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# PSPC ASSIGNMENT

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**ASTU ROLL NO : 200610003078**

**SEMESTER : 2<sup>ND</sup>                      SEC : D**

**COLLEGE ROLL NO : 20/237**

**BRANCH : ELECTRICAL ENGINEERING**

### **Problem No. 1:**

**Aim:** Create a mathematical series and write a recursive function to calculate the sum of the series.

### **Program:**

/\* Program No: 1

Aim: Create a mathematical series and write a recursive function to calculate the sum of the series.

Name: Ritav Kashyap

ASTU Roll No: 200610003078 \*/

```
#include <stdio.h>
```

```
#include <stdlib.h>
```

```
int addNumbers (int n);
```

```
int main ()
```

```
{
```

```
    printf (" Name: Ritav Kashyap\n");
```

```
    printf (" College Roll No: 20/237\n");
```

```
    printf (" ASTU Roll No: 200610003078\n\n");
```

```
    int num;
```

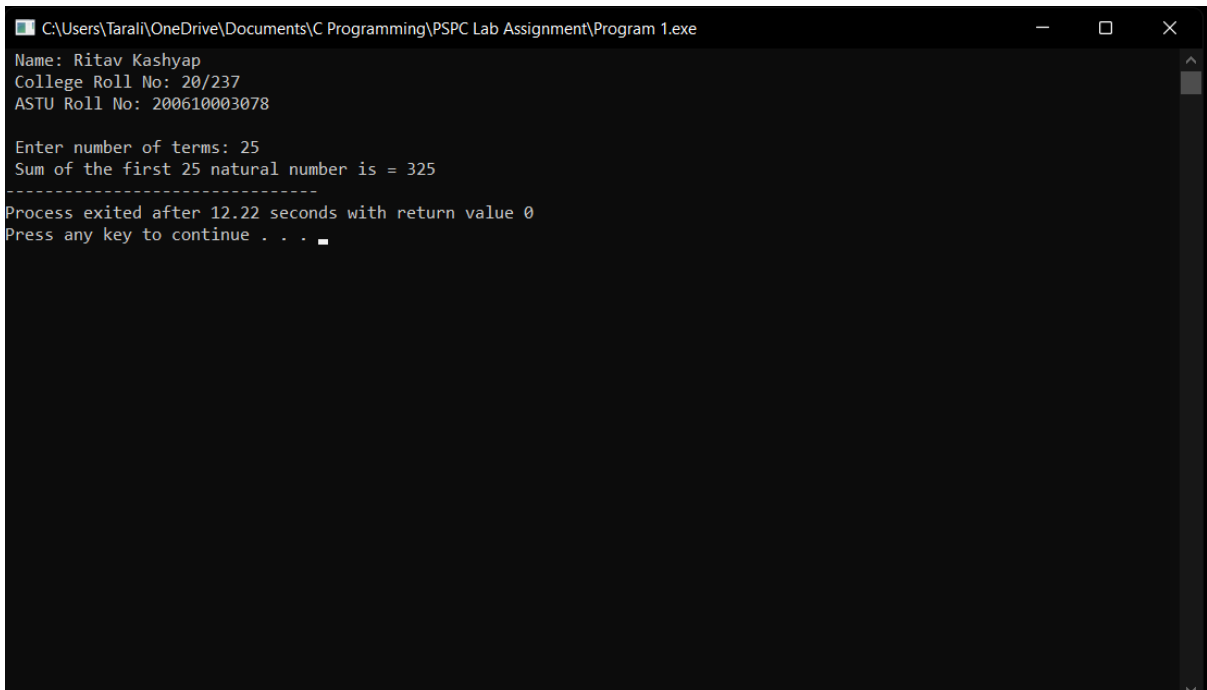
```
    printf (" Enter number of terms: ");
```

```
    scanf ("%d", &num);
```

```
    printf (" Sum of the first %d natural number is = %d", num,
```

```
        addNumbers(num));  
    return 0;  
}  
  
int addNumbers (int n)  
{  
    if (n != 0)  
        return n + addNumbers (n - 1);  
    else  
        return n;  
}
```

### **Sample output:**



```
C:\Users\Tarali\OneDrive\Documents\C Programming\PSPC Lab Assignment\Program 1.exe  
Name: Ritav Kashyap  
College Roll No: 20/237  
ASTU Roll No: 200610003078  
  
Enter number of terms: 25  
Sum of the first 25 natural number is = 325  
-----  
Process exited after 12.22 seconds with return value 0  
Press any key to continue . . .
```

## **Problem No. 2:**

**Aim:** Use Dynamic Memory Allocation to create a 1D array and take input of numbers and use a function to perform selection sort.

## **Program:**

/\* Program No: 2

Aim: Use Dynamic Memory Allocation to create a 1D array and take input of numbers and use a function to perform selection sort.

Name: Ritav Kashyap

ASTU Roll No: 200610003078 \*/

```
#include <stdio.h>
```

```
#include <stdlib.h>
```

```
void swap (int *xp, int *yp)
```

```
{
```

```
    int temp = *xp;
```

```
    *xp = *yp;
```

```
    *yp = temp;
```

```
}
```

```
void selectionSort (int *arr, int n)
```

```
{
```

```
    int i, j, min_idx;
```

```
    for (i=0; i<n-1; i++)
```

```
    {
```

```
        min_idx= i;
```

```
        for (j= i+1; j<n; j++)
        {
            if (arr[j] < arr[min_idx])
            {
                min_idx = j;
            }
        }
        swap(&arr[min_idx], &arr[i]);
    }
}

int main ()
{
    int *arr;
    int lim, i;

    printf (" Name: Ritav Kashyap\n");
    printf (" College Roll No: 20/237\n");
    printf (" ASTU Roll No: 200610003078\n\n");

    printf ("Enter total number of elements: ");
    scanf ("%d", &lim);
    arr=(int*) malloc(lim*sizeof(int));

    printf ("Enter %d elements--\n", lim);
    for (i=0; i<lim; i++)
    {
```

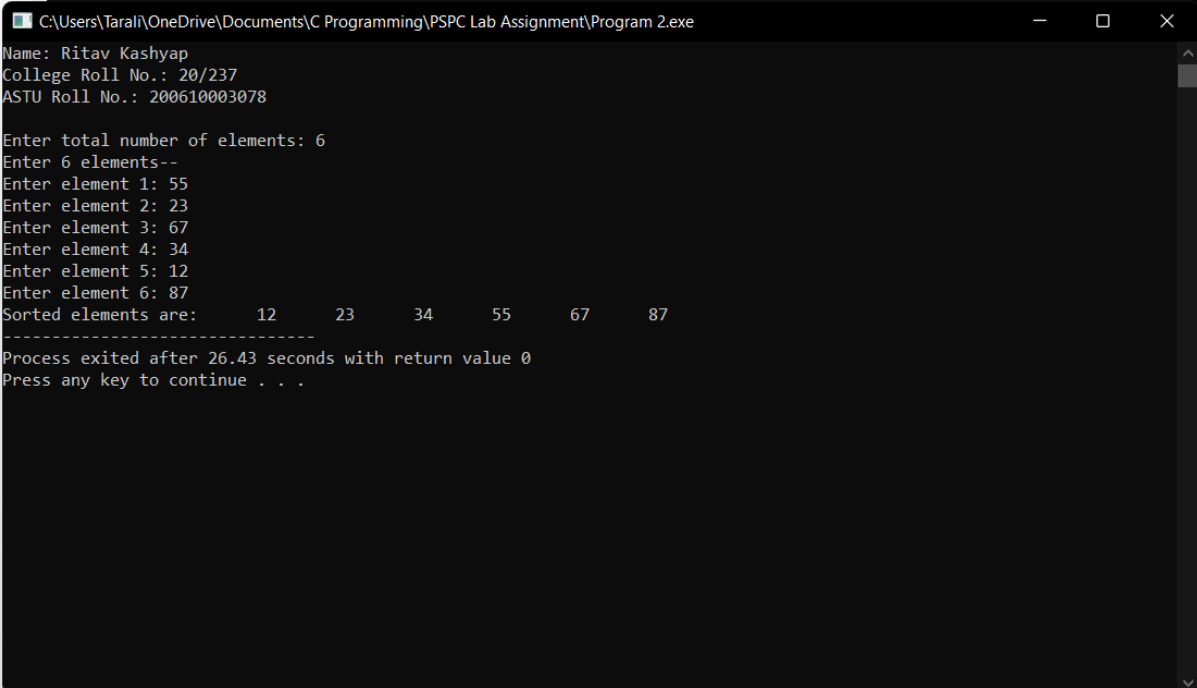
```

        printf ("Enter element %d: ", i+1);
        scanf ("%d", (arr+i));
    }

    selectionSort (arr, lim);
    printf ("Sorted elements are:");
    for (i=0; i<lim; i++)
    {
        printf ("%8d", *(arr+i));
    }
    free(arr);
    return 0;
}

```

### **Sample output:**



```

C:\Users\Tarali\OneDrive\Documents\C Programming\PSPC Lab Assignment\Program 2.exe
Name: Ritav Kashyap
College Roll No.: 20/237
ASTU Roll No.: 200610003078

Enter total number of elements: 6
Enter 6 elements--
Enter element 1: 55
Enter element 2: 23
Enter element 3: 67
Enter element 4: 34
Enter element 5: 12
Enter element 6: 87
Sorted elements are:      12      23      34      55      67      87
-----
Process exited after 26.43 seconds with return value 0
Press any key to continue . . .

```

### **Problem No. 3:**

**Aim:** Use pointer notation to create two 2D matrix, take input of data and perform matrix multiplication.

### **Program:**

/\* Program No: 3

Aim: Use pointer notation to create two 2D matrix, take input of data and perform matrix multiplication.

Name: Ritav Kashyap

ASTU Roll No: 200610003078\*/

```
#include <stdio.h>
```

```
#include<stdlib.h>
```

```
#define ROW 3
```

```
#define COL 3
```

```
void matrixInput (int mat [] [COL]);
```

```
void matrixPrint (int mat [] [COL]);
```

```
void matrixMultiply (int mat1[] [COL], int mat2[] [COL], int res [] [COL]);
```

```
int main ()
```

```
{
```

```
    printf (" Name: Ritav Kashyap\n");
```

```
    printf (" College Roll No: 20/237\n");
```

```
    printf (" Astu Roll No: 200610003078\n\n");
```

```
int mat1[ROW][COL];
int mat2[ROW][COL];
int product [ROW][COL];

printf ("Enter elements in first matrix of size %dx%d\n", ROW, COL);
matrixInput(mat1);

printf ("Enter elements in second matrix of size %dx%d\n", ROW, COL);
matrixInput(mat2);

matrixMultiply (mat1, mat2, product);
printf ("Product of both matrices is: \n");
matrixPrint(product);

return 0;
}

void matrixInput (int mat [] [COL])
{
    int row, col;

    for (row = 0; row < ROW; row++)
    {
        for (col = 0; col < COL; col++)
        {
            scanf ("%d", (*(mat + row) + col));
        }
    }
}
```



```
    }  
}  
  
void matrixPrint (int mat [] [COL])  
{  
    int row, col;  
    for (row = 0; row < ROW; row++)  
    {  
        for (col = 0; col < COL; col++)  
        {  
            printf ("%d ", (*(mat + row) + col));  
        }  
        printf("\n");  
    }  
}
```

```
void matrixMultiply (int mat1[] [COL], int mat2[] [COL], int res[] [COL])  
{  
    int row, col, i;  
    int sum;  
  
    for (row = 0; row < ROW; row++)  
    {  
        for (col = 0; col < COL; col++)  
        {  
            sum = 0;
```

```

        for (i = 0; i < COL; i++)
        {
            sum += (*(mat1 + row) + i) * (*(mat2 + i) + col));
        }
        (*(res + row) + col) = sum;
    }
}

```

### **Sample output:**

```

Name: Ritav kashyap
College Roll No: 20/237
Astu Roll No: 200610003078
S
Enter elements in first matrix of size 3x3
9 3 0
3 9 6
4 2 5
Enter elements in second matrix of size 3x3
3 1 4
10 2 8
2 34 49
Product of both matrices is :
57 15 60
111 225 378
42 178 277

Process returned 0 (0x0)   execution time : 68.646 s
Press any key to continue.

```

### **Problem No. 4:**

**Aim:** Use Dynamic Memory Allocation to create a 1D array and take input of numbers and use a function to perform binary search.

### **Program:**

/\* Program No: 4

Aim: Use Dynamic Memory Allocation to create a 1D array and take input of numbers and use a function to perform binary search

Name: Ritav Kashyap

ASTU Roll No: 200610003078 \*/

```
#include<stdio.h>
```

```
#include<stdlib.h>
```

```
#include<math.h>
```

```
int main ()
```

```
{
```

```
    int *p, n, i, k;
```

```
    int binarysr (int *p, int n);
```

```
    printf (" Name: Ritav Kashyap\n");
```

```
    printf (" College Roll No: 20/237\n");
```

```
    printf (" ASTU Roll No: 200610003008\n\n");
```

```
    printf ("\n Enter the number of elemnts of the array: ");
```

```
    scanf ("%d", &n); p=(int*) malloc(n*sizeof(int));
```

```
    printf ("\n Enter the array: ");
```

```
for (i=0; i<n; i++)  
{  
    scanf ("%d", (p+i));  
}
```

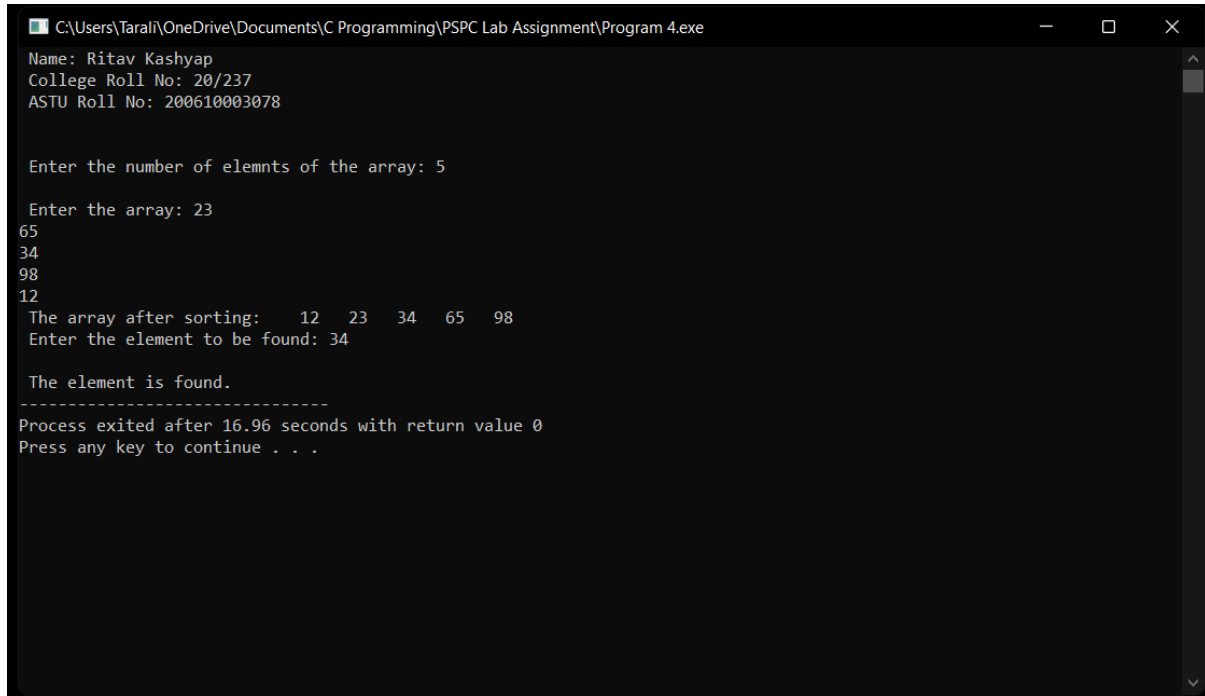
```
int min, j, pos, temp;  
for (i=0; i<n-1; i++)  
{  
    min=i;  
    for (j=i+1; j<n; j++)  
    {  
        if(p[j]<p[min])  
        {  
            min=j;  
        }  
    }  
    temp=p[i];  
    p[i]=p[min];  
    p[min]=temp;  
}
```

```
printf (" The array after sorting: ");  
for (i=0; i<n; i++)  
{  
    printf ("%5d", p[i]);  
}
```

```
    binarysr (p, n);  
    return 0;  
}  
int binarysr (int *p, int n)  
{  
    int k, beg=0, mid, end;  
    printf ("\n Enter the element to be found: ");  
    scanf ("%d", &k);  
    end=n-1;  
    while(beg<=end)  
    {  
        mid= (end + beg)/2;  
        if(p[mid]==k)  
        {  
            printf ("\n The element is found.");  
            exit (0);  
        }  
        else if (p[mid]>k)  
        {  
            end=mid-1;  
        }  
        else beg=mid+1;  
    }  
    printf ("\n The element is not found.");  
}
```

## Sample output:

If the element is found--



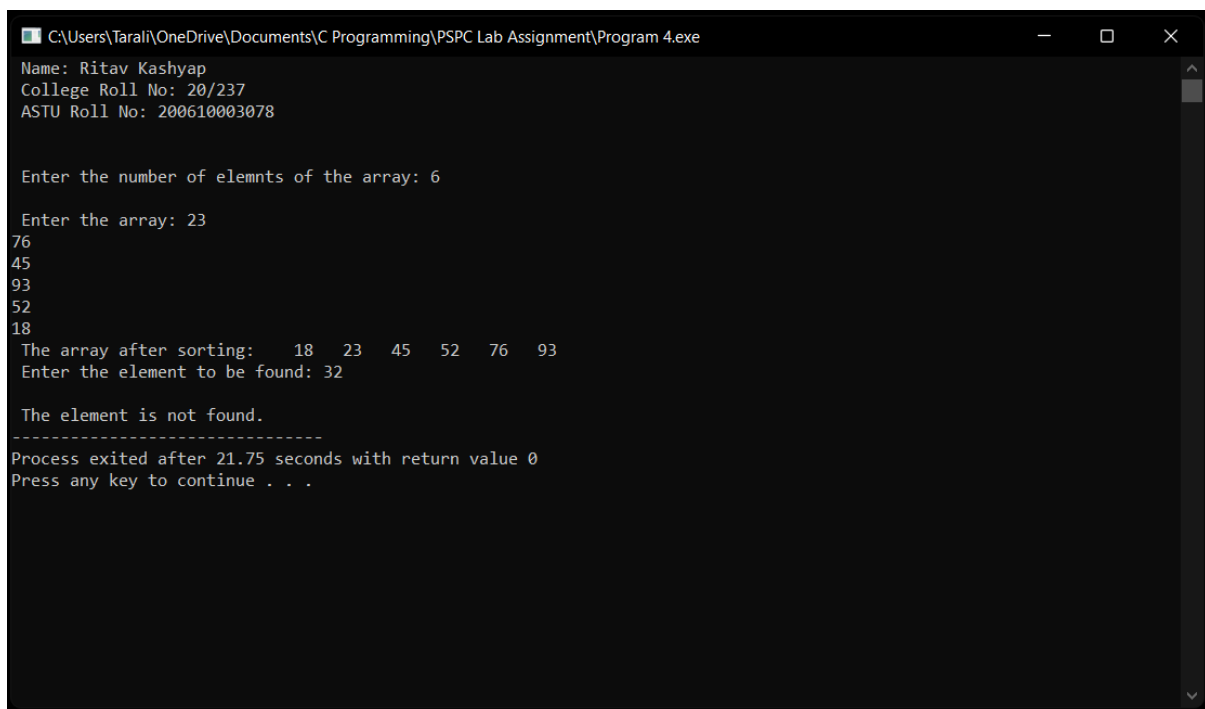
```
C:\Users\Tarali\OneDrive\Documents\C Programming\PSPC Lab Assignment\Program 4.exe
Name: Ritav Kashyap
College Roll No: 20/237
ASTU Roll No: 200610003078

Enter the number of elemnts of the array: 5

Enter the array: 23
65
34
98
12
The array after sorting: 12 23 34 65 98
Enter the element to be found: 34

The element is found.
-----
Process exited after 16.96 seconds with return value 0
Press any key to continue . . .
```

If the element is not found--



```
C:\Users\Tarali\OneDrive\Documents\C Programming\PSPC Lab Assignment\Program 4.exe
Name: Ritav Kashyap
College Roll No: 20/237
ASTU Roll No: 200610003078

Enter the number of elemnts of the array: 6

Enter the array: 23
76
45
93
52
18
The array after sorting: 18 23 45 52 76 93
Enter the element to be found: 32

The element is not found.
-----
Process exited after 21.75 seconds with return value 0
Press any key to continue . . .
```

### **Problem No. 5:**

**Aim:** Use File Handling mechanism and switch statement to write, append and display information about an employee in a company.

### **Program:**

/\* Program No: 5

Aim: Use File Handling mechanism and switch statement to write, append and display information about an employee in a company.

Name: Ritav Kashyap

ASTU Roll No: 200610003078\*/

```
#include<stdio.h>
```

```
#include<stdlib.h>
```

```
#include<conio.h>
```

```
struct employee
```

```
{
```

```
    char name [50];
```

```
    float salary;
```

```
    int age;
```

```
    int id;
```

```
};
```

```
struct employee E;
```

```
long int size = sizeof(E);
```

```
FILE *fp;
```

```
void addrecord ()
```

```

{
    char ch = 'y';
    while (ch == 'y')
    {
        printf ("Enter Name: ");
        scanf ("%s", E.name);
        printf ("Enter Age: ");
        scanf ("%d", &E.age);
        printf ("Enter Salary: ");
        scanf ("%f", &E.salary);
        printf ("Enter EMP-ID: ");
        scanf ("%d", &E.id);
        fwrite (&E, size, 1, fp);
        printf ("Want to add another record (Y/N): ");
        fflush(stdin);
        scanf ("%c", &ch);
    }
}

```

```

void displayrecord ()
{
    printf ("\nNAME\t\tAGE\t\tSALARY\t\tEMPLOYEE ID\n", E.name, E.age,
            E.salary, E.id);
    while (fread (&E, size, 1, fp) == 1)
        printf ("\n%s\t\t%d\t\t.2f\t\t10d", E.name, E.age, E.salary, E.id);
    printf("\n\n\n\t");
}

```



```
int main ()
{
    int opt;
    printf (" Name: Ritav Kashyap\n");
    printf (" Class Roll No: 20/237\n");
    printf (" ASTU Roll No: 200610003078\n\n");

    fp = fopen ("data.txt", "a+b");
    printf ("1. ADD RECORDS\n");
    printf ("2. DISPLAY RECORDS\n");
    printf ("3. EXIT\n\n");
    printf (" Enter your choice: ");
    scanf ("%d", &opt);

    switch(opt)
    {
        case 1:
            addrecord ();
            break;

        case 2:
            displayrecord ();
            break;

        case 3:
            fclose(fp);
```

```
        exit (0);

    break;

default:

    printf ("invalid number");

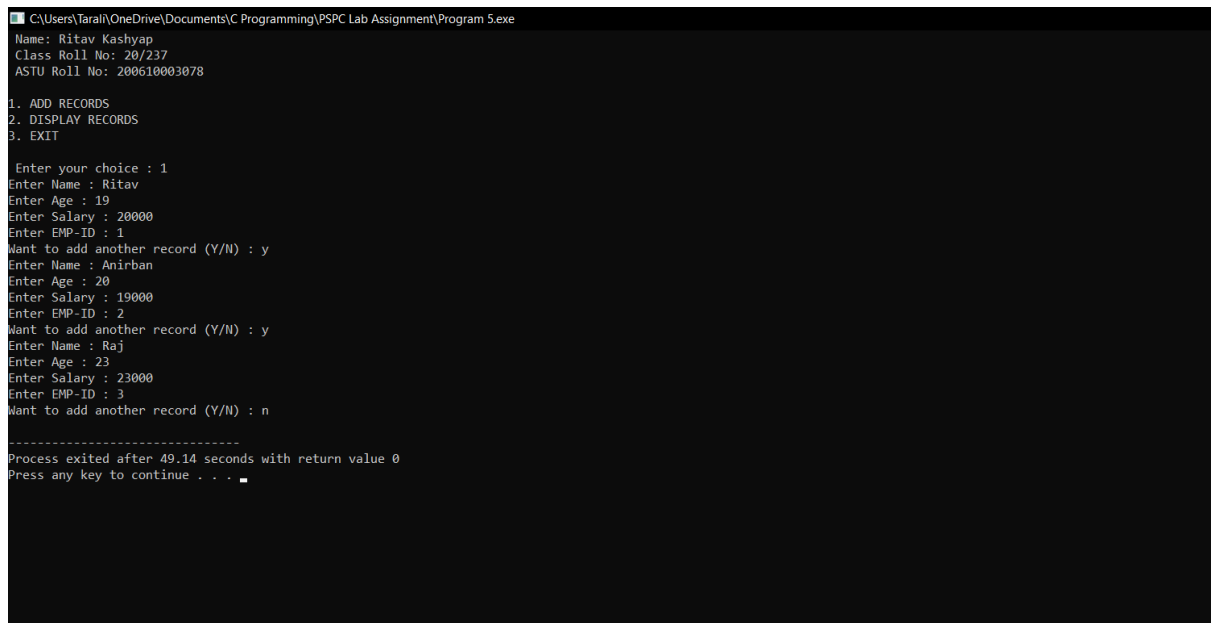
    break;

}

return 0;

}
```

## **Sample output:**



```
C:\Users\Taral\OneDrive\Documents\C Programming\PSPC Lab Assignment\Program 5.exe
Name: Ritav Kashyap
Class Roll No: 20/237
ASTU Roll No: 200610003078

1. ADD RECORDS
2. DISPLAY RECORDS
3. EXIT

Enter your choice : 1
Enter Name : Ritav
Enter Age : 19
Enter Salary : 20000
Enter EMP-ID : 1
Want to add another record (Y/N) : y
Enter Name : Anirban
Enter Age : 20
Enter Salary : 19000
Enter EMP-ID : 2
Want to add another record (Y/N) : y
Enter Name : Raj
Enter Age : 23
Enter Salary : 23000
Enter EMP-ID : 3
Want to add another record (Y/N) : n

-----
Process exited after 49.14 seconds with return value 0
Press any key to continue . . .
```

```
C:\Users\Tarali\OneDrive\Documents\C Programming\PSPC Lab Assignment\Program 5.exe
Name: Ritav Kashyap
Class Roll No: 20/237
ASTU Roll No: 200610003078

1. ADD RECORDS
2. DISPLAY RECORDS
3. EXIT

Enter your choice : 2

NAME          AGE          SALARY          EMPLOYEE ID
Ritav         19          20000.00         1
Anirban       20          19000.00         2
Raj           23          23000.00         3

-----
Process exited after 1.672 seconds with return value 0
Press any key to continue . . .
```