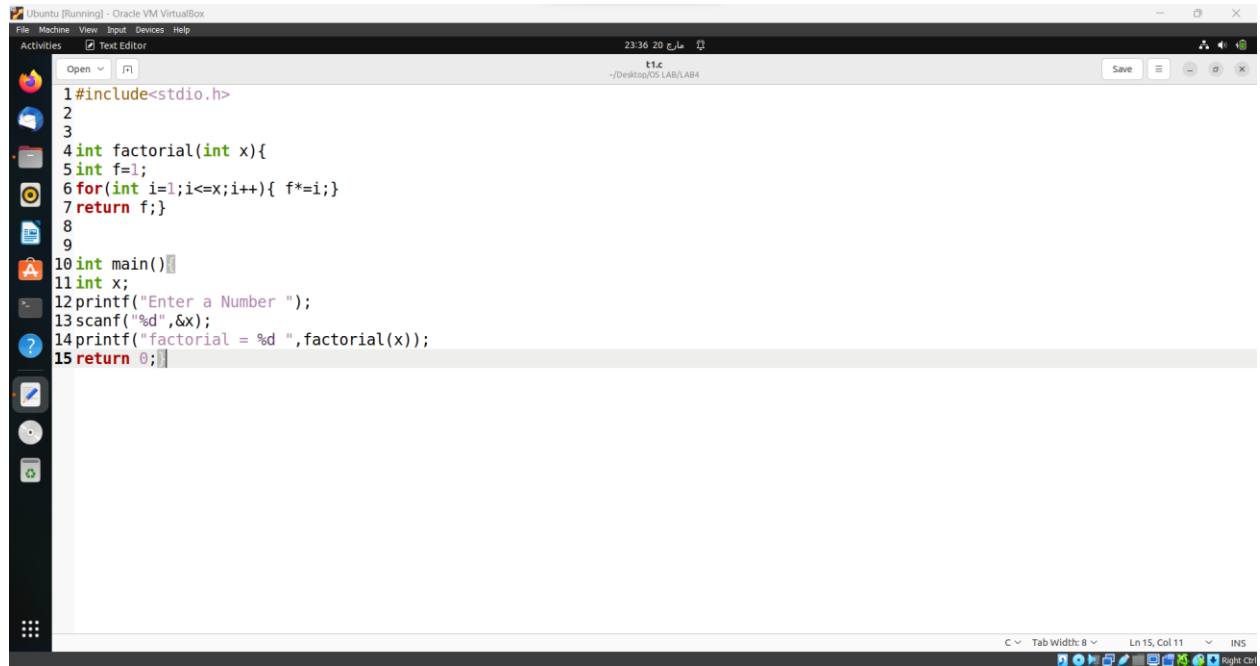
Engr. Madiha Sher

(20 Mar 2023)

Department of Computer systems engineering  
University of Engineering and Technology,  
Peshawar

# TASK 1

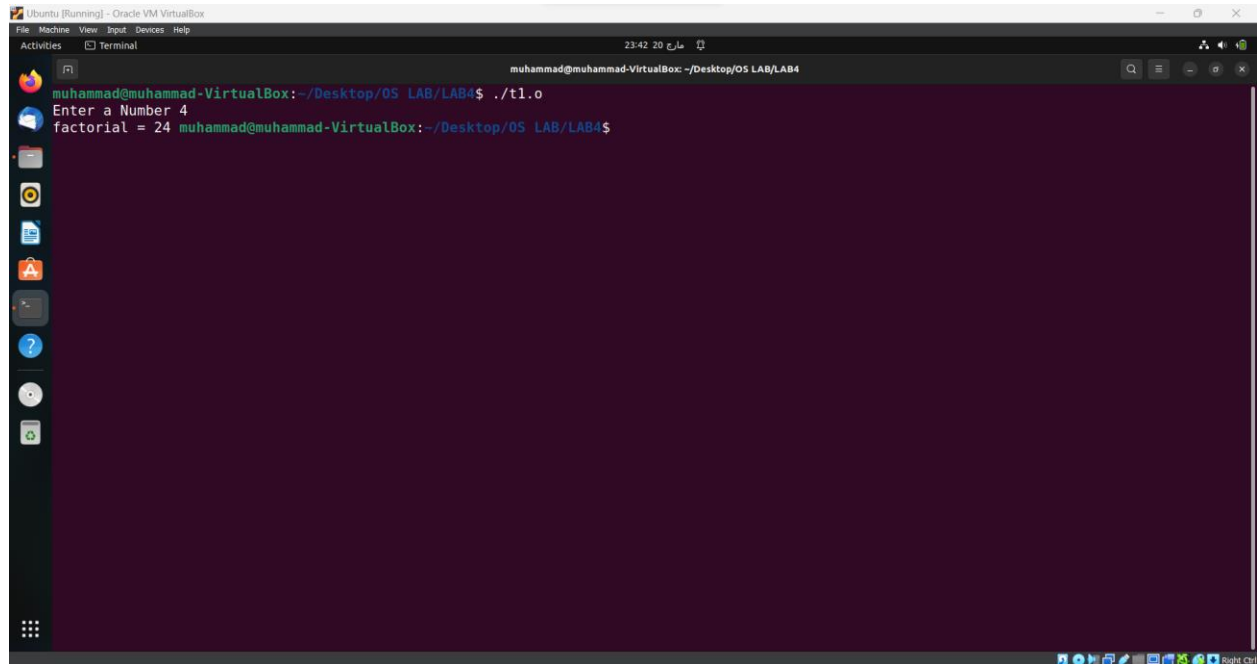
## CODE:



The screenshot shows a text editor window titled 't1.c' with the following C code:

```
1#include<stdio.h>
2
3
4int factorial(int x){
5    int f=1;
6    for(int i=1;i<=x;i++){ f*=i;}
7    return f;}
8
9
10int main()
11{
12    int x;
13    printf("Enter a Number ");
14    scanf("%d",&x);
15    printf("factorial = %d ",factorial(x));
16    return 0;
17}
```

## Output:

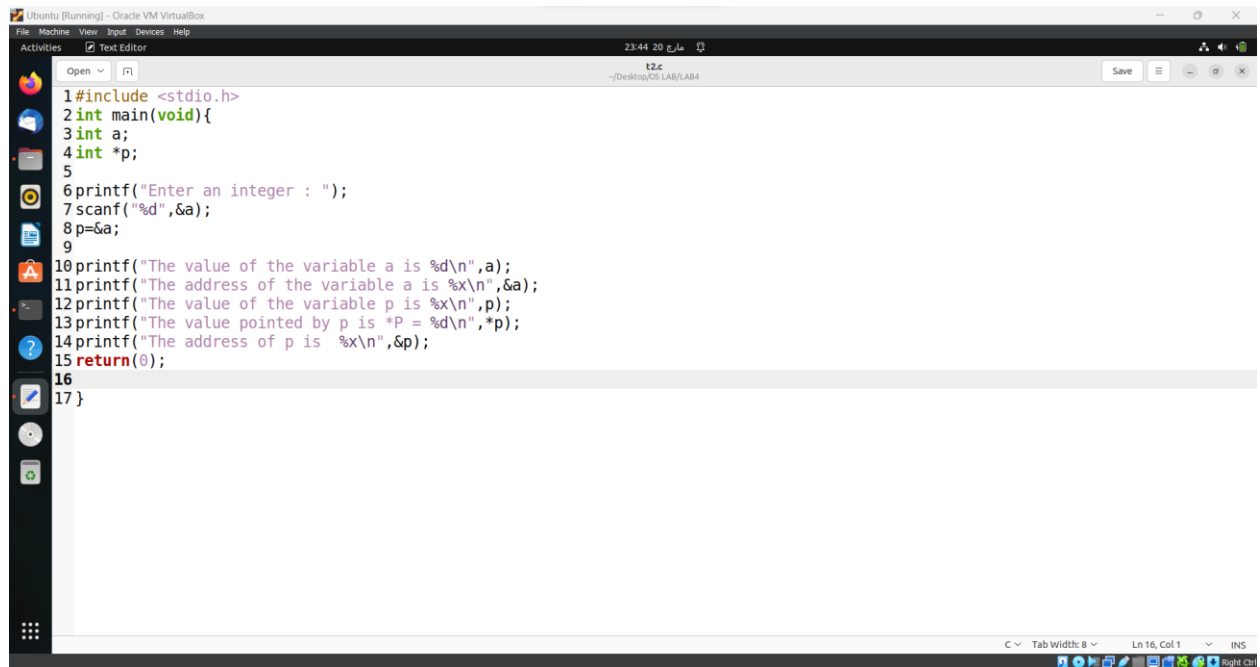


The screenshot shows a terminal window with the following output:

```
muhammad@muhammad-VirtualBox: ~/Desktop/OS LAB/LAB4
muhammad@muhammad-VirtualBox:~/Desktop/OS LAB/LAB4$ ./t1.o
Enter a Number 4
factorial = 24 muhammad@muhammad-VirtualBox:~/Desktop/OS LAB/LAB4$
```

## TASK 2

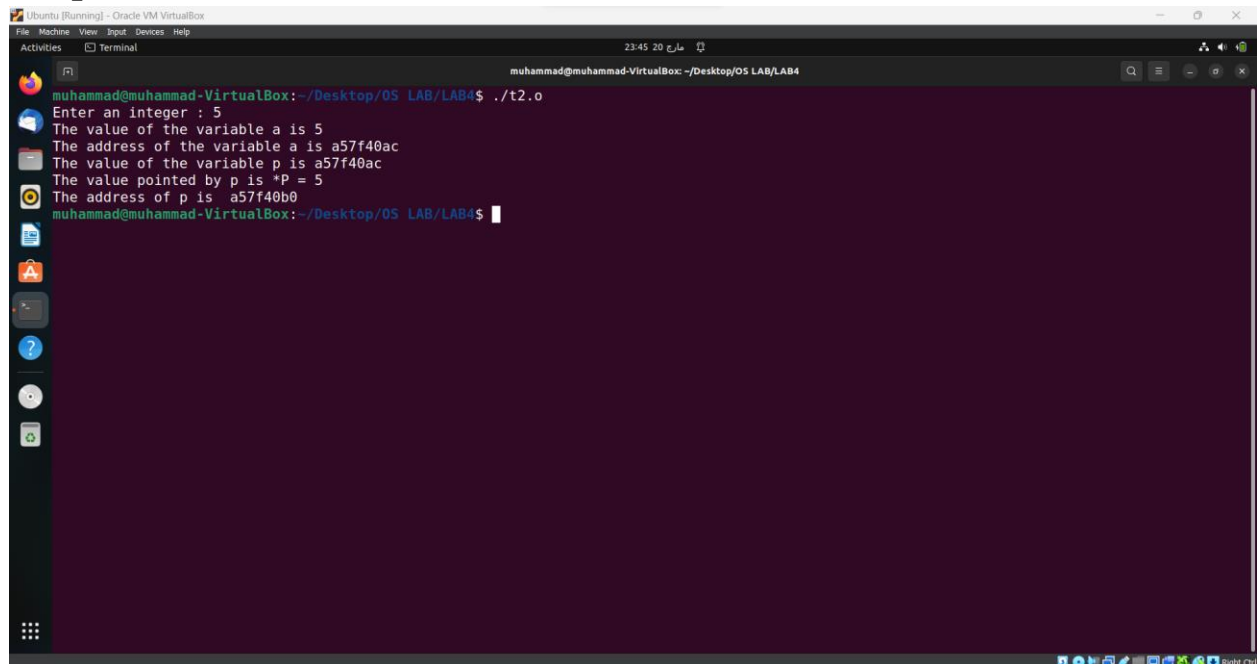
### CODE:



The screenshot shows a code editor window titled 't2.c' with the following C code:

```
1#include <stdio.h>
2int main(void){
3int a;
4int *p;
5
6printf("Enter an integer : ");
7scanf("%d",&a);
8p=&a;
9
10printf("The value of the variable a is %d\n",a);
11printf("The address of the variable a is %x\n",&a);
12printf("The value of the variable p is %x\n",p);
13printf("The value pointed by p is *P = %d\n",*p);
14printf("The address of p is %x\n",&p);
15return(0);
16
17}
```

### Output:



The screenshot shows a terminal window with the following output:

```
muhammad@muhammad-VirtualBox: ~/Desktop/OS LAB/LAB4$ ./t2.o
Enter an integer : 5
The value of the variable a is 5
The address of the variable a is a57f40ac
The value of the variable p is a57f40ac
The value pointed by p is *P = 5
The address of p is a57f40b0
muhammad@muhammad-VirtualBox:~/Desktop/OS LAB/LAB4$
```

## TASK 3

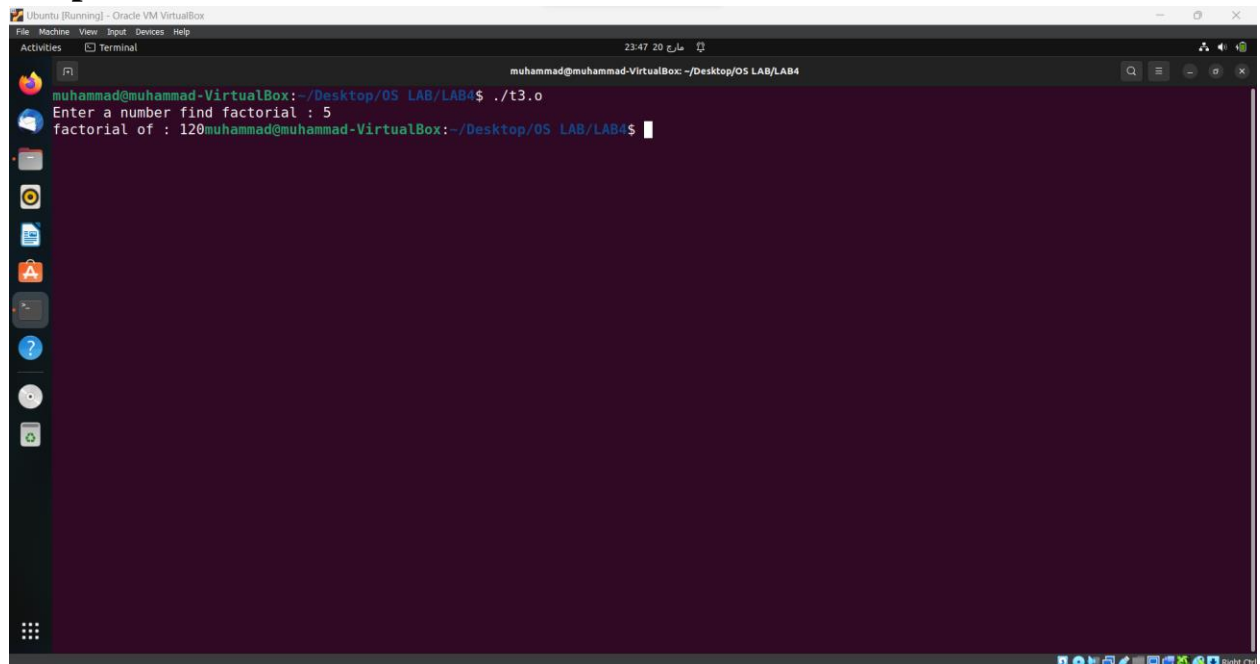
### CODE:



The screenshot shows a text editor window titled 't3.c' with the following C code:

```
1#include<stdio.h>
2
3int fac(int *f){
4int fac =1;
5for(int i=1;i<=*f;++i){
6fac*=i;
7}
8return fac;
9}
10
11int main(){
12
13int f;
14printf("Enter a number find factorial : ");
15scanf("%d",&f);
16int fact=fac(&f);
17
18printf("factorial of : %d",fact);
19return 0;
20}
21
22
23
```

### Output:



The screenshot shows a terminal window with the following output:

```
muhammad@muhammad-VirtualBox: ~/Desktop/OS LAB/LAB4
muhammad@muhammad-VirtualBox:~/Desktop/OS LAB/LAB4$ ./t3.o
Enter a number find factorial : 5
factorial of : 120muhammad@muhammad-VirtualBox:~/Desktop/OS LAB/LAB4$
```

## TASK 4

### CODE:

```
Open  [icon] t4.c ~/Desktop/OS LAB/LAB4 Save [icon] [icon] [icon] [icon]
1#include<stdio.h>
2
3int dp(int r1,int c1,int a1[r1][c1],int r2,int c2,int a2[r2][c2]){
4
5    if(c1!=r2){
6        return 0;
7    }
8    int result = 0;
9    for(int i = 0;i<r1;i++){
10        for(int j=0;j<c2;j++){
11            int sum=0;
12            for(int k=0;k<c1;k++){
13                sum += a1[i][j]*a2[k][j];
14            }
15            result+=sum;
16        }
17    }
18    return result;
19 }
20 int main(){
21     printf("Enter the dimention of first array : ");
22     scanf("%d %d",&r1,&c1);
23     printf("Enter the dimention of Second array : ");
24     scanf("%d %d",&r2,&c2);
25     if(c1!=r2){
26         printf("error");
27         return 0;
28     }
29
30     int a1[r1][c1],a2[r2][c2];
31     printf("enter the elements of the first array : \n");
32     for(int i=0;i<r1;i++){
33         for(int j=0;j<c1;j++){
34             scanf("%d",&a1[i][j]);
35         }
36     }
37     printf("enter the elements of the second array :\n");
38     for(int i=0;i<r2;i++){
39         for(int j=0;j<c2;j++){
40             scanf("%d",&a2[i][j]);
41         }
42     }
43     int result = dp(r1,c1,a1,r2,c2,a2);
44     printf("the dot product of two arrays is :%d\n",result);
45     return 0;
46 }
```

### Output:

```
muhammad@muhammad-VirtualBox: ~/Desktop/OS LAB/LAB4
muhammad@muhammad-VirtualBox:~/Desktop/OS LAB/LAB4$ ^C
muhammad@muhammad-VirtualBox:~/Desktop/OS LAB/LAB4$ ./t4.o
Enter the dimention of first array : 2
2
Enter the dimention of Second array :
2
2
enter the elements of the first array :
1 2
3 4
enter the elements of the second array :
4 5
6 7
the dot product of two arrays is :158
muhammad@muhammad-VirtualBox:~/Desktop/OS LAB/LAB4$
```

## TASK 5

### CODE:

```
1#include<stdio.h>
2main(){
3struct student {
4char name[20];
5int id;
6};
7
8struct student s1,s2,s3;
9
10printf("please enter the student name,and id\n");
11scanf(" %s %d", &s1.name, &s1.id);
12scanf(" %s %d", &s2.name, &s2.id);
13scanf(" %s %d", &s3.name, &s3.id);
14
15printf("\nThe student details");
16printf("\n %s \t\t %d ",s1.name,s1.id);
17printf("\n %s \t\t %d ",s2.name,s2.id);
18printf("\n %s \t\t %d ",s3.name,s3.id);
19
```

### Output:

```
muhammad@muhammad-VirtualBox:~/Desktop/05 LAB/LAB4$ ^C
muhammad@muhammad-VirtualBox:~/Desktop/05 LAB/LAB4$ ./t5.o
please enter the student name,and id
maaz 41
sadeeq 28
waseem 12

The student details
maaz      41
sadeeq    28
waseem    12 muhammad@muhammad-VirtualBox:~/Desktop/05 LAB/LAB4$
```

## TASK 6

### CODE:

```
1#include <stdio.h>
2
3struct Time {
4    int hour;
5    int minute;
6    int second;
7};
8struct Time addTime(struct Time t1, struct Time t2) {
9    struct Time result;
10
11    result.second = t1.second + t2.second;
12    result.minute = t1.minute + t2.minute + result.second/60;
13    result.second = result.second % 60;
14    result.hour = t1.hour + t2.hour + result.minute/60;
15    result.minute = result.minute % 60;
16
17    return result;}
18
19int main() {
20    struct Time time1, time2, result;
21
22    printf("Enter time 1 (hh:mm:ss): ");
23    scanf("%d:%d:%d", &time1.hour, &time1.minute, &time1.second);
24
25    printf("Enter time 2 (hh:mm:ss): ");
26    scanf("%d:%d:%d", &time2.hour, &time2.minute, &time2.second);
27
28    result = addTime(time1, time2);
29
30    printf("Result: %02d:%02d:%02d\n", result.hour, result.minute, result.second);
31
32    return 0;}
33
```

## Output:

```
muhammad@muhammad-VirtualBox: ~/Desktop/OS LAB/LAB4$ ^C
muhammad@muhammad-VirtualBox: ~/Desktop/OS LAB/LAB4$ ./t6.o
Enter time 1 (hh:mm:ss): 2:30:00
Enter time 2 (hh:mm:ss): 2:40:00
Result: 05:10:00
muhammad@muhammad-VirtualBox: ~/Desktop/OS LAB/LAB4$
```

## TASK 7

## CODE:

```
1#include <stdio.h>
2
3int main() {
4    int size, i, j, temp;
5
6    printf("Enter the size of the array: ");
7    scanf("%d", &size);
8
9    int arr[size];
10
11    printf("Enter the elements of the array: ");
12    for (i = 0; i < size; i++) {
13        scanf("%d", &arr[i]);
14    }
15
16    // Sort array in ascending order using Bubble Sort algorithm
17    for (i = 0; i < size - 1; i++) {
18        for (j = 0; j < size - i - 1; j++) {
19            if (arr[j] > arr[j+1]) {
20                // swap arr[j] and arr[j+1]
21                temp = arr[j];
22                arr[j] = arr[j+1];
23                arr[j+1] = temp;
24            }
25        }
26    }
27
28    printf("Sorted array in ascending order:\n");
29    for (i = 0; i < size; i++) {
30        printf("%d ", arr[i]);
31    }
32    printf("\n");
33
34    return 0;
35}
36
```

## Output:

```
muhammad@muhammad-VirtualBox: ~/Desktop/OS LAB/LAB4$ ^C
muhammad@muhammad-VirtualBox: ~/Desktop/OS LAB/LAB4$ ./t7.o
Enter the size of the array: 4
Enter the elements of the array: 3 5 -1
4
Sorted array in ascending order:
-1 3 4 5
muhammad@muhammad-VirtualBox: ~/Desktop/OS LAB/LAB4$
```

## TASK 8

### CODE:

```
Open [icon] t8.c ~/Desktop/CS LAB/LAB4 Save [icon] [icon] [icon] [icon]
1#include <stdio.h>
2#include <stdlib.h>
3#include <string.h>
4
5typedef enum { false = 0, true } boolean;
6
7typedef struct list {
8    char name[50];
9    struct list *next;
10} list;
11
12void add(list **head, char *newname);
13boolean search(list *head, char *name);
14void printList(list *head);
15
16int main() {
17    list *head = NULL;
18    char choice, name[50];
19    boolean found;
20
21    while (1) {
22        printf("\nMenu:\n");
23        printf("1. Add a name\n");
24        printf("2. Search for a name\n");
25        printf("3. Print the list\n");
26        printf("4. Exit\n");
27        printf("Enter your choice (1-4): ");
28        scanf(" %c", &choice);
29
30        switch (choice) {
31            case '1':
32                printf("Enter a name to add: ");
33                scanf("%s", name);
34                add(&head, name);
35                printf("Name added to the list.\n");
36                break;
37            case '2':
38                printf("Enter a name to search: ");
39                scanf("%s", name);
40                found = search(head, name);
41                if (found) {
42                    printf("Name found in the list.\n");
43                } else {
44                    printf("Name not found in the list.\n");
45                }
46                break;
47            case '3':
48                printf("List of names:\n");
49                printList(head);
50                break;
51            case '4':
52                printf("Exiting the program.\n");
53                exit(0);
54            default:
55                printf("Invalid choice. Please enter a number between 1 and 4.\n");
56                break;
57        }
58    }
```



```

59
60     return 0;
61}
62
63void add(list **head, char *newname) {
64    list *newnode, *current;
65
66    newnode = (list *)malloc(sizeof(list));
67    strcpy(newnode->name, newname);
68    newnode->next = NULL;
69
70    if (*head == NULL) {
71        *head = newnode;
72    } else {
73        current = *head;
74        while (current->next != NULL) {
75            current = current->next;
76        }
77        current->next = newnode;
78    }
79}
80
81boolean search(list *head, char *name) {
82    list *current;
83
84    current = head;
85    while (current != NULL) {
86        if (strcmp(current->name, name) == 0) {
87            return true;
88        }
89        current = current->next;
90    }
91    return false;
92}
93
94void printList(list *head) {
95    list *current;
96
97    if (head == NULL) {
98        printf("List is empty.\n");
99    } else {
100        current = head;
101        while (current != NULL) {
102            printf("%s\n", current->name);
103            current = current->next;
104        }
105    }
106}
107

```

## Output:

```

muhammad@muhammad-VirtualBox: ~/Desktop/OS LAB/LAB4
muhammad@muhammad-VirtualBox:~/Desktop/OS LAB/LAB4$ ^C
muhammad@muhammad-VirtualBox:~/Desktop/OS LAB/LAB4$ ./t8.o

Menu:
1. Add a name
2. Search for a name
3. Print the list
4. Exit
Enter your choice (1-4): 1
Enter a name to add: SADEEQ
Name added to the list.

Menu:
1. Add a name
2. Search for a name
3. Print the list
4. Exit
Enter your choice (1-4): 1
Enter a name to add: WASEEM
Name added to the list.

Menu:
1. Add a name
2. Search for a name
3. Print the list
4. Exit
Enter your choice (1-4): 2
Enter a name to search: SADEEQ
Name found in the list.

Menu:
1. Add a name
2. Search for a name
3. Print the list
4. Exit
Enter your choice (1-4): 3
List of names:
SADEEQ

```

WASEEM

Menu:

1. Add a
2. Search for a name
3. Print the list
4. Exit

Enter your choice (1-4):