KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY (KIIT)

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DSA PROGRAMMING LAB:1-8
Before Link List

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- Branch :CSE

LAB 1

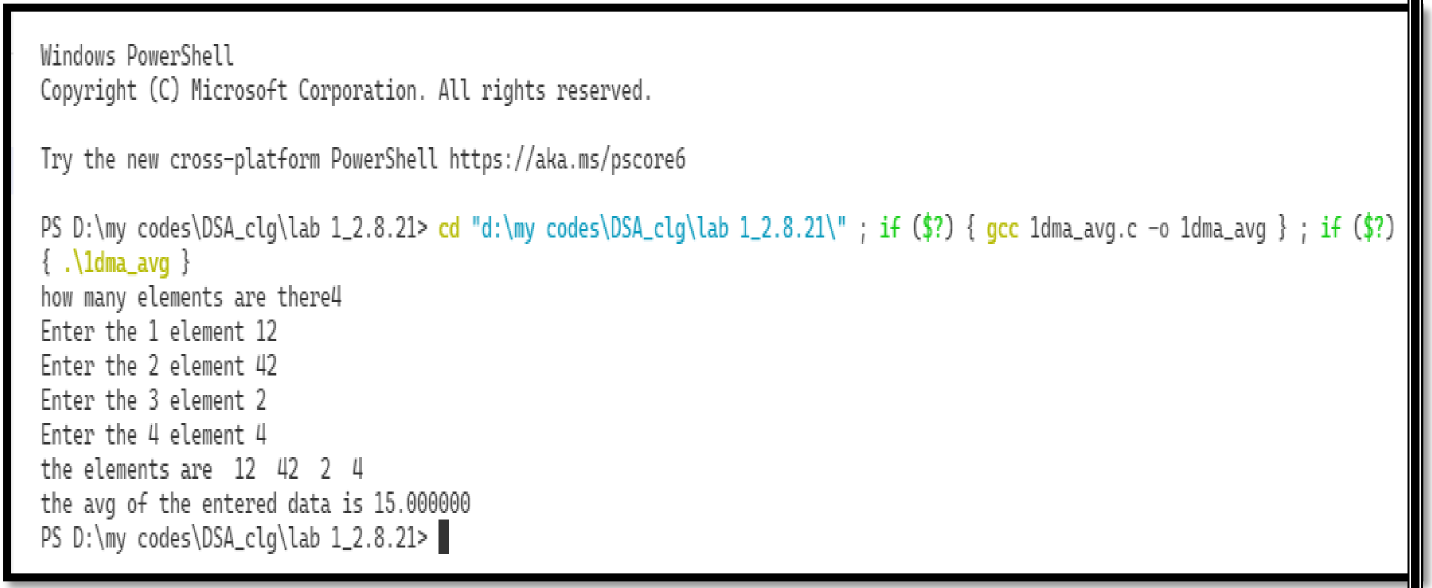
```
/*Q1.WAP in C to dynamically allocate memory using malloc or callo
c to store  ‘N’ numbers entered by a user
and display all the numbers and the average of the numbers.*/
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
int main()
{
    int n_025, *p_025, sum_025 = 0;
    float avg_025;

    printf("how many elements are there");
    scanf("%d", &n_025);
    p_025 = (int *)malloc(n_025 * sizeof(int));
    for (int i = 0; i < n_025; i++)
    {
        printf("Enter the %d element ", i + 1);
        scanf(" %d", &*(p_025 + i));

        sum_025 = sum_025 + *(p_025+i);
    }
    avg_025 = sum_025 / (float)n_025;
    printf("the elements are ");
    for (int i = 0; i < n_025; i++)
    {

        printf(" %d ", *(p_025 + i));
        sum_025 = sum_025 + *p_025;
    }
    printf("\nthe avg of the entered data is %f", avg_025);
    return 0;
}
```

OUTPUT-1



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab 1_2.8.21> cd "d:\my codes\DSA_clg\lab 1_2.8.21\" ; if ($?) { gcc 1dma_avg.c -o 1dma_avg } ; if ($?)
{ .\1dma_avg }
how many elements are there4
Enter the 1 element 12
Enter the 2 element 42
Enter the 3 element 2
Enter the 4 element 4
the elements are  12  42  2  4
the avg of the entered data is 15.000000
PS D:\my codes\DSA_clg\lab 1_2.8.21>
```

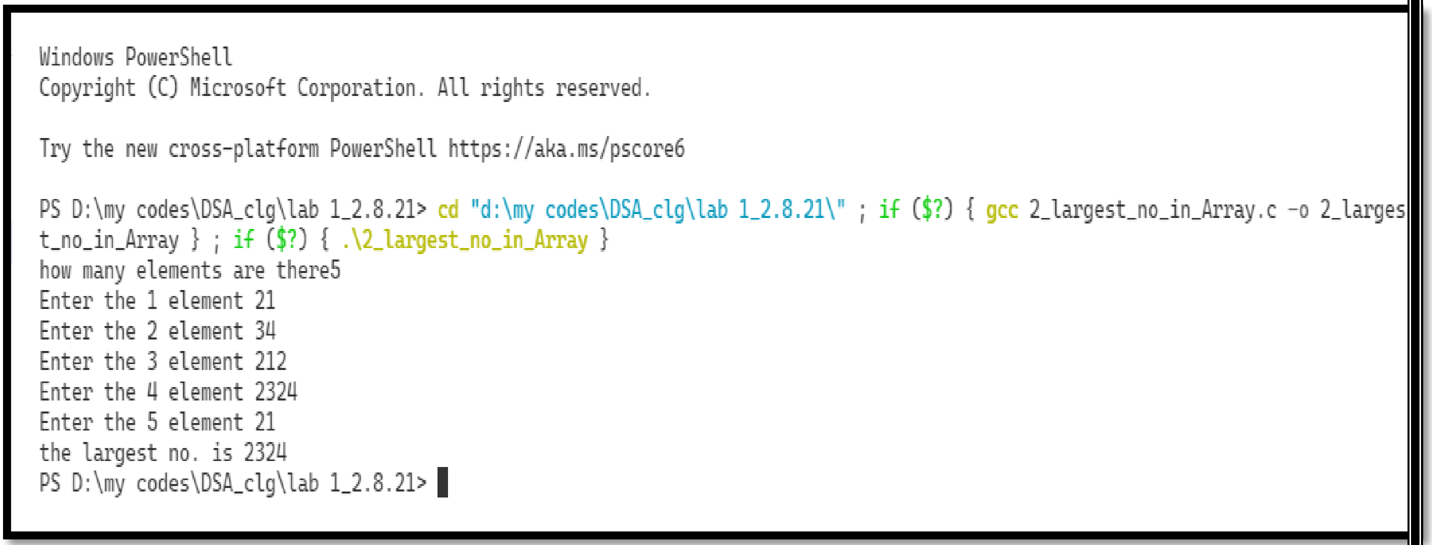
```
//Q2.Find the largest element in an array using Dynamic Memory All
ocation.


#include <stdio.h>
#include <string.h>
#include <stdlib.h>
int main()
{
    int n_025, *p_025, max_025;
```

```c
    printf("how many elements are there");
    scanf("%d", &n_025);
    p_025 = (int *)malloc(n_025 * sizeof(int));
    for (int i = 0; i < n_025; i++)
    {
        printf("Enter the %d element ", i + 1);
        scanf(" %d", &*(p_025 + i));
    }
    max_025 = *p_025;
    for (int i = 0; i < n_025; i++)
    {

        if (max_025 <= *(p_025 + i))
            max_025 = *(p_025 + i);
    }
    printf("the largest no. is %d", max_025);
    return 0;
}
```

OUTPUT-2



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab 1_2.8.21> cd "d:\my codes\DSA_clg\lab 1_2.8.21\" ; if ($?) { gcc 2_largest_no_in_Array.c -o 2_larges
t_no_in_Array } ; if ($?) { .\2_largest_no_in_Array }
how many elements are there5
Enter the 1 element 21
Enter the 2 element 34
Enter the 3 element 212
Enter the 4 element 2324
Enter the 5 element 21
the largest no. is 2324
PS D:\my codes\DSA_clg\lab 1_2.8.21> █
```
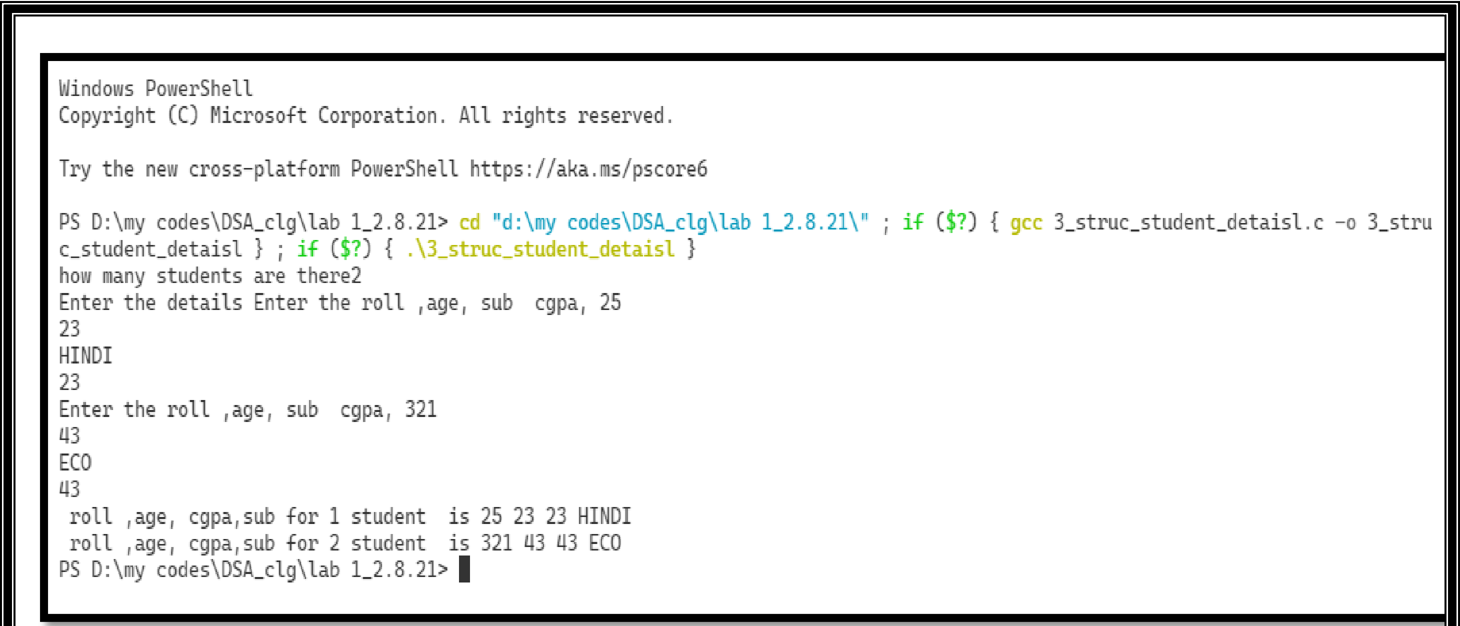

```c
/*Q3.WAP to read and print the details of 5 CS student details
using Dynamic Memory Allocation (roll, age, cgpa, subject).
*/

#include <stdio.h>
#include <string.h>
#include <stdlib.h>
struct stud
```

```
{
    int roll_025, age_025;
    int cgpa_025;
    char sub_025[10];
};
int main()
{
    int n;
    struct stud *s[10];

    printf("how many students are there");
    scanf("%d", &n);
    for (int i = 0; i < n; i++)
    {
        s[i] = (struct stud * )malloc(n * sizeof(struct stud));
    }


    printf("Enter the details ");
    for (int i = 0; i < n; i++)
    {
        printf("Enter the roll ,age, sub  cgpa, ");

        scanf("%d%d%s%d",&s[i]->roll_025,&s[i]->age_025, &s[i]-
>sub_025, &s[i]->cgpa_025);
    }

    for (int i = 0; i < n; i++)
    {
        printf(" roll ,age, cgpa,sub for %d student  is %d %d %d %
s \n", i + 1, s[i]->roll_025, s[i]->age_025, s[i]->cgpa_025, s[i]-
>sub_025);
    }

    return 0;
}
```

OUTPUT-3



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab 1_2.8.21> cd "d:\my codes\DSA_clg\lab 1_2.8.21\" ; if ($?) { gcc 3_struc_student_detaisl.c -o 3_stru
c_student_detaisl } ; if ($?) { .\3_struc_student_detaisl }
how many students are there2
Enter the details Enter the roll ,age, sub  cgpa, 25
23
HINDI
23
Enter the roll ,age, sub  cgpa, 321
43
ECO
43
 roll ,age, cgpa,sub for 1 student  is 25 23 23 HINDI
 roll ,age, cgpa,sub for 2 student  is 321 43 43 ECO
PS D:\my codes\DSA_clg\lab 1_2.8.21> █
```
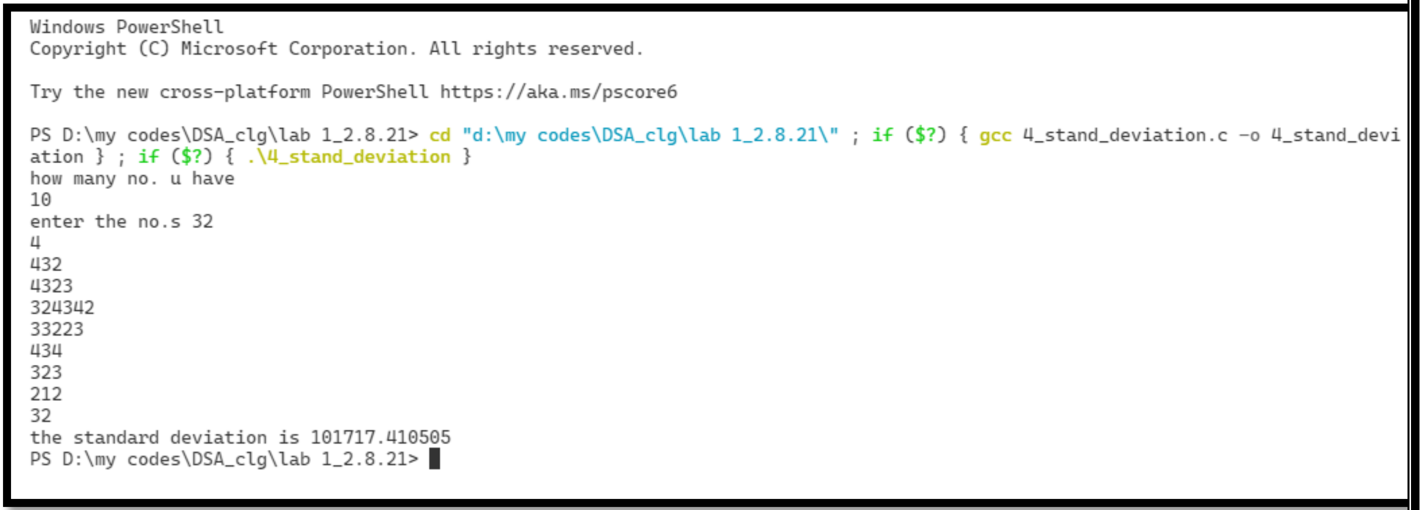

```c
//Q4.WAP to find the standard deviation of 20 numbers.

#include <stdio.h>
#include <math.h>
#include <stdlib.h>
int main()
{
    int n_025, *p_025, sum_025 = 0, mean_025;
    double sqr_025 = 0.0, sd_025 = 0.0;
    printf("how many no. u have");
    scanf("%d", &n_025);

    p_025 = (int *)malloc(sizeof(int) * n_025);
    printf("enter the no.s ");
    for (int i = 0; i < n_025; i++)
    {
        scanf("%d", &p_025[i]);
        sum_025 = sum_025 + p_025[i];
    }
    mean_025 = sum_025 / n_025;

    for (int i = 0; i < n_025; i++)
    {
        double t = p_025[i] - mean_025;
        sqr_025 = pow(t, 2);
        sd_025 = sd_025 + sqr_025;
    }
    sd_025 = sd_025 / (n_025 - 1);
    printf("the standard deviation is %lf ", sqrt(sd_025));

    return 0;
}
```

OUTPUT-4



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab 1_2.8.21> cd "d:\my codes\DSA_clg\lab 1_2.8.21\" ; if ($?) { gcc 4_stand_deviation.c -o 4_stand_devi
ation } ; if ($?) { .\4_stand_deviation }
how many no. u have
10
enter the no.s 32
4
432
4323
324342
33223
434
323
212
32
the standard deviation is 101717.410505
PS D:\my codes\DSA_clg\lab 1_2.8.21>
```
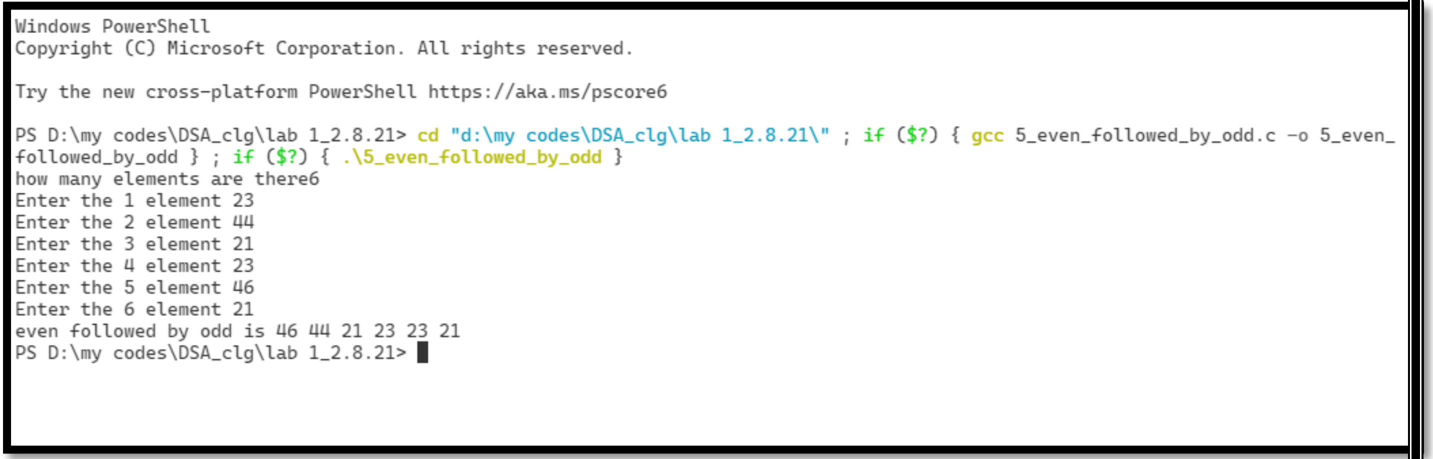

```
//WAP to arrange the elements of a dynamic
//array such that even numbers are followed by odd numbe
rs.
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
int main()
{
    int n_025, *p_025 ;

    printf("how many elements are there");
    scanf("%d", &n_025);
    p_025 = (int *)malloc(n_025 * sizeof(int));
    for (int i = 0; i < n_025; i++)
    {
        printf("Enter the %d element ", i + 1);
        scanf(" %d", &p_025[i]);
    }

    for (int i = 0; i < n_025 / 2; i++)
    {
        if (p_025[i] % 2 == 0 && p_025[n_025 - 1 - i] %
2 != 0)
        {
        }

        else if (p_025[i] % 2 != 0 && p_025[n_025 - 1 -
i] % 2 == 0)
        {
            int temp = *(p_025 + i);
            *(p_025 + i) = *(p_025 + (n_025 - i - 1));
            *(p_025 + (n_025 - i - 1)) = temp;
        }
        else if (p_025[i] % 2 == 0 && p_025[n_025 - 1 -
i] % 2 == 0)
        {
            int j = i + 1, c = 0;
            while (c ==0&&j<=n_025/2)
            {
                if (p_025[j] % 2 != 0)
                {
                    int temp = *(p_025 + j);
                    *(p_025 + j) = *(p_025 + (n_025 - i
- 1));

                    *(p_025 + (n_025 - i - 1)) = temp;
                    c = 1;
                }
                j++;
            }
        }
        else if (p_025[i] % 2 != 0 && p_025[n_025 - 1 -
i] % 2 != 0)
        {
            int j = n_025 - 2 - i, c = 0;
            while (c == 0&&j>=n_025/2)
            {
                if (p_025[j] % 2 == 0)
```

```c
                {
                    int temp = *(p_025 + j);
                    *(p_025 + j) = *(p_025 + i);
                    *(p_025 + i) = temp;
                    c = 1;
                }
                j--;
            }
        }
    }
    printf("even followed by odd is ");
    for (int i = 0; i < n_025; i++)
    {
        printf("%d ", *(p_025 + i));
    }

    return 0;
}
```

OUTPUT-5



```
Windows PowerShell
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PS D:\my codes\DSA_clg\lab 1_2.8.21> cd "d:\my codes\DSA_clg\lab 1_2.8.21\" ; if ($?) { gcc 5_even_followed_by_odd.c -o 5_even_
followed_by_odd } ; if ($?) { .\5_even_followed_by_odd }
how many elements are there6
Enter the 1 element 23
Enter the 2 element 44
Enter the 3 element 21
Enter the 4 element 23
Enter the 5 element 46
Enter the 6 element 21
even followed by odd is 46 44 21 23 23 21
PS D:\my codes\DSA_clg\lab 1_2.8.21> █
```
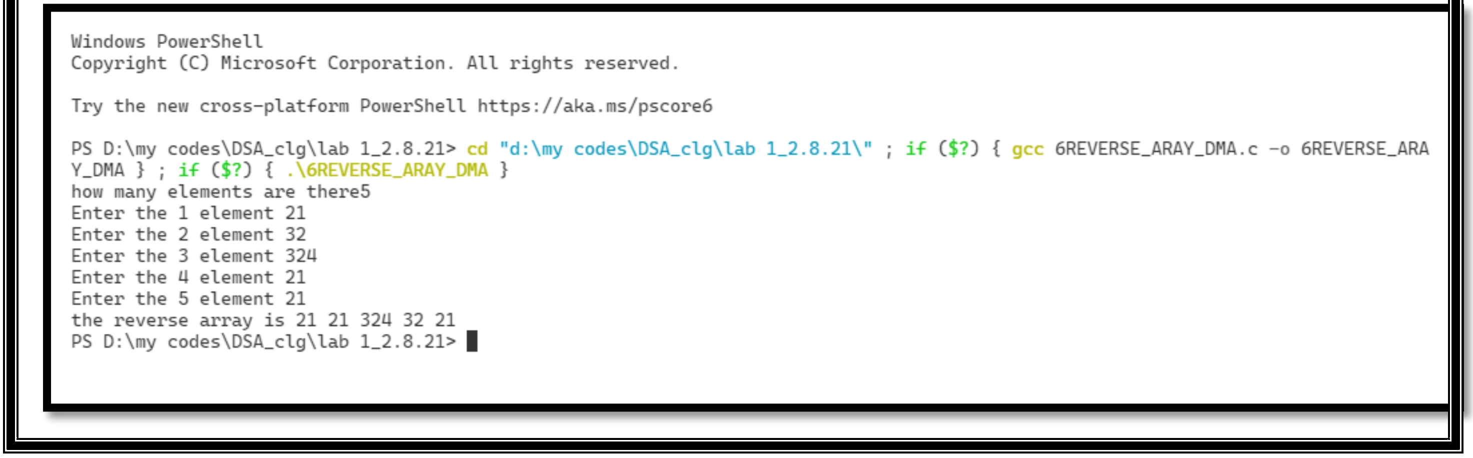

```c
//Q6.WAP to reverse the contents of a dynamic array of ‘N’ elements.
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
int main()
```

```c
{
    int n_025, *p_025;

    printf("how many elements are there");
    scanf("%d", &n_025);
    p_025 = (int *)malloc(n_025 * sizeof(int));
    for (int i = 0; i < n_025; i++)
    {
        printf("Enter the %d element ", i + 1);
        scanf(" %d", &*(p_025 + i));
    }

    for (int i = 0; i < n_025/2; i++)
    {
       int temp=*(p_025+i);
       *(p_025+i)=*(p_025+(n_025-i-1));
       *(p_025+(n_025-i-1))=temp;
    }
    printf("the reverse array is ");
    for (int i = 0; i < n_025; i++)
    {
        printf("%d ", *(p_025+i) );

    }

    return 0;
}
```

OUTPUT-6



```
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab 1_2.8.21> cd "d:\my codes\DSA_clg\lab 1_2.8.21\" ; if ($?) { gcc 6REVERSE_ARAY_DMA.c -o 6REVERSE_ARA
Y_DMA } ; if ($?) { .\6REVERSE_ARAY_DMA }
how many elements are there5
Enter the 1 element 21
Enter the 2 element 32
Enter the 3 element 324
Enter the 4 element 21
Enter the 5 element 21
the reverse array is 21 21 324 32 21
PS D:\my codes\DSA_clg\lab 1_2.8.21> █
```
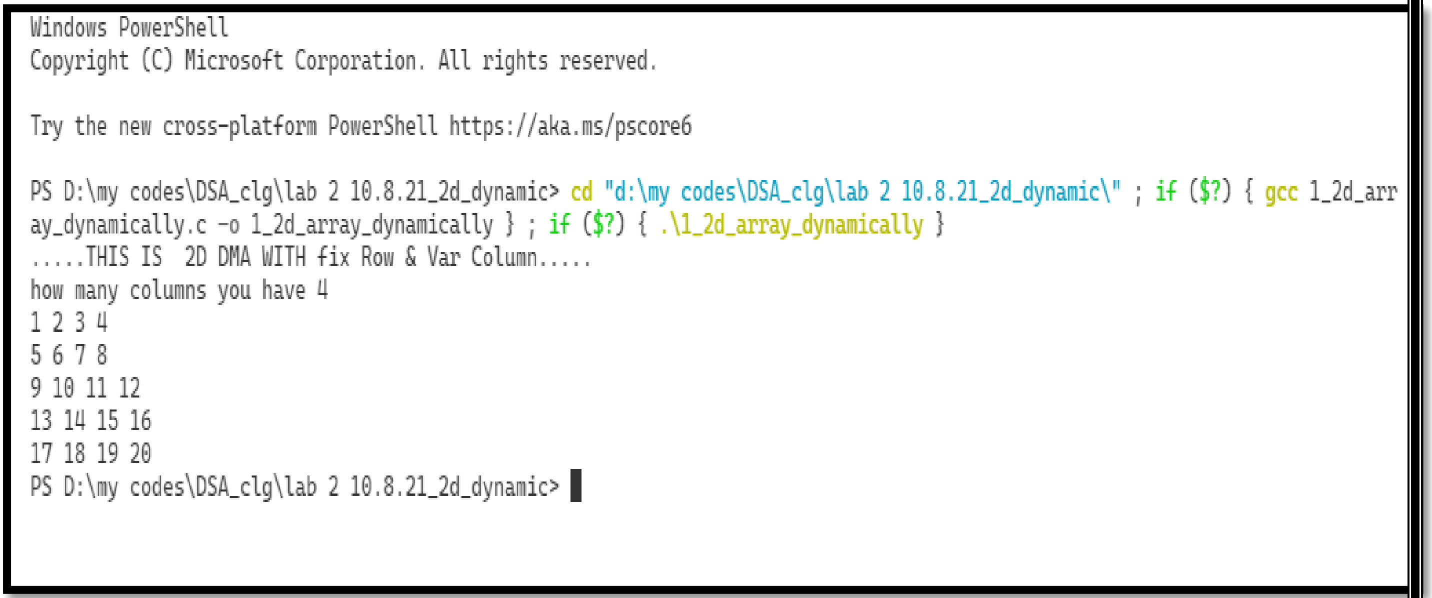

LAB-2

```
/*Q1. Write a program using C to allocate memory dynamically for 2D array ,read the values and display them using 3 functions separately
I. Keeping no columns fixed and using variable no of rows
II. Keeping no rows fixed and using variable no of columns
III. Using both variable no of rows and columns(use double pointer)

*/
#include <stdio.h>
#include <stdlib.h>
void rfcv()
{
    printf(".....THIS IS  2D DMA WITH fix Row & Var Column.....\n");
    int r_025, c_025;

    printf("how many columns you have ");
    scanf("%d", &c_025);

    int *p_025[10], l = 1;

    for (int j = 0; j < 5; j++)
    {
        p_025[j] = (int *)malloc(c_025 * sizeof(int));
    }

    for (int i = 0; i < 5; i++)
    {
        for (int j = 0; j < c_025; j++)
        {

            p_025[i][j] = l;
            l++;
        }
    }

    for (int i = 0; i < 5; i++)
    {
        for (int j = 0; j < c_025; j++)
        {

            printf("%d ", p_025[i][j]);
        }
        printf("\n");
    }
```

```
}
void rvcf()
{
    printf(".....THIS IS  2D DMA WITH var Row & fix Column.....\n");
     int(*p_025)[5];
    int r_025, l = 1;
    printf("how many rows you have ");
    scanf("%d", &r_025);
    p_025 = (int(*)[5])malloc(r_025 * 5 * sizeof(int));

    for (int i = 0; i < r_025; i++)
    {
        for (int j = 0; j < 5; j++)
        {

            p_025[i][j] = l;
            l++;
        }
    }

    for (int i = 0; i < r_025; i++)
    {
        for (int j = 0; j < 5; j++)
        {

            printf("%d ", p_025[i][j]);
        }
        printf("\n");
    }
}
void rvcv()
{
    printf(".....THIS IS  2D DMA WITH var Row & Var Column.....\n");
    int r_025, c_025, l = 1;
    printf("how many rows you have ");
    scanf("%d", &r_025);
    printf("how many columns you have ");
    scanf("%d", &c_025);

    int **p_025;
    p_025 = (int **)malloc(r_025 * sizeof(int));
    for (int j = 0; j < r_025; j++)
    {
        p_025[j] = (int *)malloc((j + 1) * sizeof(int));
    }
    for (int i = 0; i < r_025; i++)
    {
        for (int j = 0; j < c_025; j++)
        {

            p_025[i][j] = l;
            l++;
        }
    }

    for (int i = 0; i < r_025; i++)
    {
        for (int j = 0; j < c_025; j++)
        {

            printf("%d ", p_025[i][j]);
        }
        printf("\n");
    }
}

int main()
{
    rfcv();
    return 0;
}
```

OUTPUT-1



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab 2 10.8.21_2d_dynamic> cd "d:\my codes\DSA_clg\lab 2 10.8.21_2d_dynamic\" ; if ($?) { gcc 1_2d_arr
ay_dynamically.c -o 1_2d_array_dynamically } ; if ($?) { .\1_2d_array_dynamically }
.....THIS IS  2D DMA WITH fix Row & Var Column.....
how many columns you have 4
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
17 18 19 20
PS D:\my codes\DSA_clg\lab 2 10.8.21_2d_dynamic>
```
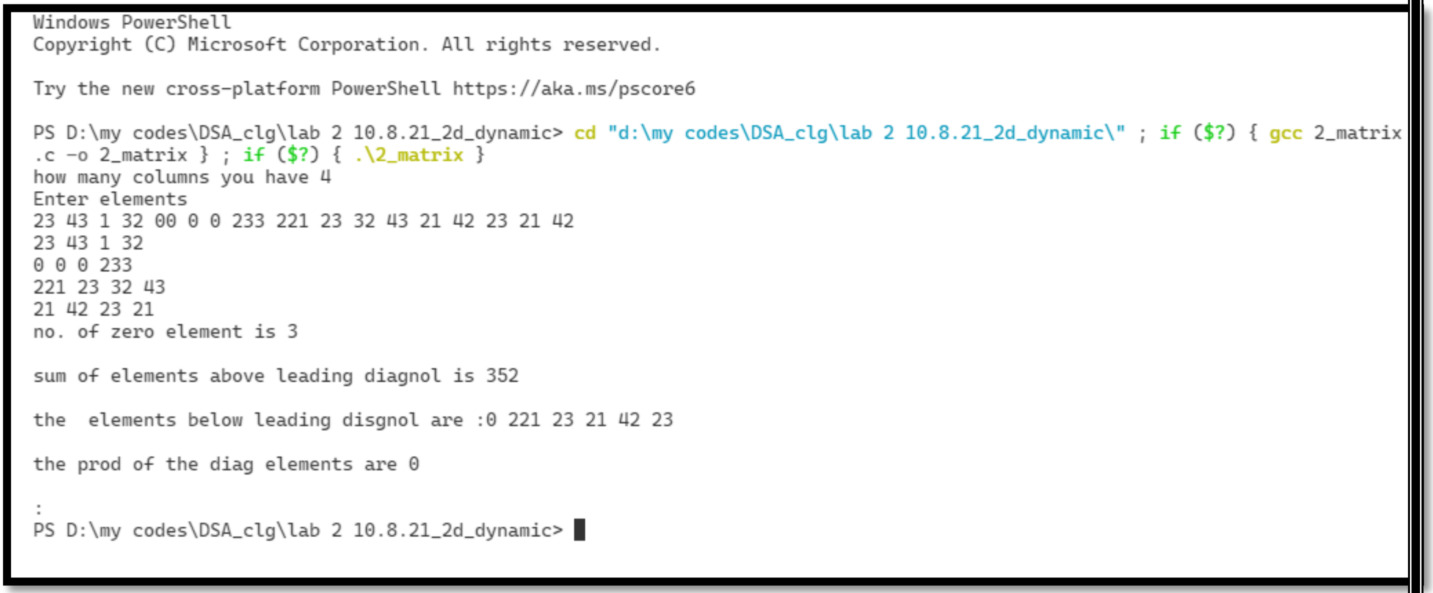

```
/*Q2 Let A be nXn square dynamic matrix. WAP by using appropriate user
defined functions for the following:
a. Find the number of nonzero elements in A
B. Find the sum of the elements above the leading diagonal.
```

```
C. Display the elements below the minor diagonal.
D. Find the product of the diagonal elements.
*/
#include <stdio.h>
#include <stdlib.h>
void zero_el(int *a[10], int c_025)
{
    int count = 0;
    for (int i = 0; i < c_025; i++)
    {
        for (int j = 0; j < c_025; j++)
        {
            if (a[i][j] == 0)
            {
                count++;
            }
        }
    }
    printf("no. of zero element is %d \n\n", count);
}

void sumabovediad(int *a[10], int c_025)
{
    int sum = 0;
    for (int i = 0; i < c_025; i++)
    {
        for (int j = 0; j < c_025; j++)
        {
            if (j > i)
            {
                sum = sum + a[i][j];
            }
        }
    }
    printf("sum of elements above leading diagnol is %d\n\n", sum);
}

void disp_b_lead_diag(int *a[10], int c_025)
{
    printf("the  elements below leading disgnol are :");
    for (int i = 0; i < c_025; i++)
    {
        for (int j = 0; j < c_025; j++)
        {
            if (i > j)
            {
                printf("%d ", a[i][j]);
            }
        }
    }
    printf("\n\n");
}
void diag_prod(int *a[10], int c_025)
{
    int prod = 1;

    for (int i = 0; i < c_025; i++)
    {
        for (int j = 0; j < c_025; j++)
        {
            if (i ==j)
            {
                prod = prod * a[i][j];
            }
            else if ((i + j) == (c_025 - 1))
            {
                prod = prod * a[i][j];
            }
        }
    }


    printf("the prod of the diag elements are %d \n\n:", prod);
}

int main()
{

    int *p_025[10], c_025, l = 0;
    printf("how many columns you have ");
    scanf("%d",&c_025);
    for (int i = 0; i < c_025; i++)
    {
        p_025[i] = (int *)malloc(c_025 * sizeof(int));
    }
    printf("Enter elements \n");
    for (int i = 0; i < c_025; i++)
    {
        for (int j = 0; j < c_025; j++)
        {
            scanf("%d",&p_025[i][j]);
        }
    }

    for (int i = 0; i < c_025; i++)
    {
        for (int j = 0; j < c_025; j++)
        {
            printf("%d ", p_025[i][j]);
        }
        printf("\n");
    }

zero_el(p_025,c_025);
sumabovediad(p_025,c_025);
disp_b_lead_diag(p_025,c_025);
diag_prod(p_025,c_025);
    return 0;
}
```

OUTPUT-2



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab 2 10.8.21_2d_dynamic> cd "d:\my codes\DSA_clg\lab 2 10.8.21_2d_dynamic\" ; if ($?) { gcc 2_matrix
.c -o 2_matrix } ; if ($?) { .\2_matrix }
how many columns you have 4
Enter elements
23 43 1 32 00 0 0 233 221 23 32 43 21 42 23 21 42
23 43 1 32
0 0 0 233
221 23 32 43
21 42 23 21
no. of zero element is 3

sum of elements above leading diagnol is 352

the  elements below leading disgnol are :0 221 23 21 42 23

the prod of the diag elements are 0

:
PS D:\my codes\DSA_clg\lab 2 10.8.21_2d_dynamic> █
```
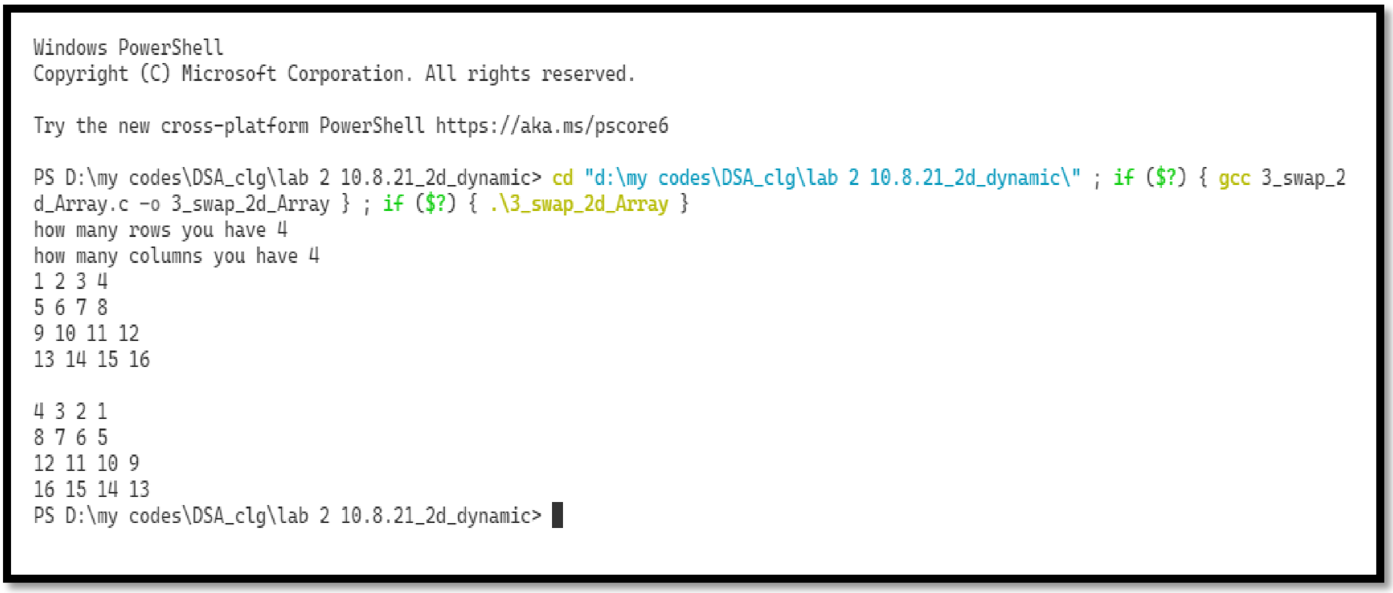

```
/*Q3. WAP to swap all the elements in the 1st column with all the corre
sponding elements in the last column, and 2nd column with the second la
st column\
 and 3rd with 3rd last etc. of a 2-
D dynamic array.  Display the matrix.
*/

#include <stdio.h>
#include <stdlib.h>
void swap(int *a[10], int r_025, int c_025)
{
    for (int i = 0; i < c_025/2; i++)
    {
        for (int j = 0; j < r_025; j++)
        {
            int temp = a[j][i];
            a[j][i] = a[j][c_025 - 1-i];
            a[j][c_025 - 1-i] = temp;
        }

    }
    for (int i = 0; i < r_025; i++)
    {
        for (int j = 0; j < c_025; j++)
        {

            printf("%d ", a[i][j]);
        }
        printf("\n");
    }
}
int main()
{
    int r_025, c_025, l = 1;
    printf("how many rows you have ");
    scanf("%d", &r_025);
    printf("how many columns you have ");
    scanf("%d", &c_025);

    int **p_025;
    p_025 = (int **)malloc(r_025 * sizeof(int));
    for (int j = 0; j < r_025; j++)
    {
        p_025[j] = (int *)malloc(c_025 * sizeof(int));
    }
    for (int i = 0; i < r_025; i++)
    {
        for (int j = 0; j < c_025; j++)
        {

            p_025[i][j] = l;
            l++;
        }
    }

    for (int i = 0; i < r_025; i++)
    {
        for (int j = 0; j < c_025; j++)
        {

            printf("%d ", p_025[i][j]);
        }
        printf("\n");
    }
    printf("\n");
swap(p_025,r_025,c_025);

return 0;
}
```

OUTPUT-3



```
Windows PowerShell
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PS D:\my codes\DSA_clg\lab 2 10.8.21_2d_dynamic> cd "d:\my codes\DSA_clg\lab 2 10.8.21_2d_dynamic\" ; if ($?) { gcc 3_swap_2
d_Array.c -o 3_swap_2d_Array } ; if ($?) { .\3_swap_2d_Array }
how many rows you have 4
how many columns you have 4
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16

4 3 2 1
8 7 6 5
12 11 10 9
16 15 14 13
PS D:\my codes\DSA_clg\lab 2 10.8.21_2d_dynamic>
```

LAB-3

```
//Q1.   WAP to add two distances (in kilometre-meter) by
//passing structure to a function.
#include <stdio.h>
struct dist
{
    int kilometre;
    int metre;
} ;
```

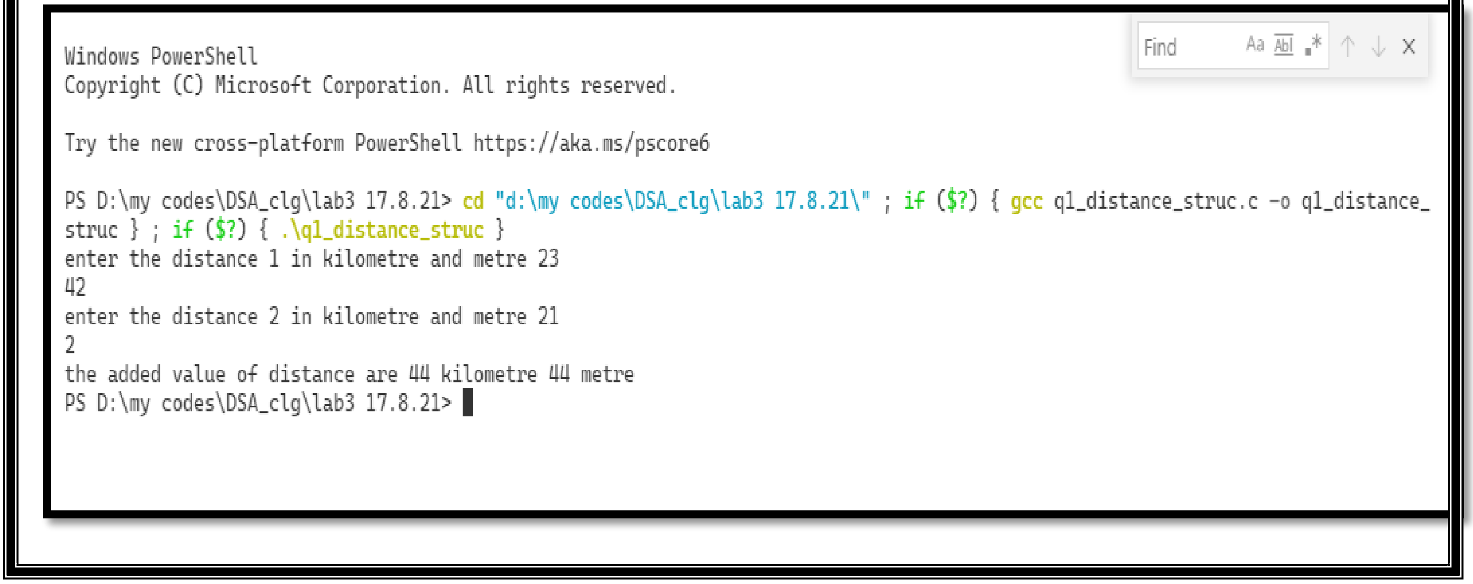
```c
void add_dis(struct dist s[2])
{
    int kilometre, metre;
    metre = s[0].metre + s[1].metre;

    kilometre = s[0].kilometre + s[1].kilometre + metre / 1000;
    metre = metre % 1000;
    printf("the added value of distance are %d kilometre %d metre ", kilometre, metre);
}

int main()
{ struct dist s[2];


    for (int i = 0; i < 2; i++)
    {
        printf("enter the distance %d in kilometre and metre ", i + 1);
        scanf("%d %d", &s[i].kilometre, &s[i].metre);
    }
add_dis(s);
    return 0;
}
```

<u>OUTPUT-1</u>



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab3 17.8.21> cd "d:\my codes\DSA_clg\lab3 17.8.21\" ; if ($?) { gcc q1_distance_struc.c -o q1_distance_
struc } ; if ($?) { .\q1_distance_struc }
enter the distance 1 in kilometre and metre 23
42
enter the distance 2 in kilometre and metre 21
2
the added value of distance are 44 kilometre 44 metre
PS D:\my codes\DSA_clg\lab3 17.8.21> █
```
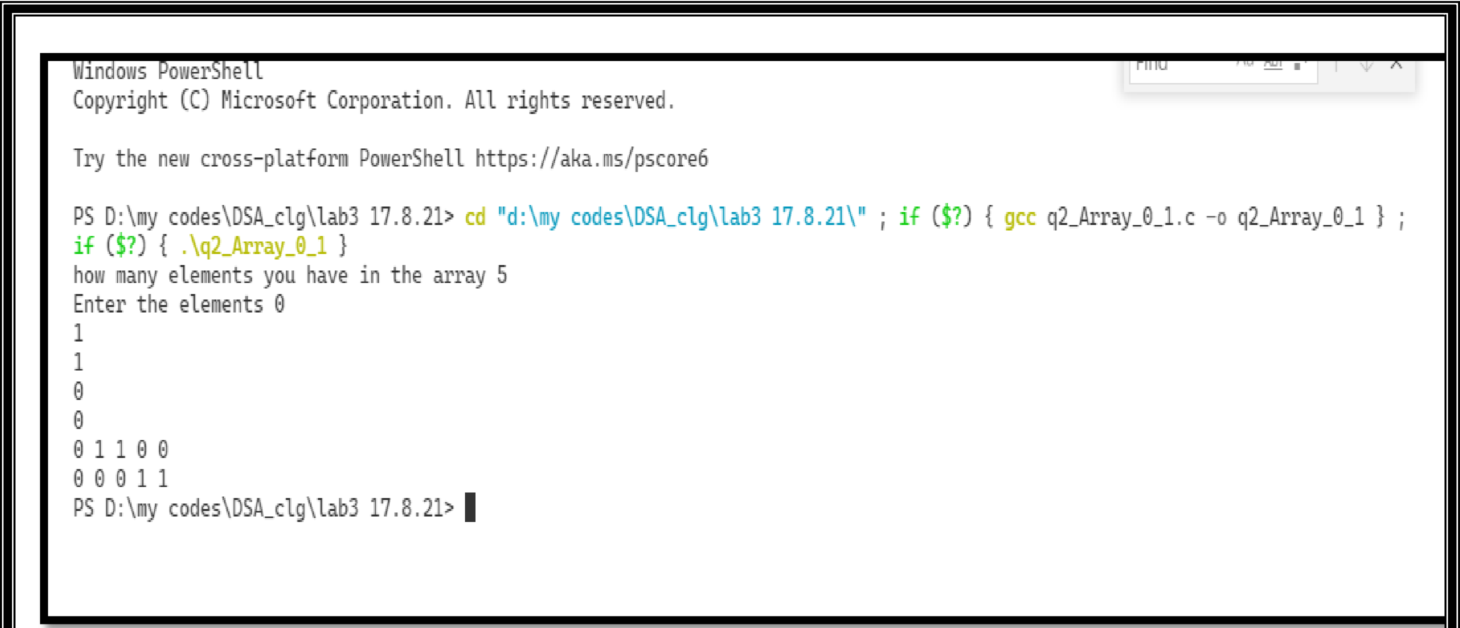

```
//  Q2• You are given an array of 0s and 1s in random or
der.
// Segregate 0s on left side and 1s on right side of the
 array.
// Traverse array only once.
#include <stdio.h>
#include <stdlib.h>

int main()
{
    int *p, n;
    printf("how many elements you have in the array ");
    scanf("%d", &n);

    p = (int *)malloc(n * sizeof(int));

    printf("Enter the elements ");

    for (int i = 0; i < n; i++)
    {

        scanf("%d",&p[i]);
    }
    for (int i = 0; i < n; i++)
    {

        printf("%d ", p[i]);
    }
    printf("\n");

    for (int i = 0, j = n-1; i <= n / 2 && j >= n / 2;)
    {
        if (p[i] == 1 && p[j] == 0)
        {
            int temp = p[i];
            p[i] = p[j];
            p[j] = temp;
            i++;
            j--;
        }
        else if (p[i] == 0 && p[j] == 0)
        {
            int temp = p[i + 1];
            p[i + 1] = p[j];
            p[j] = temp;
            i++;
        }
        else if (p[i] == 1 && p[j] == 1)
        {
            int temp = p[i];
            p[i] = p[j-1];
            p[j - 1] = temp;
            j--;
        }
        else
        {
            i++;
            j--;
        }
    }
    for (int i = 0; i < n; i++)
    {

        printf("%d ", *(p + i));
    }

return 0;
}
```

OUTPUT-2



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab3 17.8.21> cd "d:\my codes\DSA_clg\lab3 17.8.21\" ; if ($?) { gcc q2_Array_0_1.c -o q2_Array_0_1 } ;
if ($?) { .\q2_Array_0_1 }
how many elements you have in the array 5
Enter the elements 0
1
1
0
0
0 1 1 0 0
0 0 0 1 1
PS D:\my codes\DSA_clg\lab3 17.8.21> █
```
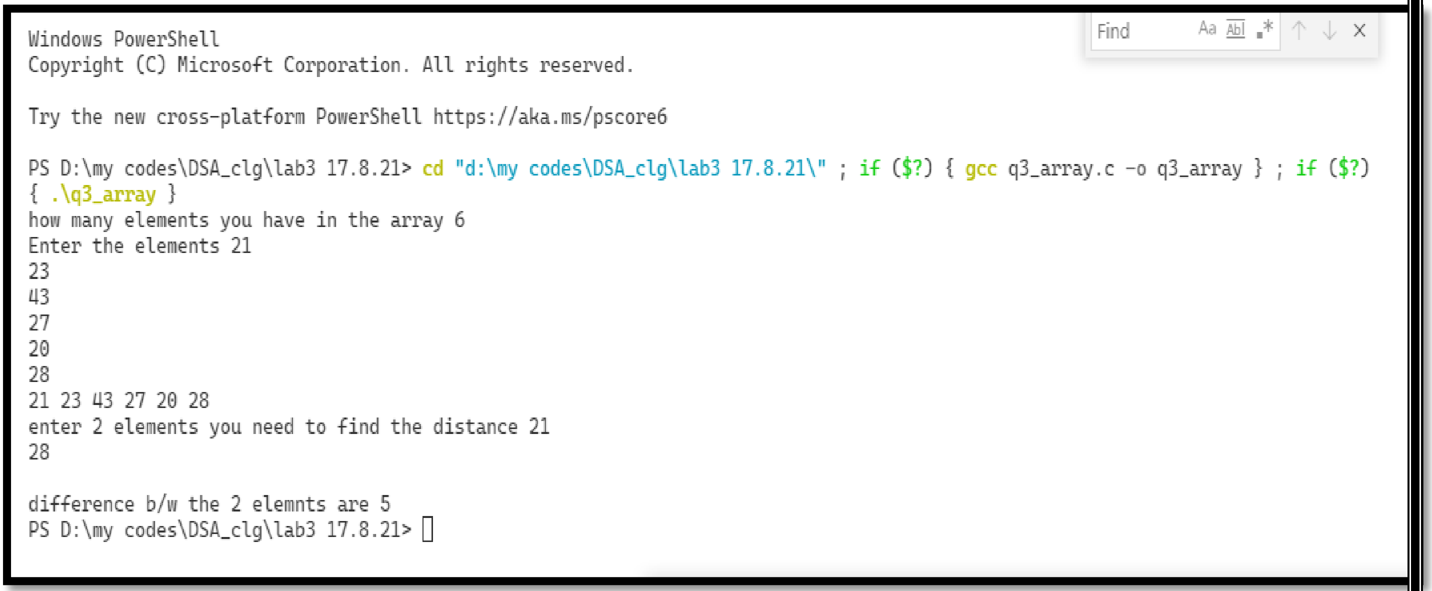

```
//Q3•   Given an unsorted dynamic array arr and two numbers x and y, find the minimum distance between x and y
//in arr. The array might also contain duplicates. You may assume that both x and y are different and present in arr.
//Input: arr[] = {3, 5, 4, 2, 6, 5, 6, 6, 5, 4, 8, 3}, x = 3, y = 6
//Output: Minimum distance between 3 and 6 is 4.

#include <stdio.h>
#include <stdlib.h>

int main()
{
    int *p, n, x, y,uplimit,lowerlimit;
    printf("how many elements you have in the array ");
    scanf("%d", &n);

    p = (int *)malloc(n * sizeof(int));

    printf("Enter the elements ");

    for (int i = 0; i < n; i++)
    {
        scanf("%d", &p[i]);
    }
    for (int i = 0; i < n; i++)
    {

        printf("%d ", p[i]);
    }

    printf("\nenter 2 elements you need to find the dist
ance ");
    scanf("%d %d", &x, &y);
    printf("\n");

    for (int i = 0; i <= n; i++)
    {
        if (p[i] == x)
        {
            lowerlimit = i;
            break;
        }

    }
    for (int i = 0; i < n; i++)
    {

      if (p[i] == y)
        {
            uplimit = i;
            break;
        }

    }
    printf("difference b/w the 2 elemnts are %d ",uplimi
t-lowerlimit);
```

```
    return 0;
}
```

OUTPUT-3



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab3 17.8.21> cd "d:\my codes\DSA_clg\lab3 17.8.21\" ; if ($?) { gcc q3_array.c -o q3_array } ; if ($?)
{ .\q3_array }
how many elements you have in the array 6
Enter the elements 21
23
43
27
20
28
21 23 43 27 20 28
enter 2 elements you need to find the distance 21
28

difference b/w the 2 elemnts are 5
PS D:\my codes\DSA_clg\lab3 17.8.21> 
```
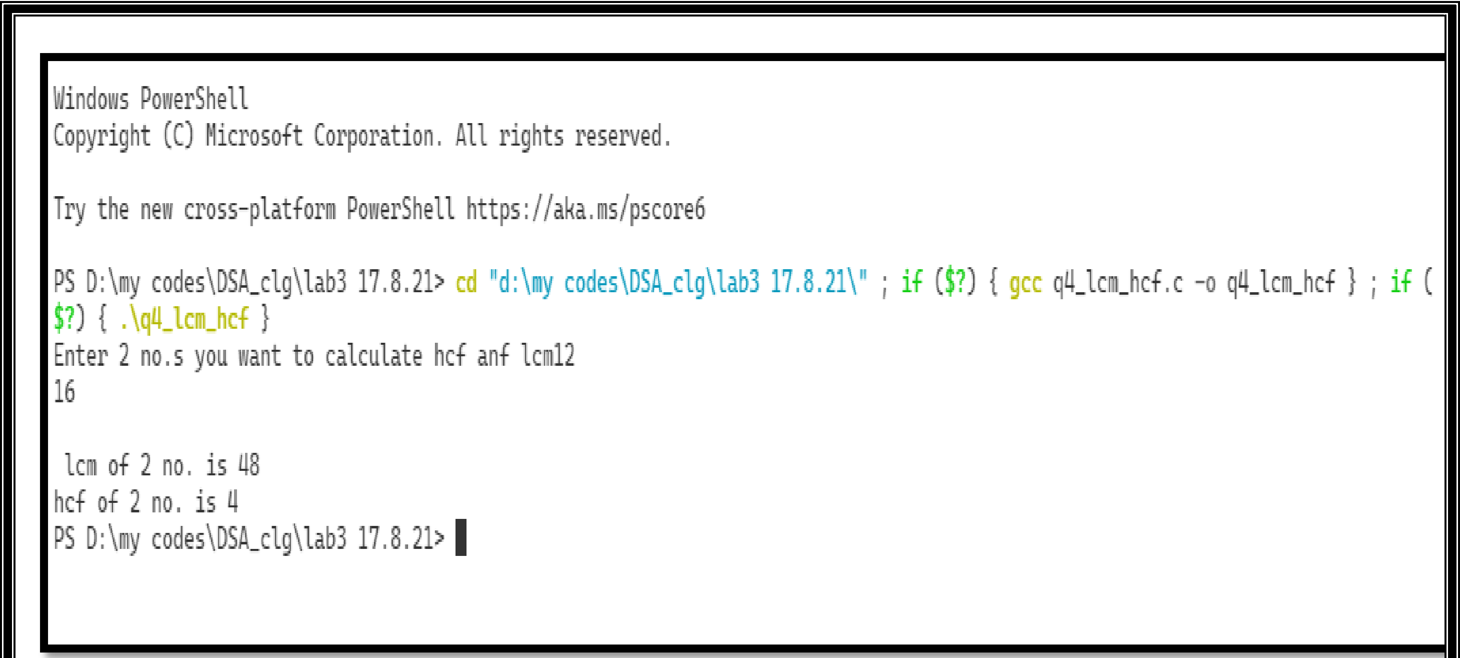

```
//Q4•   Write a program in C to find the LCM ,HCF,GCD of
 two numbers using recursion
//by using menu driven switch case and functions.

#include <stdio.h>
void hcf(int a, int b, int i)
{      static int thcf = 1;
    if (a % i == 0 && b % i == 0)

        {
            thcf = thcf * i;
            hcf(a / i, b / i, 2);
        }

        else if (i <= a && i <= b)

            hcf(a,b,++i);
        else
        {

            printf("\nhcf of 2 no. is %d", thcf);
    }
}
 void lcm(int a, int b, int i)
{  static int tlcm = 1;
  if (a % i == 0 && b % i == 0)

    {
      tlcm = tlcm * i;
      lcm(a / i, b / i, 2);
    }

    else if (i <= a && i <= b)

      lcm(a,b,++i);
    else
    {

      printf("\n lcm of 2 no. is %d", tlcm*a*b);

    }
}

int main()
{
  int a, b;
  printf("Enter 2 no.s you want to calculate hcf anf l
cm");
  scanf("%d%d", &a, &b);
  lcm(a, b, 1);
  hcf(a, b, 1);
  return 0;
}
```

OUTPUT-4



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab3 17.8.21> cd "d:\my codes\DSA_clg\lab3 17.8.21\" ; if ($?) { gcc q4_lcm_hcf.c -o q4_lcm_hcf } ; if (
$?) { .\q4_lcm_hcf }
Enter 2 no.s you want to calculate hcf anf lcm12
16

 lcm of 2 no. is 48
hcf of 2 no. is 4
PS D:\my codes\DSA_clg\lab3 17.8.21>
```

2005025_Hitu raj

KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY (KIIT)

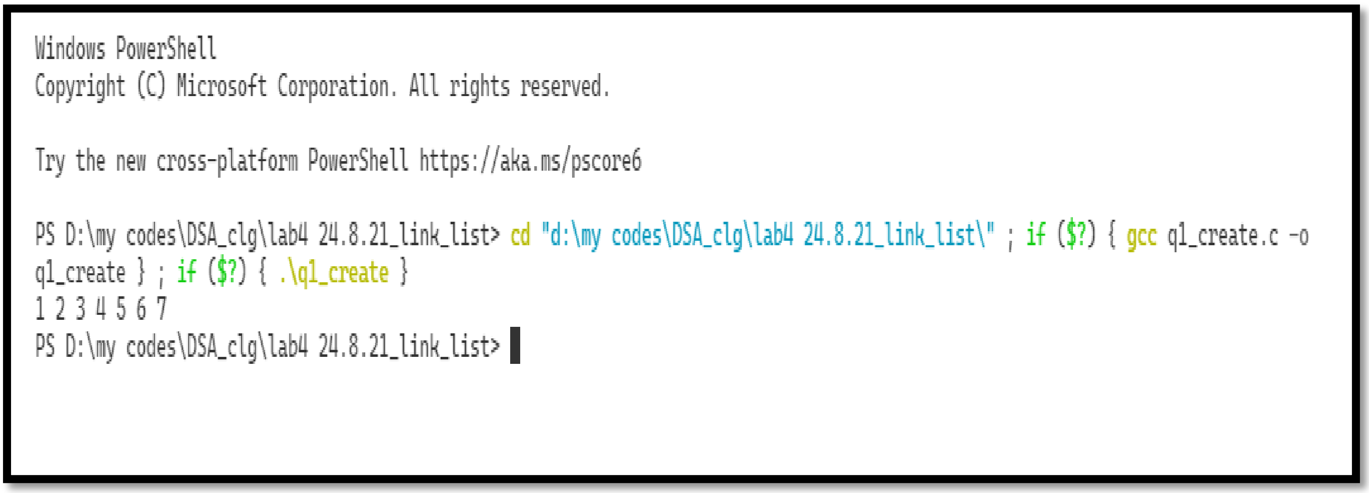
Deemed to be University U/S 3 of UGC Act, 1956

DSA PROGRAMMING LAB-4
Link List

- Name :HITU RAJ
- Roll no. :2005025
- Branch :CSE

```c
/* Q1.WAP to create SLLand display the value of each node
 using user defined funcion create and display*/

#include <stdio.h>
#include <stdlib.h>

struct node
{
    int data_025;
    struct node *next_025;
} * first_025, *temp_025, *last_025;
void create(int a[10], int n)
{
    first_025 = (struct node *)malloc(sizeof(struct node));
    first_025->data_025 = a[0];
    first_025->next_025 = NULL;

    last_025 = first_025;
    for (int i = 1; i < n; i++)
    {
        temp_025 = (struct node *)malloc(sizeof(struct node));
        temp_025->data_025 = a[i];
        temp_025->next_025 = NULL;
        last_025->next_025 = temp_025;
        last_025=temp_025;
    }
}
void display(struct node *F)
{
    while (F!=NULL)
    {
        printf("%d ", F->data_025);
        F = F->next_025;
    }
}


int main()
{

    int a[] = {1, 2, 3, 4, 5, 6, 7};
    create(a, 7);
    display(first_025);

    return 0;
}
```

OUTPUT-Q1



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab4 24.8.21_link_list> cd "d:\my codes\DSA_clg\lab4 24.8.21_link_list\" ; if ($?) { gcc q1_create.c -o
q1_create } ; if ($?) { .\q1_create }
1 2 3 4 5 6 7
PS D:\my codes\DSA_clg\lab4 24.8.21_link_list> 
```
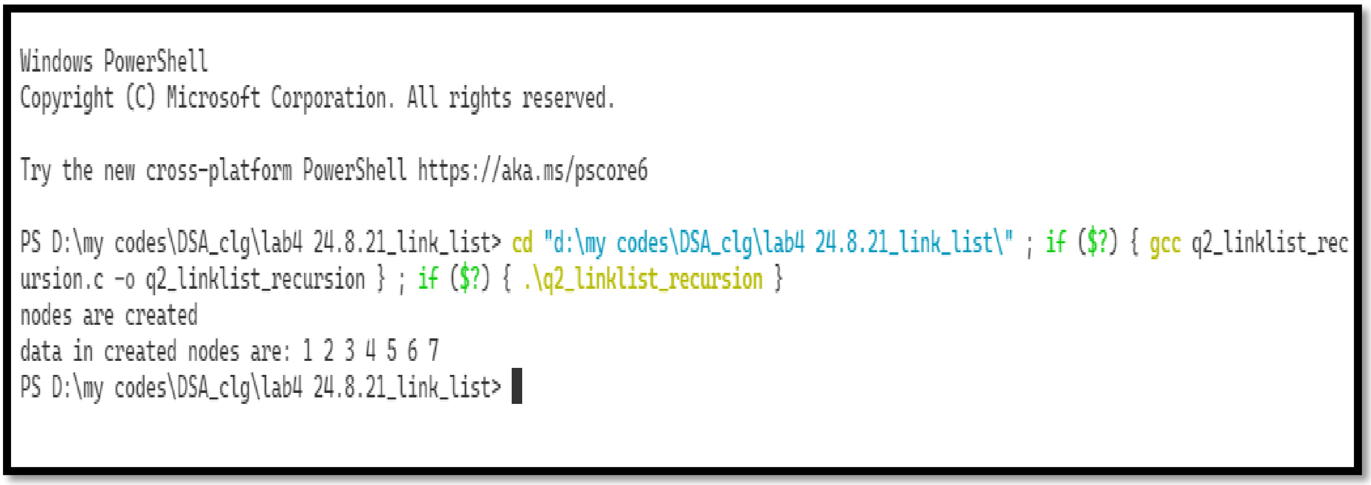

```c
/* Q2.WAP to create SLL using recursion and display the
value of each node
 using user defined funcion create and display*/
#include <stdio.h>
#include <stdlib.h>

struct node
{
    int data_025;
    struct node *next_025;
} * first_025, *temp_025, *last_025;

void crearec(int a[], int n, int i)
{

    if (i == n)
    {
        printf("nodes are created\n");
    }

    else
    {
        struct node *temp_025;
        temp_025 = (struct node *)malloc(sizeof(struct n
ode));
```

2005025_Hitu raj

```
        temp_025->data_025 = a[i];
        temp_025->next_025 = NULL;
        last_025->next_025 = temp_025;
        last_025 = temp_025;
        crearec(a, n, i + 1);
    }
}
void display(struct node *f)
{
    //struct node *temp_025 = f;
    while (f != NULL)

    {
        printf("%d ", f->data_025);
        f = f->next_025;

    }
}

int main()
{

    int a[] = {1, 2, 3, 4, 5, 6, 7};
    first_025 = (struct node *)malloc(sizeof(struct node
));
    first_025->data_025 = a[0];
    first_025->next_025 = NULL;
    last_025 = first_025;
    crearec(a, 7, 1);
    printf("data in created nodes are: ");
    display(first_025);

    return 0;
}
```

OUTPUT-Q2



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab4 24.8.21_link_list> cd "d:\my codes\DSA_clg\lab4 24.8.21_link_list\" ; if ($?) { gcc q2_linklist_rec
ursion.c -o q2_linklist_recursion } ; if ($?) { .\q2_linklist_recursion }
nodes are created
data in created nodes are: 1 2 3 4 5 6 7
PS D:\my codes\DSA_clg\lab4 24.8.21_link_list> 
```
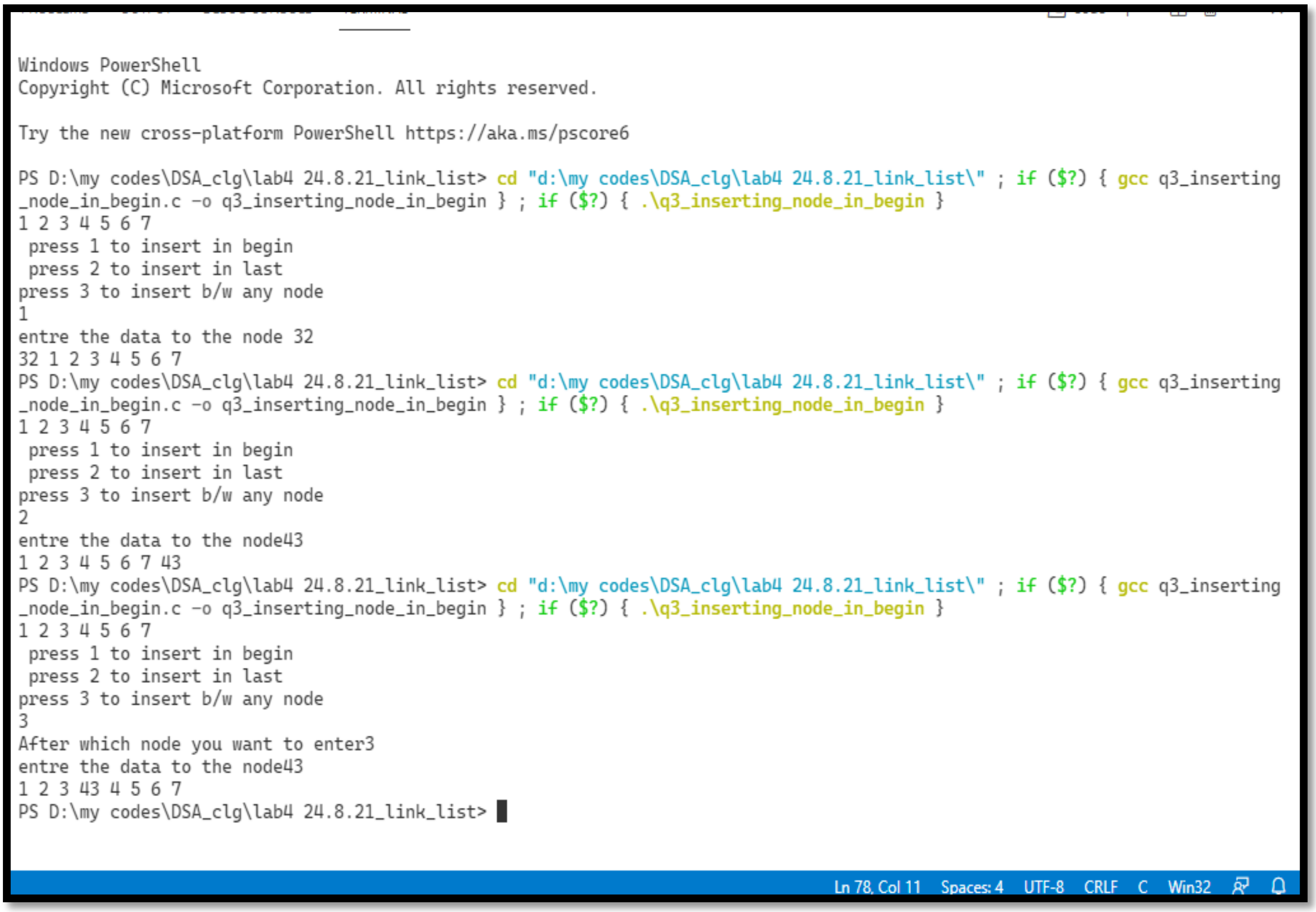

```c
/*Q3.inserting new node at beginning

inserting new node at end
inserting new node at any place*/

#include <stdio.h>
#include <stdlib.h>

struct node
{
    int data_025;
    struct node *next_025;
} * first_025, *last_025, *temp_025;
void create(int a[10], int n)
{
    first_025 = (struct node *)malloc(sizeof(struct node));
    first_025->data_025 = a[0];
    first_025->next_025 = NULL;
    last_025 = first_025;
    for (int i = 1; i < n; i++)
    {
        temp_025 = (struct node *)malloc(sizeof(struct node));
        temp_025->data_025 = a[i];
        temp_025->next_025 = NULL;
        last_025->next_025 = temp_025;
        last_025 = temp_025;
    }
}
void display(struct node *temp_025)
```

```
{
    while (temp_025 != NULL)
    {
        printf("%d ", temp_025->data_025);
        temp_025 = temp_025->next_025;
    }
}

void insertbeg(struct node *temp_025)
{
    struct node *newnode;

    printf("entre the data to the node ");
    newnode = (struct node *)malloc(sizeof(struct node));
    scanf("%d", &newnode->data_025);

    newnode->next_025 = temp_025;

    first_025 = newnode;
}
void insertlast(struct node *temp_025)
{
    int a;
    printf("entre the data to the node");
    scanf("%d", &a);
    struct node *newnode;
    newnode = (struct node *)malloc(sizeof(struct node));
    newnode->data_025 = a;
    newnode->next_025 = NULL;
    temp_025->next_025 = newnode;
    last_025 = newnode;
}
void insertany(struct node *temp_025, int n)
{
    int a;
    printf("entre the data to the node");
    scanf("%d", &a);
    struct node *newnode;
    newnode = (struct node *)malloc(sizeof(struct node));
    newnode->data_025 = a;
    newnode->next_025 = NULL;
    for (int i = 1; i < n; i++)
    {
        temp_025 = temp_025->next_025;
    }

    newnode->next_025 = temp_025->next_025;
    temp_025->next_025 = newnode;
}
int main()
{
    int n,p;
    int a[] = {1, 2, 3, 4, 5, 6, 7};
    create(a, 7);
    display(first_025);
    printf("\n press 1 to insert in begin\n press 2 to insert in l
ast \npress 3 to insert b/w any node\n");
    scanf("%d", &n);
    switch (n)
    {
    case 1:
        insertbeg(first_025);
        display(first_025);
        break;
    case 2:
        insertlast(last_025);
        display(first_025);
        break;
    case 3:

        printf("After which node you want to enter");
        scanf("%d", &p);
        insertany(first_025,p);
        display(first_025);
        break;

    default:
        break;
    }

    return 0;
}
```

OUTPUT-Q3



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab4 24.8.21_link_list> cd "d:\my codes\DSA_clg\lab4 24.8.21_link_list\" ; if ($?) { gcc q3_inserting
_node_in_begin.c -o q3_inserting_node_in_begin } ; if ($?) { .\q3_inserting_node_in_begin }
1 2 3 4 5 6 7
 press 1 to insert in begin
 press 2 to insert in last
press 3 to insert b/w any node
1
entre the data to the node 32
32 1 2 3 4 5 6 7
PS D:\my codes\DSA_clg\lab4 24.8.21_link_list> cd "d:\my codes\DSA_clg\lab4 24.8.21_link_list\" ; if ($?) { gcc q3_inserting
_node_in_begin.c -o q3_inserting_node_in_begin } ; if ($?) { .\q3_inserting_node_in_begin }
1 2 3 4 5 6 7
 press 1 to insert in begin
 press 2 to insert in last
press 3 to insert b/w any node
2
entre the data to the node43
1 2 3 4 5 6 7 43
PS D:\my codes\DSA_clg\lab4 24.8.21_link_list> cd "d:\my codes\DSA_clg\lab4 24.8.21_link_list\" ; if ($?) { gcc q3_inserting
_node_in_begin.c -o q3_inserting_node_in_begin } ; if ($?) { .\q3_inserting_node_in_begin }
1 2 3 4 5 6 7
 press 1 to insert in begin
 press 2 to insert in last
press 3 to insert b/w any node
3
After which node you want to enter3
entre the data to the node43
1 2 3 43 4 5 6 7
PS D:\my codes\DSA_clg\lab4 24.8.21_link_list> █
```

2005025_Hitu raj

KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY (KIIT)

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LAB 5

- Name :HITU RAJ
- Roll no. :2005025
- Branch :CSE

```c
/*1.WAP to create a link list and display using
recursive funcn
2.find out the length of the link list using bot
h iterative  recursive funcn
3.find out thr sum and product of nodes of the l
ink list using iterative and recursive func
4.find out max and mean using iterative and recu
rsive funcn
5.write a program  to demonstrate the deletion o
f node at beg , end and at given position
*/
#include <stdio.h>
#include <stdlib.h>
struct node
```

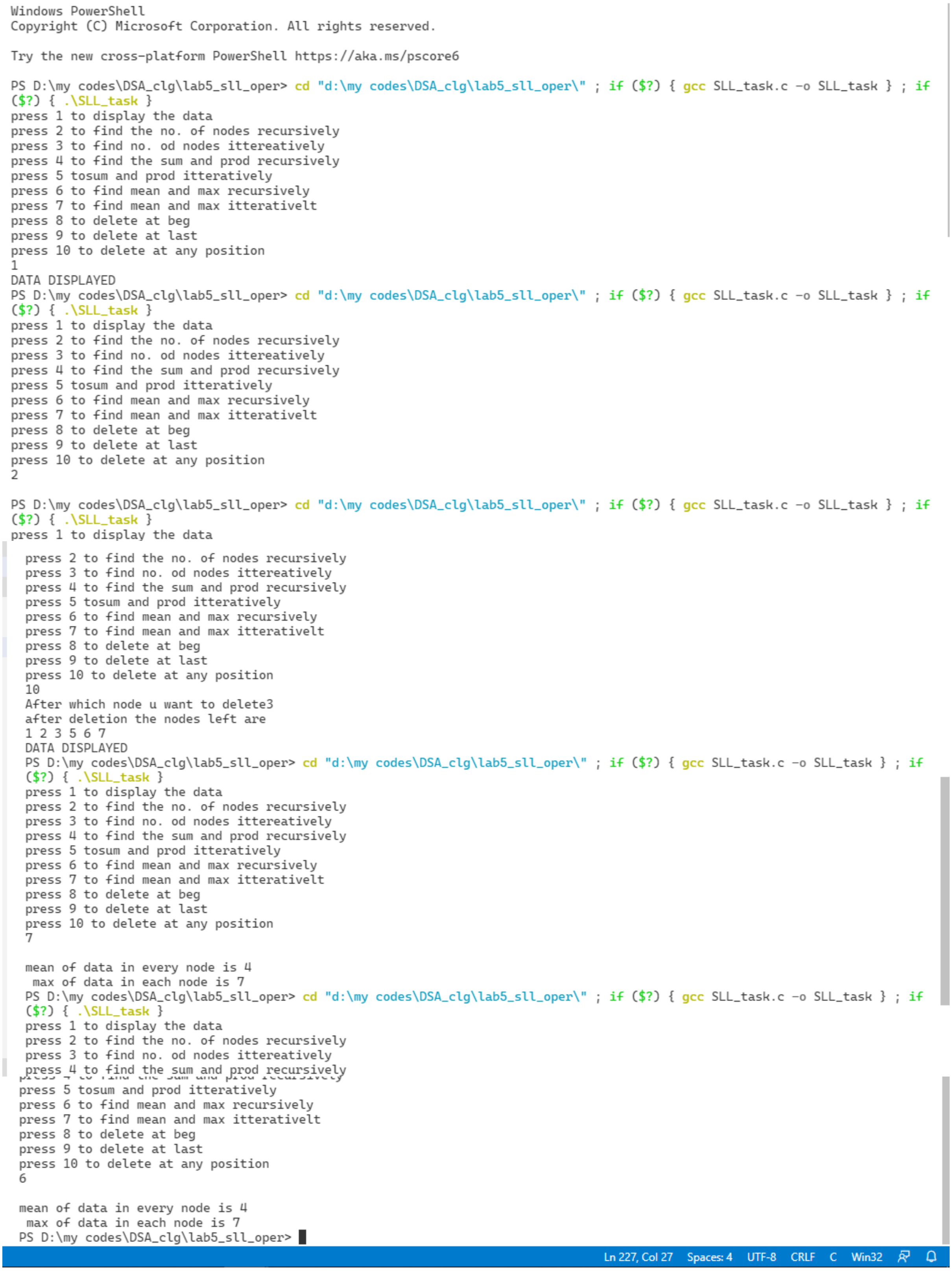
```
{
    int data;
    struct node *next;
} * first, *last, *temp;

void create(int a[], int n)
{

    first = (struct node *)malloc(sizeof(struct
node));
    first->data = a[0];
    first->next = NULL;
    last = first;
    for (int i = 1; i < n; i++)
    {
        temp = (struct node *)malloc(sizeof(stru
ct node));
        temp->data = a[i];
        temp->next = NULL;
        last->next = temp;
        last = temp;
    }
}
void display_rec(struct node *f)
{

    if (f != NULL)
    {
        printf("%d ", f->data);
        display_rec(f->next);
    }
    else
    {
        printf("\nDATA DISPLAYED");
    }
}
```

```c
void length_rec(struct node *f)
{
    int static count = 0;
    if (f != NULL)
    {
        count++;
        length_rec(f->next);
    }
    else
    {
        printf("\nlength of node is %d", count);
    }
}
void length(struct node *f)
{
    int count = 0;
    while (f != NULL)
    {
        count++;
        f = f->next;
    }

    printf("\nlength of node is %d", count);
}

void sum_prod(struct node *f)
{
    int sum = 0, prod = 1;
    while (f != NULL)
    {
        prod = prod * f->data;
        sum = sum + f->data;
        f = f->next;
    }

    printf("\nsum of data in each node is %d\n product of data in each node is %d", sum, prod);
```

```
}
void sum_prod_rec(struct node *f)
{
    int static sum = 0;
    int static prod = 1;
    if (f != NULL)
    {
        sum = sum + f->data;
        prod = prod * f->data;
        sum_prod_rec(f->next);
    }
    else
    {

        printf("\nsum of data in each node is %d
\n product of data in each node is %d", sum, pro
d);
    }
}
void max_mean_rec(struct node *f)
{
    int static max = 0;
    int static sum = 0;
    int static c = 0;
    if (f != NULL)
    {
        sum = sum + f->data;
        if (f->data > max)
        {
            max = f->data;
        }
        c++;
        max_mean_rec(f->next);
    }
    else
    {
        printf("\nmean of data in every node is
%d\n max of data in each node is %d", sum / c, m
ax);
    }
}
void max_mean(struct node *f)
{
    int max = 0;
    int sum = 0;
    int c = 0;
    while (f != NULL)
    {
        sum = sum + f->data;
        if (f->data > max)
        {
            max = f->data;
        }
        c++;
        f = f->next;
    }

    printf("\nmean of data in every node is %d\n
 max of data in each node is %d", sum / c, max);
}
void delete_beg(struct node *f)
{
    struct node *temp;
    temp = f;
    f = f->next;
    free(temp);
    first = f;
    printf("after deletion the nodes left are\n"
);
    display_rec(first);
}
void delete_last(struct node *f)
{
    int c = 0;
    while (c == 0)
    {
        if (f->next->next == NULL)
        {
            struct node *temp = f->next->next;
            // last=f;
            f->next = NULL;
            free(temp);

            c = 1;
        }
        f = f->next;
    }

    printf("after deletion the nodes left are\n"
);
    display_rec(first);
}
void delete_any(struct node *f)
{
    int n;
    printf("After which node u want to delete");
    scanf("%d", &n);
    for (int i = 1; i < n; i++)
    {
        f = f->next;
    }
    struct node *temp = f->next;
    f->next = f->next->next;
    free(temp);
    printf("after deletion the nodes left are\n"
);
    display_rec(first);
}
int main()
{
```

```c
    int a[] = {1, 2, 3, 4, 5, 6, 7};
    create(a, 7);
    int n;
    printf("press 1 to display the data\n");
    printf("press 2 to find the no. of nodes recursively\n");

    printf("press 3 to find no. od nodes ittereatively\n");

    printf("press 4 to find the sum and prod recursively\n");

    printf("press 5 tosum and prod itteratively\n");
    printf("press 6 to find mean and max recursively \n");
    printf("press 7 to find mean and max itterativelt\n");
    printf("press 8 to delete at beg\n");
    printf("press 9 to delete at last\n");

    printf("press 10 to delete at any position\n");

    scanf("%d", &n);
    switch (n)
    {
    case 1:
        display_rec(first);
        break;
    case 2:
        length_rec(first);
        break;
    case 3:
        length(first);
        break;
    case 4:
        sum_prod_rec(first);
        break;
    case 5:
        sum_prod(first);
        break;
    case 6:
        max_mean_rec(first);
        break;
    case 7:
        max_mean(first);
        break;
    case 8:
        delete_beg(first);
        break;
    case 9:
        delete_last(first);
        break;
    case 10:
        delete_any(first);
        break;

    default:
        break;
    }

    return 0;

}
```

OUTPUT



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab5_sll_oper> cd "d:\my codes\DSA_clg\lab5_sll_oper\" ; if ($?) { gcc SLL_task.c -o SLL_task } ; if
($?) { .\SLL_task }
press 1 to display the data
press 2 to find the no. of nodes recursively
press 3 to find no. od nodes ittereatively
press 4 to find the sum and prod recursively
press 5 tosum and prod itteratively
press 6 to find mean and max recursively
press 7 to find mean and max itterativelt
press 8 to delete at beg
press 9 to delete at last
press 10 to delete at any position
1
DATA DISPLAYED
PS D:\my codes\DSA_clg\lab5_sll_oper> cd "d:\my codes\DSA_clg\lab5_sll_oper\" ; if ($?) { gcc SLL_task.c -o SLL_task } ; if
($?) { .\SLL_task }
press 1 to display the data
press 2 to find the no. of nodes recursively
press 3 to find no. od nodes ittereatively
press 4 to find the sum and prod recursively
press 5 tosum and prod itteratively
press 6 to find mean and max recursively
press 7 to find mean and max itterativelt
press 8 to delete at beg
press 9 to delete at last
press 10 to delete at any position
2

PS D:\my codes\DSA_clg\lab5_sll_oper> cd "d:\my codes\DSA_clg\lab5_sll_oper\" ; if ($?) { gcc SLL_task.c -o SLL_task } ; if
($?) { .\SLL_task }
press 1 to display the data
press 2 to find the no. of nodes recursively
press 3 to find no. od nodes ittereatively
press 4 to find the sum and prod recursively
press 5 tosum and prod itteratively
press 6 to find mean and max recursively
press 7 to find mean and max itterativelt
press 8 to delete at beg
press 9 to delete at last
press 10 to delete at any position
10
After which node u want to delete3
after deletion the nodes left are
1 2 3 5 6 7
DATA DISPLAYED
PS D:\my codes\DSA_clg\lab5_sll_oper> cd "d:\my codes\DSA_clg\lab5_sll_oper\" ; if ($?) { gcc SLL_task.c -o SLL_task } ; if
($?) { .\SLL_task }
press 1 to display the data
press 2 to find the no. of nodes recursively
press 3 to find no. od nodes ittereatively
press 4 to find the sum and prod recursively
press 5 tosum and prod itteratively
press 6 to find mean and max recursively
press 7 to find mean and max itterativelt
press 8 to delete at beg
press 9 to delete at last
press 10 to delete at any position
7

mean of data in every node is 4
 max of data in each node is 7
PS D:\my codes\DSA_clg\lab5_sll_oper> cd "d:\my codes\DSA_clg\lab5_sll_oper\" ; if ($?) { gcc SLL_task.c -o SLL_task } ; if
($?) { .\SLL_task }
press 1 to display the data
press 2 to find the no. of nodes recursively
press 3 to find no. od nodes ittereatively
press 4 to find the sum and prod recursively
press 5 tosum and prod itteratively
press 6 to find mean and max recursively
press 7 to find mean and max itterativelt
press 8 to delete at beg
press 9 to delete at last
press 10 to delete at any position
6

mean of data in every node is 4
 max of data in each node is 7
PS D:\my codes\DSA_clg\lab5_sll_oper>
```

KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY (KIIT)

Deemed to be University U/S 3 of UGC Act, 1956

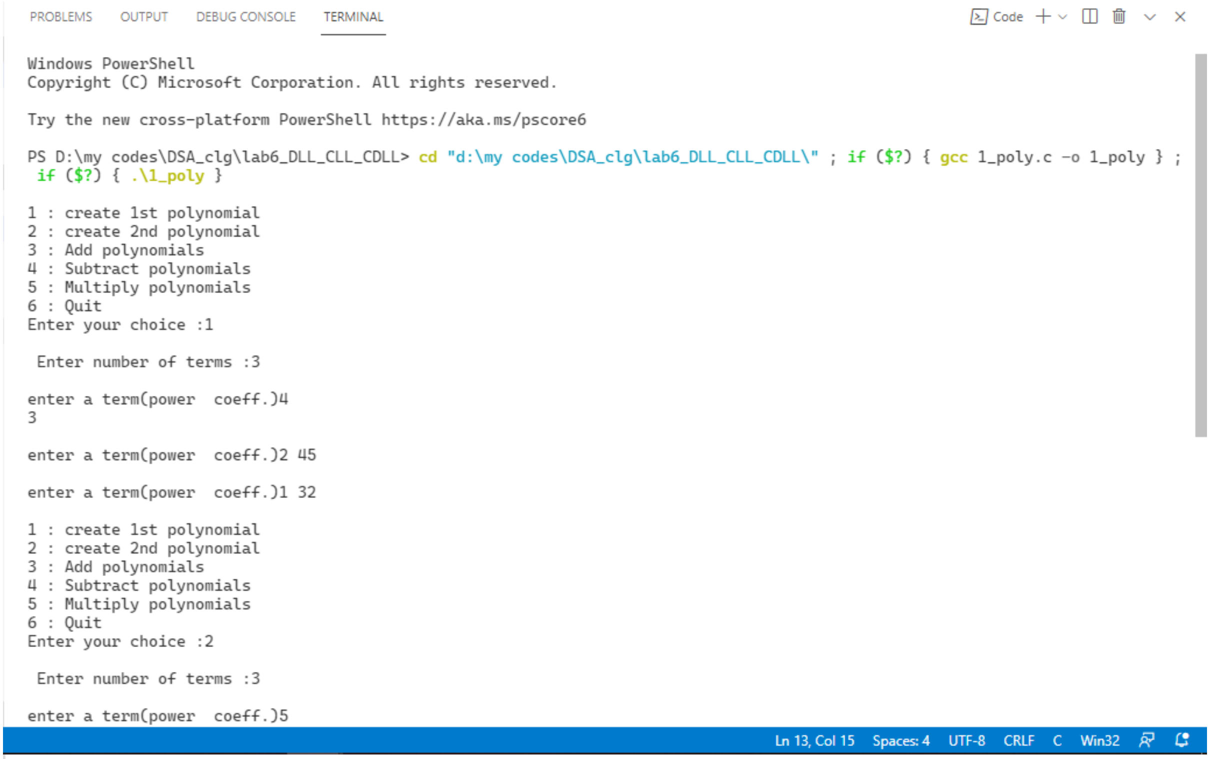
LAB 6

- Name :HITU RAJ
- Roll no. :2005025
- Branch :CSE

```
/*1.    WAP to create a linked list that represents a polynom
ial expression with single variable
(i.e. 5x7-
3x5+x2+9) and display the polynomial by using user defined fu
nctions for creation
and display.Write a program to add and multiply two polynomia
ls with single varia
ble with a new function for addition and multiplication opera
tions.
*/
#include <math.h>
#include <stdio.h>
#include <stdlib.h>
#define MAX 17
typedef struct node
```

```
{
    int coeff;
    struct node *next;
} node;
node *init();
void read(node *h1);
void print(node *h1);
node *add(node *h1, node *h2);
node *sub(node *h1, node *h2);
node *multiply(node *h1, node *h2);
/*Polynomial is stored in a linked list, ith node  gives coef
ficient of x^i .
  a polynomial 3x^2 + 12x^4 will be represented as (0,0,3,0,1
2,0,0,â€¦.)
*/
void main()
{
    node *h1 = NULL, *h2 = NULL, *h3 = NULL;
    int option;
    do
    {
        printf("\n1 : create 1st polynomial");
        printf("\n2 : create 2nd polynomial");
        printf("\n3 : Add polynomials");
        printf("\n4 : Subtract polynomials");
        printf("\n5 : Multiply polynomials");
        printf("\n6 : Quit");
        printf("\nEnter your choice :");
        scanf("%d", &option);
        switch (option)
        {
        case 1:
            h1 = init();
            read(h1);
            break;
        case 2:
            h2 = init();
            read(h2);
            break;
        case 3:
            h3 = add(h1, h2);
            printf("\n1â€™st polynomial -> ");
            print(h1);
            printf("\n2â€™nd polynomial -> ");
            print(h2);
            printf("\n Sum = ");
            print(h3);
            break;
        case 4:
            h3 = sub(h1, h2);
            printf("\n1â€™st polynomial -> ");
            print(h1);
            printf("\n2â€™nd polynomial -> ");
            print(h2);
            printf("\n Subtraction = ");
            print(h3);
            break;
        case 5:
            h3 = multiply(h1, h2);
            printf("\n1st polynomial -> ");
            print(h1);
            printf("\n2nd polynomial -> ");
            print(h2);
            printf("\n Product = ");
            print(h3);
            break;
        }
    } while (option != 6);
}
void read(node *h)
{
    int n, i, j, power, coeff;
    node *p;
    p = init();
    printf("\n Enter number of terms :");
    scanf("%d", &n);
    /* read n terms */
    for (i = 0; i < n; i++)
    {
        printf("\nenter a term(power  coeff.)");
        scanf("%d%d", &power, &coeff);
        for (p = h, j = 0; j < power; j++)
            p = p->next;
        p->coeff = coeff;
    }
}
void print(node *p)
{
    int i;
    for (i = 0; p != NULL; i++, p = p->next)
        if (p->coeff != 0)
            printf("%dX^%d   ", p->coeff, i);
}
node *add(node *h1, node *h2)
{
    node *h3, *p;
    h3 = init();
    p = h3;
    while (h1 != NULL)
    {
        h3->coeff = h1->coeff + h2->coeff;
        h1 = h1->next;
        h2 = h2->next;
        h3 = h3->next;
    }
    return (p);
}
node *sub(node *h1, node *h2)
{
    node *h3, *p;
    h3 = init();
    p = h3;
    while (h1 != NULL)
    {
        h3->coeff = h1->coeff - h2->coeff;
        h1 = h1->next;
        h2 = h2->next;
        h3 = h3->next;
    }
    return (p);
}
node *multiply(node *h1, node *h2)
{
    node *h3, *p, *q, *r;
    int i, j, k, coeff, power;
    h3 = init();
    for (p = h1, i = 0; p != NULL; p = p->next, i++)
        for (q = h2, j = 0; q != NULL; q = q->next, j++)
        {
            coeff = p->coeff * q->coeff;
            power = i + j;
            for (r = h3, k = 0; k < power; k++)
                r = r->next;
            r->coeff = r->coeff + coeff;
        }
    return (h3);
}
node *init()
{
    int i;
    node *h = NULL, *p;
    for (i = 0; i < MAX; i++)
    {
        p = (node *)malloc(sizeof(node));
        p->next = h;
        p->coeff = 0;
        h = p;
    }
    return (h);
}
```

OUTPUT-1



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab6_DLL_CLL_CDLL> cd "d:\my codes\DSA_clg\lab6_DLL_CLL_CDLL\" ; if ($?) { gcc 1_poly.c -o 1_poly } ;
 if ($?) { .\1_poly }

1 : create 1st polynomial
2 : create 2nd polynomial
3 : Add polynomials
4 : Subtract polynomials
5 : Multiply polynomials
6 : Quit
Enter your choice :1

 Enter number of terms :3

enter a term(power  coeff.)4
3

enter a term(power  coeff.)2 45

enter a term(power  coeff.)1 32

1 : create 1st polynomial
2 : create 2nd polynomial
3 : Add polynomials
4 : Subtract polynomials
5 : Multiply polynomials
6 : Quit
Enter your choice :2

 Enter number of terms :3

enter a term(power  coeff.)5
```
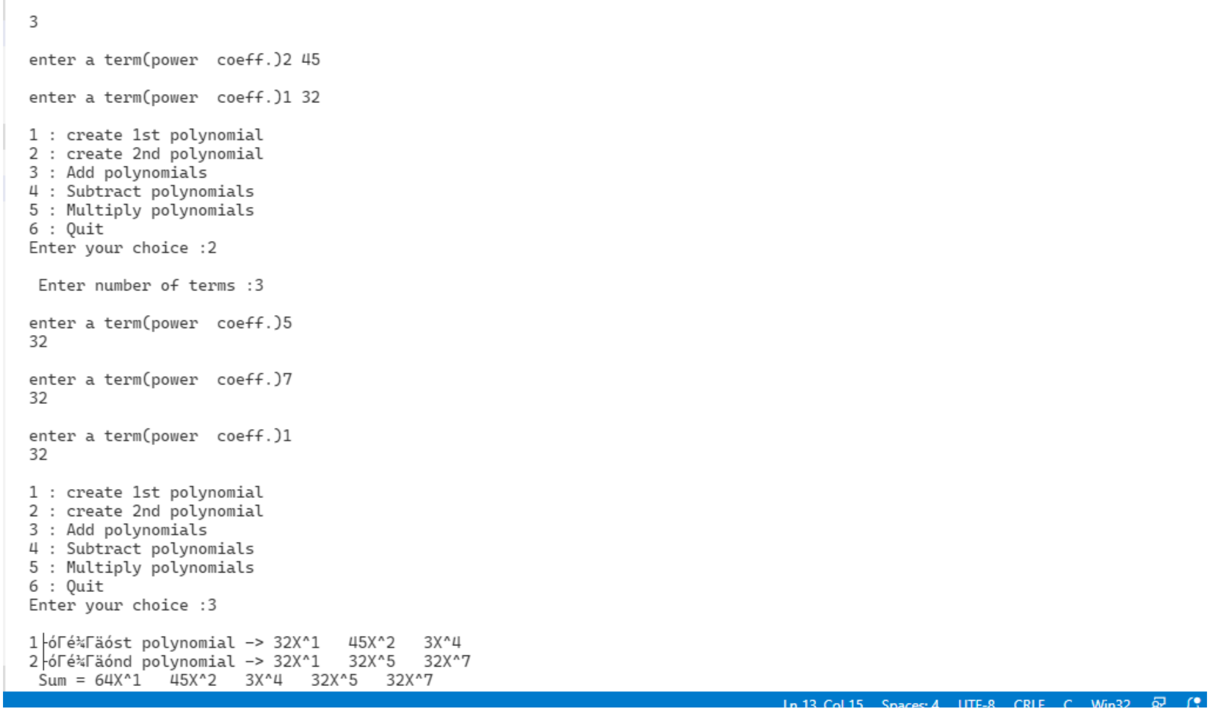
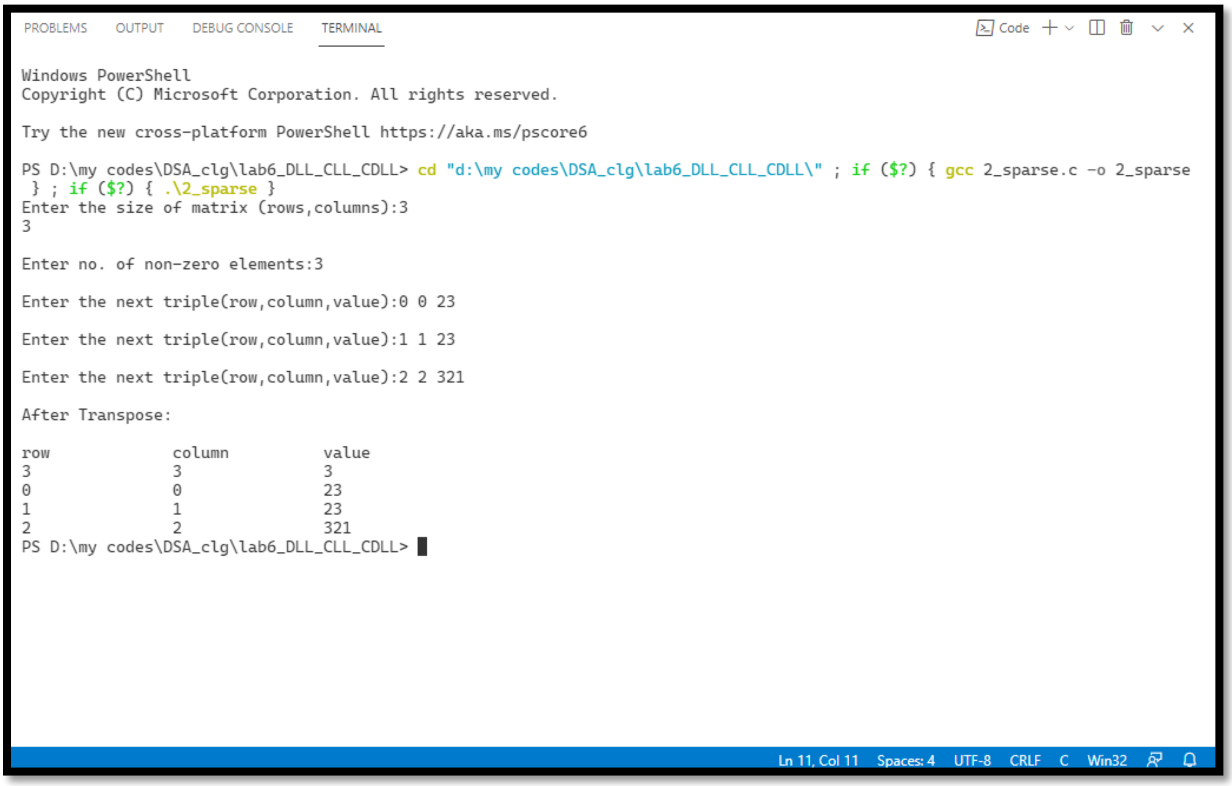



```
3

enter a term(power  coeff.)2 45

enter a term(power  coeff.)1 32

1 : create 1st polynomial
2 : create 2nd polynomial
3 : Add polynomials
4 : Subtract polynomials
5 : Multiply polynomials
6 : Quit
Enter your choice :2

 Enter number of terms :3

enter a term(power  coeff.)5
32

enter a term(power  coeff.)7
32

enter a term(power  coeff.)1
32

1 : create 1st polynomial
2 : create 2nd polynomial
3 : Add polynomials
4 : Subtract polynomials
5 : Multiply polynomials
6 : Quit
Enter your choice :3

1├óΓé¼Γäóst polynomial -> 32X^1   45X^2   3X^4
2├óΓé¼Γäónd polynomial -> 32X^1   32X^5   32X^7
 Sum = 64X^1   45X^2   3X^4   32X^5   32X^7
```

```
//2.    WAP to represent a sparse matrix using linked list.WAP t
o find out the transpose of a sparse matrix.WAP to multiply two
sparse matrices.

#include<stdio.h>

#define MAX 20
```

```
void printsparse(int[][3]);
void readsparse(int[][3]);
void transpose(int[][3],int[][3]);

int main()
{
int b1[MAX][3],b2[MAX][3],m,n;
printf("Enter the size of matrix (rows,columns):");
scanf("%d%d",&m,&n);
b1[0][0]=m;
b1[0][1]=n;
readsparse(b1);
transpose(b1,b2);
printsparse(b2);
}

void readsparse(int b[MAX][3])
{
int i,t;
printf("\nEnter no. of non-zero elements:");
scanf("%d",&t);
b[0][2]=t;
for(i=1;i<=t;i++)
{
printf("\nEnter the next triple(row,column,value):");
scanf("%d%d%d",&b[i][0],&b[i][1],&b[i][2]);
}
}

void printsparse(int b[MAX][3])
{
int i,n;
n=b[0][2]; //no of 3-triples
printf("\nAfter Transpose:\n");
printf("\nrow\t\tcolumn\t\tvalue\n");
for(i=0;i<=n;i++)
printf("%d\t\t%d\t\t%d\n",b[i][0],b[i][1],b[i][2]);
}

void transpose(int b1[][3],int b2[][3])
{
int i,j,k,n;
b2[0][0]=b1[0][1];
b2[0][1]=b1[0][0];
b2[0][2]=b1[0][2];
k=1;
n=b1[0][2];
for(i=0;i<b1[0][1];i++)
for(j=1;j<=n;j++)
//if a column number of current triple==i then insert the curren
t triple in b2
if(i==b1[j][1])
{
b2[k][0]=i;
b2[k][1]=b1[j][0];
b2[k][2]=b1[j][2];
k++;
}
}
```



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab6_DLL_CLL_CDLL> cd "d:\my codes\DSA_clg\lab6_DLL_CLL_CDLL\" ; if ($?) { gcc 2_sparse.c -o 2_sparse
 } ; if ($?) { .\2_sparse }
Enter the size of matrix (rows,columns):3
3

Enter no. of non-zero elements:3

Enter the next triple(row,column,value):0 0 23

Enter the next triple(row,column,value):1 1 23

Enter the next triple(row,column,value):2 2 321

After Transpose:

row             column          value
3               3               3
0               0               23
1               1               23
2               2               321
PS D:\my codes\DSA_clg\lab6_DLL_CLL_CDLL> █
```
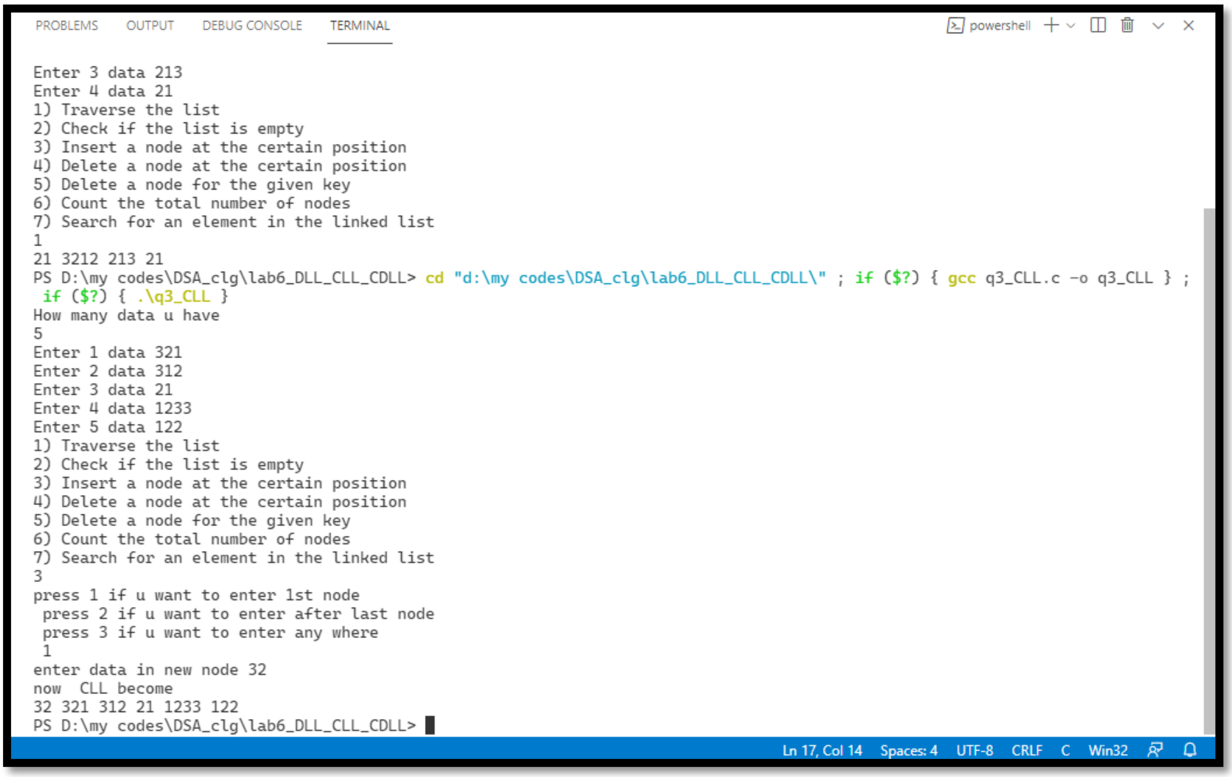

```
/*

3.Write a menu driven program to perform the following op
erations in a single circular linked list by using suitab
le user defined functions for each case.
a) Traverse the list
b) Check if the list is empty
c) Insert a node at the certain position
d) Delete a node at the certain position
```

```
e) Delete a node for the given key
f) Count the total number of nodes
g) Search for an element in the linked list
*/
#include <stdio.h>
#include <stdlib.h>

struct node
{
    int data;
    struct node *next;

} * first, *last, *temp;

void create()
{
    int n;
    printf("How many data u have\n");
    scanf("%d", &n);
    first = (struct node *)malloc(sizeof(struct node));
    printf("Enter 1 data ");
    scanf("%d", &first->data);
    first->next = NULL;
    last = first;

    for (int i = 1; i < n; i++)
    {

        temp = (struct node *)malloc(sizeof(struct node))
;
        printf("Enter %d data ", i + 1);

        scanf("%d", &temp->data);
        temp->next = NULL;
        last->next = temp;
        last = temp;
    }
    last->next = first;
```

```
}
void display(struct node *f)
{
    printf("%d ", f->data);
    f = f->next;
    while (f != first)
    {
        printf("%d ", f->data);
        f = f->next;
    }
    printf("\n");
}
void insertbeg(struct node *f)

{
    struct node *newnode;
    newnode = (struct node *)malloc(sizeof(struct node));
    printf("enter data in new node ");

    scanf("%d", &newnode->data);

    newnode->next = first;
    first = newnode;
    last->next = first;
    printf("now  CLL become \n");
    display(first);
}
void insertlast(struct node *f)
{
    struct node *newnode;
    newnode = (struct node *)malloc(sizeof(struct node));
    printf("enter data in new node ");

    scanf("%d", &newnode->data);
    last->next = newnode;
    newnode->next = NULL;
    last = newnode;
    last->next = first;
    printf("now  CLL become after inserting at the end \n
");
    display(first);
}
void delete_beg()
{
    struct node *temp = first;
    first = first->next;
    last->next = first;
    free(temp);
    printf("After deleting the 1st node CLL becomes ");
    display(first);
}
void delete_last()
{
    struct node *temp, *back = last;
    while (temp->next != last)
    {

        temp = temp->next;
    }
    last = temp;
    temp->next = first;
    free(back);
    printf("after deleting the lastt data cll bracomes");
    display(first);
}
void delete_any(struct node *f)
{
    int n;
    printf("After which node u want to delete");
    scanf("%d", &n);

    for (int i = 1; i < n; i++)
    {
        f = f->next;
    }
    struct node *temp = f->next;
    f->next = f->next->next;
    free(temp);
    printf("after deletion the nodes left are\n");
    display(first);
}
int count(struct node *f)
{

    int c;
    while (f != NULL)
    {
        c++;
    }
    return c;
}
void search(struct node *f, int data)
{

    int c;
    while (f != NULL)
    {
        if (f->data == data)
            c++;
    }
    if (c > 0)
        printf("data found\n");
}
void delete_key(struct node *f, int data)
{

    while (f->data != data)
    {
        temp->next = f->next;
        free(f);
        struct node *temp = f;
        f = f->next;
    }
    display(first);
```

```
}

void insertany(struct node *temp, int n)
{
    int a;
    printf("entre the data to the node");
    scanf("%d", &a);
    struct node *newnode;
    newnode = (struct node *)malloc(sizeof(struct node));
    newnode->data = a;
    newnode->next = NULL;
    for (int i = 1; i < n; i++)
    {
        temp = temp->next;
    }

    newnode->next = temp->next;
    temp->next = newnode;
}
int main()
{
    int t, C, j;
    int n;
    create();

    printf("1) Traverse the list\n");
    printf("2) Check if the list is empty \n");
    printf("3) Insert a node at the certain position\n");
    printf("4) Delete a node at the certain position\n");
    printf("5) Delete a node for the given key\n");
    printf("6) Count the total number of nodes \n");
    printf("7) Search for an element in the linked list\n
");
    scanf("%d",&n);

    switch (n)
    {
    case 1 :
        display(first);
        break;
    case 2:

        break;
    case 3:
     printf("press 1 if u want to enter 1st node\n ");
        printf("press 2 if u want to enter after last nod
e\n ");
        printf("press 3 if u want to enter any where\n ")
;
        scanf("%d", &t);
        if (t == 1)
            insertbeg(first);
        else if (t == 2)
            insertlast(first);
        else
            insertany(first,3);

        break;
    case 4:
        printf("press 1 if u want to delete  1st node\n "
);
        printf("press 2 if u want to enter after last nod
e\n ");
        printf("press 3 if u want to enter any where\n ")
;
        scanf("%d", &t);
        if (t == 1)
            delete_beg(first);
        else if (t == 2)
            delete_last(last);
        else
            delete_any(first);

        break;
    case 5: //int t;
        printf("which data u want to delete\n");
        scanf("%d", j);
        delete_key(first, j);

        break;
    case 6:
        printf("total no. of element is %d", count(first)
);
        break;
    case 7:
        // int C;
        printf("enter the data u want to search\n");
        scanf("%d", &C);

        search(first, C);
        break;

    default:
        break;
    }

    return 0;
}
```

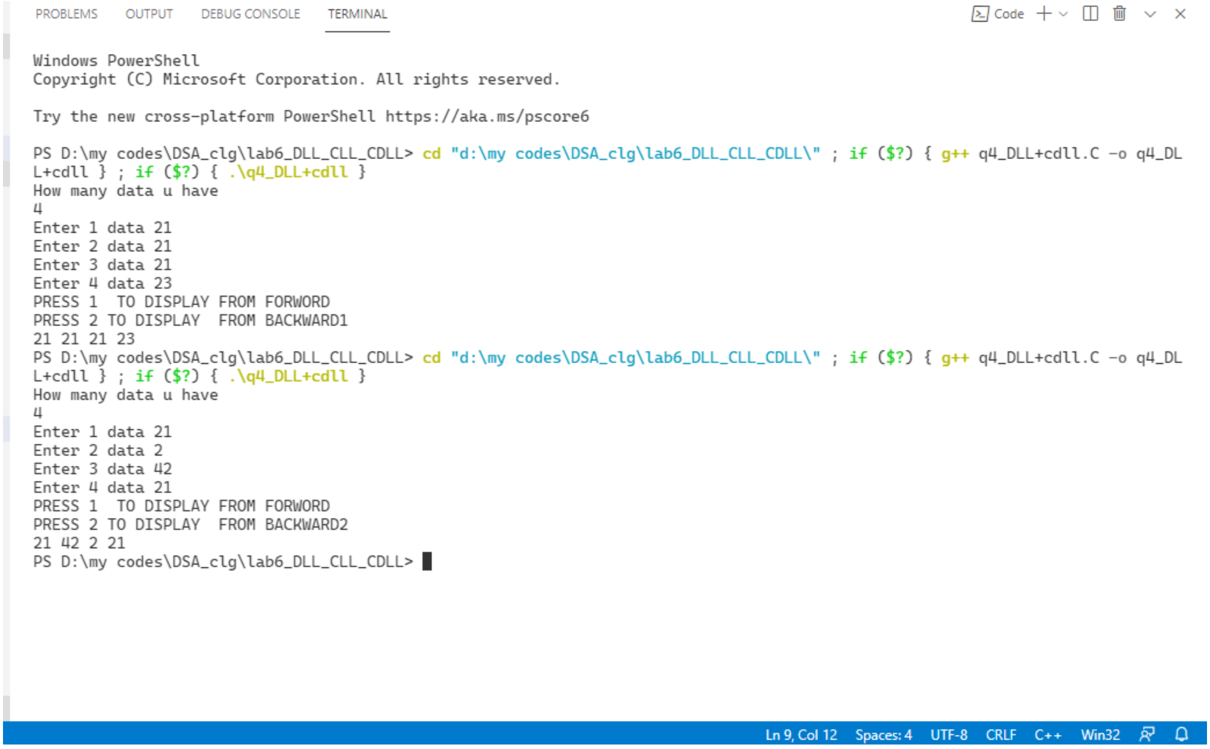
OUTPUT-3



```
Enter 3 data 213
Enter 4 data 21
1) Traverse the list
2) Check if the list is empty
3) Insert a node at the certain position
4) Delete a node at the certain position
5) Delete a node for the given key
6) Count the total number of nodes
7) Search for an element in the linked list
1
21 3212 213 21
PS D:\my codes\DSA_clg\lab6_DLL_CLL_CDLL> cd "d:\my codes\DSA_clg\lab6_DLL_CLL_CDLL\" ; if ($?) { gcc q3_CLL.c -o q3_CLL } ;
 if ($?) { .\q3_CLL }
How many data u have
5
Enter 1 data 321
Enter 2 data 312
Enter 3 data 21
Enter 4 data 1233
Enter 5 data 122
1) Traverse the list
2) Check if the list is empty
3) Insert a node at the certain position
4) Delete a node at the certain position
5) Delete a node for the given key
6) Count the total number of nodes
7) Search for an element in the linked list
3
press 1 if u want to enter 1st node
 press 2 if u want to enter after last node
 press 3 if u want to enter any where
 1
enter data in new node 32
now  CLL become
32 321 312 21 1233 122
PS D:\my codes\DSA_clg\lab6_DLL_CLL_CDLL> ▌
```

```c
/*4. WAP to create a double circular double linked li
st of n nodes
 and display the linked list by using suitable user d
efined functions
  for create and display operations
*/
#include <stdio.h>
#include <stdlib.h>

struct node
{
    int data;
    struct node *next;
    struct node *prev;

} * first, *last, *temp;
```

```
void create()
{
    int n;
    printf("How many data u have\n");
    scanf("%d", &n);
    first = (struct node *)malloc(sizeof(struct node)
);
    printf("Enter 1 data ");
    scanf("%d", &first->data);
    first->prev = NULL;
    first->next = NULL;
    last = first;

    for (int i = 1; i < n; i++)
    {

        temp = (struct node *)malloc(sizeof(struct no
de));
        printf("Enter %d data ", i + 1);

        scanf("%d", &temp->data);
        temp->prev = last;
        temp->next = NULL;
        last->next = temp;
        last = temp;
    }
    last->next = first;
    first->prev = last;
}
void display_f(struct node *f)
{
    printf("%d ", f->data);
    f = f->next;
    while (f != first)
    {
        printf("%d ", f->data);
        f = f->next;
    }
    printf("\n");
}
void display_b(struct node *f)
{
    printf("%d ", f->data);
    f = f->prev;
    while (f != last)
    {
        printf("%d ", f->data);
        f = f->prev;
    }
    printf("\n");
}

int main()
{
    int n;
    create();
    printf("PRESS 1  TO DISPLAY FROM FORWORD\nPRESS 2
 TO DISPLAY  FROM BACKWARD");
    scanf("%d", &n);
    switch (n)
    {
    case 1:
        display_f(first);
        break;

    case 2:

        display_b(last);
        break;
    default:
        break;
    }

    return 0;
}
```



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab6_DLL_CLL_CDLL> cd "d:\my codes\DSA_clg\lab6_DLL_CLL_CDLL\" ; if ($?) { g++ q4_DLL+cdll.C -o q4_DL
L+cdll } ; if ($?) { .\q4_DLL+cdll }
How many data u have
4
Enter 1 data 21
Enter 2 data 21
Enter 3 data 21
Enter 4 data 23
PRESS 1  TO DISPLAY FROM FORWORD
PRESS 2 TO DISPLAY  FROM BACKWARD1
21 21 21 23
PS D:\my codes\DSA_clg\lab6_DLL_CLL_CDLL> cd "d:\my codes\DSA_clg\lab6_DLL_CLL_CDLL\" ; if ($?) { g++ q4_DLL+cdll.C -o q4_DL
L+cdll } ; if ($?) { .\q4_DLL+cdll }
How many data u have
4
Enter 1 data 21
Enter 2 data 2
Enter 3 data 42
Enter 4 data 21
PRESS 1  TO DISPLAY FROM FORWORD
PRESS 2 TO DISPLAY  FROM BACKWARD2
21 42 2 21
PS D:\my codes\DSA_clg\lab6_DLL_CLL_CDLL> 
```

KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY (KIIT)

Deemed to be University U/S 3 of UGC Act, 1956

LAB 7

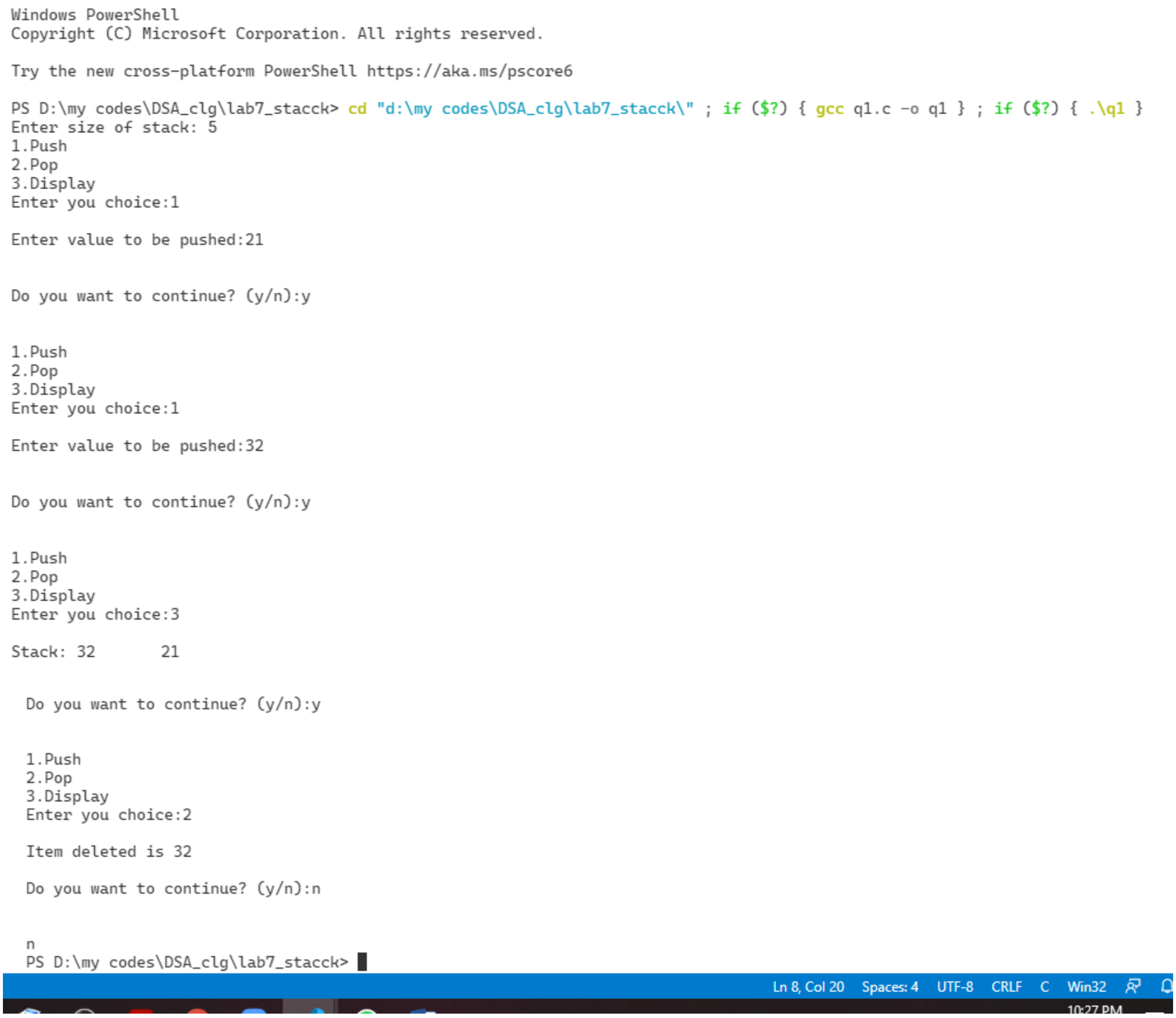
- Name :HITU RAJ
- Roll no. :2005025
- Branch :CSE

```
/*1.Write a menu driven program to perform the following oper
ations of a stack using array by using suitable user defined
functions for each case.
a) Check if the stack is empty
b) Display the contents of stack
c)  Push
d) Pop
*/
#include <stdio.h>
#include <stdlib.h>

struct stack
{
    int size;
    int top;
    int *s;
```

```
};
void create_stack(struct stack *st)
{
    printf("Enter size of stack: ");
    scanf("%d",&st->size);
    st->top=-1;
    st->s=(int *)malloc((st->size)*sizeof(int));
}
int isEmpty(struct stack *st)
{
    if(st->top==-1)
       return 1;
    else
       return 0;
}
void push(struct stack *st, int x)
{
    if (st->top==st->size-1)
        printf("Stack Overflow");
    else
    {
        st->top++;
        st->s[st->top]=x;
    }
}
int pop(struct stack *st)
{
    int x=-1;
    if(isEmpty(st))
        printf("\nStack Underflow");
    else
        x=st->s[st->top--];
    return x;
}
void display(struct stack st)
{
    int i;
    if(isEmpty(&st))
        printf("Stack is empty");
    else
    {
        for(i=st.top;i>=0;--i)
```

```
            printf("%d\t",st.s[i]);
    }
}

int main()
{
    int ch,item;
    char ch2;
    struct stack st;
    create_stack(&st);
    do{
          printf("1.Push\n2.Pop\n3.Display\n");
          printf("Enter you choice:");
          scanf("%d",&ch);
          switch(ch)
          {
              case 1:
                   printf("\nEnter value to be pushed:");
                   scanf("%d",&item);
                   push(&st,item);
                   break;
              case 2:
                   printf("\nItem deleted is %d",pop(&st));
                   break;
              case 3:
                   printf("\nStack: ");
                   display(st);
                   break;
              default:
                  printf("Wrong choice!!");
          }
          printf("\n\nDo you want to continue? (y/n):");
          fflush(stdin);
          scanf("%c",&ch2);
          printf("\n\n");
    }while(ch2=='y');
    fflush(stdin);
    getchar();
    return 0;
}
```

OUTPUT -Q1



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab7_stacck> cd "d:\my codes\DSA_clg\lab7_stacck\" ; if ($?) { gcc q1.c -o q1 } ; if ($?) { .\q1 }
Enter size of stack: 5
1.Push
2.Pop
3.Display
Enter you choice:1

Enter value to be pushed:21


Do you want to continue? (y/n):y


1.Push
2.Pop
3.Display
Enter you choice:1

Enter value to be pushed:32


Do you want to continue? (y/n):y


1.Push
2.Pop
3.Display
Enter you choice:3

Stack: 32       21


  Do you want to continue? (y/n):y


  1.Push
  2.Pop
  3.Display
  Enter you choice:2

  Item deleted is 32

  Do you want to continue? (y/n):n


  n
  PS D:\my codes\DSA_clg\lab7_stacck> 
```
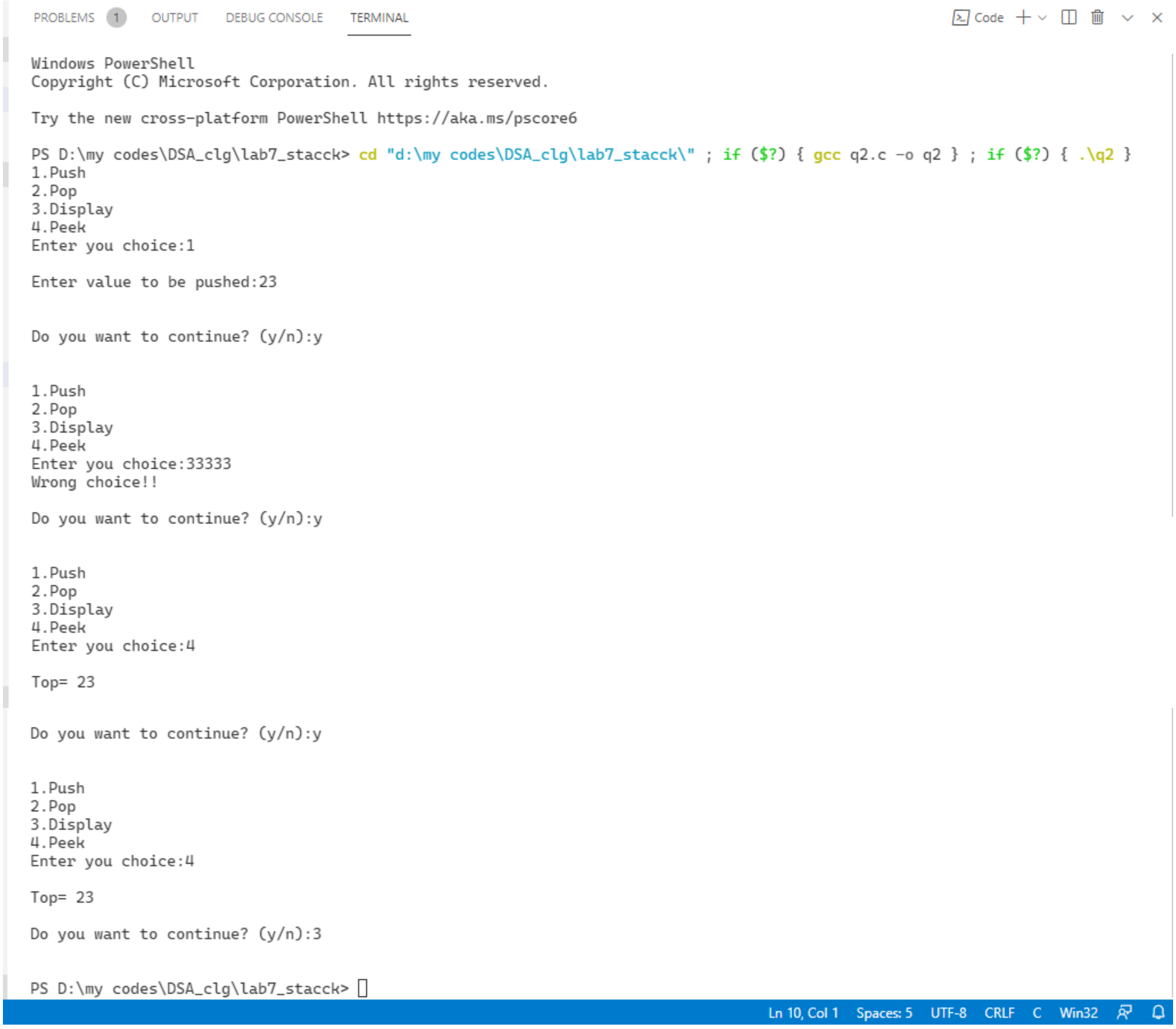

```c
/*2 Write a menu driven program to perform the above operatio
ns of a stack using linked list by using suitable
 user defined functions for each case..*/
#include<stdio.h>
#include<stdlib.h>
struct Node
{
        int data;
        struct Node* next;
}*top=NULL;

int isEmpty()
{
    if(top==NULL)
```

```
         return 1;
    else
         return 0;
}

int Peek()
{
    return top->data;
}

void Push(int x)
{
     struct Node* temp=(struct Node*)malloc(sizeof(struct Nod
e));
     temp->data=x;
     temp->next=top;
     top=temp;
}

int Pop()
{
    if (isEmpty())
    {
        printf("Underflow!");
        return -1;
    }
    struct Node* temp=top;
    int val;
    val=top->data;
    top=top->next;
    free(temp);
    return val;
}

void display(struct Node* top)
{
     while(top!=NULL)
     {
         printf("%d ",top->data);
         top=top->next;
     }
}
```

```c
int main()
{
    int ch,item;
    char ch2;
    do{
          printf("1.Push\n2.Pop\n3.Display\n4.Peek\n");
          printf("Enter you choice:");
          scanf("%d",&ch);
          switch(ch)
          {
              case 1:
                   printf("\nEnter value to be pushed:");
                   scanf("%d",&item);
                   Push(item);
                   break;
              case 2:
                   item=Pop();
                   printf("\nItem deleted is %d",item);
                   break;
              case 3:
                   printf("\nStack: ");
                   display(top);
                   break;
              case 4:
                   printf("\nTop= %d",Peek());
                   break;
              default:
                  printf("Wrong choice!!");
          }
          printf("\n\nDo you want to continue? (y/n):");
          fflush(stdin);
          scanf("%c",&ch2);
          printf("\n\n");
    }while(ch2=='y');

    return 0;
}
```

OUTPUT-2



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab7_stacck> cd "d:\my codes\DSA_clg\lab7_stacck\" ; if ($?) { gcc q2.c -o q2 } ; if ($?) { .\q2 }
1.Push
2.Pop
3.Display
4.Peek
Enter you choice:1

Enter value to be pushed:23


Do you want to continue? (y/n):y


1.Push
2.Pop
3.Display
4.Peek
Enter you choice:33333
Wrong choice!!

Do you want to continue? (y/n):y


1.Push
2.Pop
3.Display
4.Peek
Enter you choice:4

Top= 23

Do you want to continue? (y/n):y


1.Push
2.Pop
3.Display
4.Peek
Enter you choice:4

Top= 23

Do you want to continue? (y/n):3

PS D:\my codes\DSA_clg\lab7_stacck> 
```
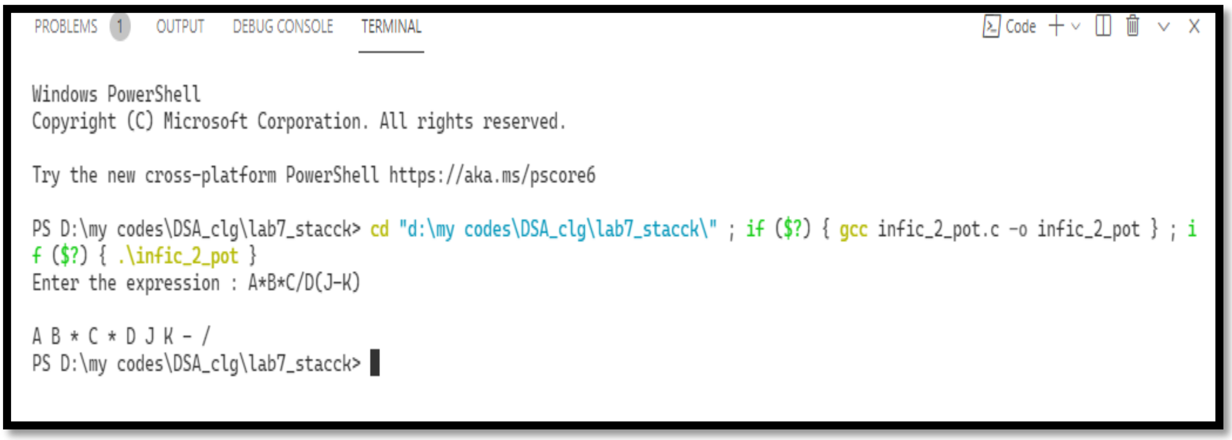

```c
/*3.WAP to convert an infix expression into its equivalent po
stfix notation*/
#include<stdio.h>
#include<ctype.h>
char stack[100];
int top = -1;

void push(char x)
{
    stack[++top] = x;
}

char pop()
{
    if(top == -1)
```

```
        return -1;
    else
        return stack[top--];
}

int priority(char x)
{
    if(x == '(')
        return 0;
    if(x == '+' || x == '-')
        return 1;
    if(x == '*' || x == '/')
        return 2;
    return 0;
}

int main()
{
    char exp[100];
    char *e, x;
    printf("Enter the expression : ");
    scanf("%s",exp);
    printf("\n");
e = exp;

    while(*e != '\0')
    {
        if(isalnum(*e))
            printf("%c ",*e);
        else if(*e == '(')
            push(*e);
        else if(*e == ')')
        {
            while((x = pop()) != '(')
                printf("%c ", x);
        }
        else
        {
            while(priority(stack[top]) >= priority(*e))
                printf("%c ",pop());
            push(*e);
        }
        e++;
}

    while(top != -1)
    {
        printf("%c ",pop());
   }


    return 0;
}
```

OUTPUT 3



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab7_stacck> cd "d:\my codes\DSA_clg\lab7_stacck\" ; if ($?) { gcc infic_2_pot.c -o infic_2_pot } ; i
f ($?) { .\infic_2_pot }
Enter the expression : A*B*C/D(J-K)

A B * C * D J K - /
PS D:\my codes\DSA_clg\lab7_stacck> 
```

KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY (KIIT)

Deemed to be University U/S 3 of UGC Act, 1956

LAB 8

- Name :HITU RAJ
- Roll no. :2005025
- Branch :CSE

```
/*1.WAP to convert an infix expression  into its
 equivalent prefix notation.
*/

#include <stdio.h>
#include <string.h>
#include <math.h>
#include <stdlib.h>

#define BLANK ' '
#define TAB '\t'
#define MAX 50
```

```
    long int
    pop();
long int eval_pre();
char infix[MAX], prefix[MAX];
long int stack[MAX];
int top;
int isempty();
int white_space(char symbol);

void infix_to_prefix();
int priority(char symbol);
void push(long int symbol);
long int pop();
long int eval_pre();

int main()
{
    long int value;
    top = -1;
    printf("Enter infix : ");
    gets(infix);
    infix_to_prefix();
    printf("prefix : %s\n", prefix);
    value = eval_pre();
    printf("Value of expression : %ld\n", value)
;

    return 0;

} /*End of main()*/

void infix_to_prefix()
```

```
{
    int i, j, p, n;
    char next;
    char symbol;
    char temp;
    n = strlen(infix);
    p = 0;

    for (i = n - 1; i >= 0; i--)
    {
        symbol = infix[i];
        if (!white_space(symbol))
        {
            switch (symbol)
            {
            case ')':
                push(symbol);
                break;
            case '(':
                while ((next = pop()) != ')')
                    prefix[p++] = next;
                break;
            case '+':
            case '-':
            case '*':
            case '/':
            case '%':
            case '^':
                while (!isempty() && priority(st
ack[top]) > priority(symbol))
                    prefix[p++] = pop();
                push(symbol);
                break;
            default: /*if an operand comes*/
                prefix[p++] = symbol;
            }
        }
    }
    while (!isempty())
        prefix[p++] = pop();
    prefix[p] = '\0'; /*End prefix with'\0' to m
ake it a string*/

    for (i = 0, j = p - 1; i < j; i++, j--)
    {
        temp = prefix[i];
        prefix[i] = prefix[j];
        prefix[j] = temp;
    }
} /*End of infix_to_prefix()*/

/* This function returns the priority of the ope
rator */
int priority(char symbol)
{
    switch (symbol)
    {
    case ')':
        return 0;
    case '+':
    case '-':
        return 1;
    case '*':
    case '/':
    case '%':
        return 2;
    case '^':
        return 3;
    default:
        return 0;
    } /*End of switch*/
} /*End of priority()*/

void push(long int symbol)
{
    if (top > MAX)
    {
        printf("Stack overflow\n");
        exit(1);
    }
    else
    {
        top = top + 1;
        stack[top] = symbol;
    }
} /*End of push()*/

long int pop()
{
    if (top == -1)
    {
        printf("Stack underflow \n");
        exit(2);
    }
    return (stack[top--]);
} /*End of pop()*/
int isempty()
{
    if (top == -1)
```

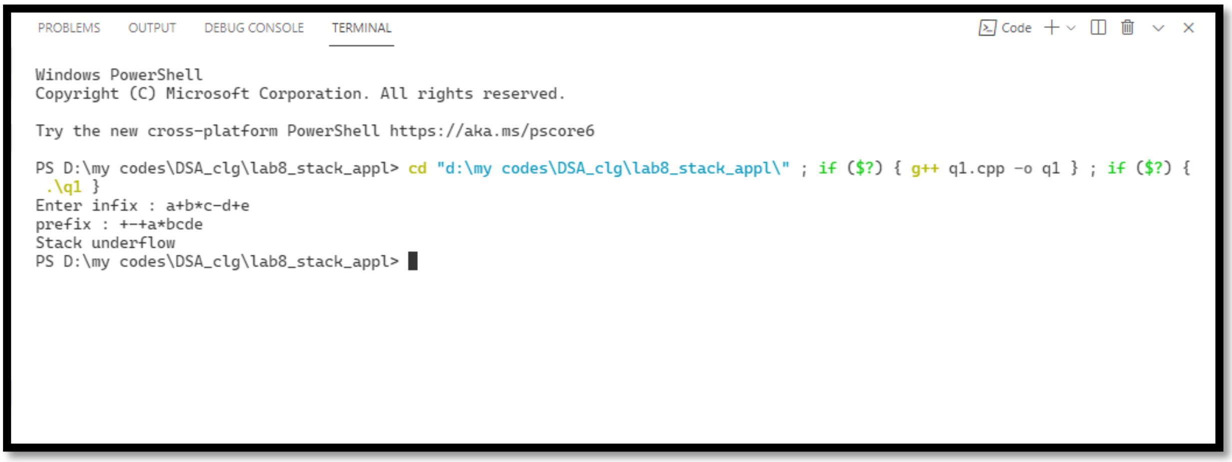
```
        return 1;
    else
        return 0;
}

int white_space(char symbol)
{
    if (symbol == BLANK || symbol == TAB || symb
ol == '\0')
        return 1;
    else
        return 0;
} /*End of white_space()*/

long int eval_pre()
{
    long int a, b, temp, result;
    int i;

    for (i = strlen(prefix) - 1; i >= 0; i--)
    {
        if (prefix[i] <= '9' && prefix[i] >= '0'
)
            push(prefix[i] - 48);
        else
        {
            b = pop();
            a = pop();
            switch (prefix[i])
            {
            case '+':
                temp = b + a;
                break;
            case '-':
                temp = b - a;
                break;
            case '*':
                temp = b * a;
                break;
            case '/':
                temp = b / a;
                break;
            case '%':
                temp = b % a;
                break;
            case '^':
                temp = pow(b, a);
            }
            push(temp);
        }
    }
    result = pop();
    return result;
}
```

OUTPUT-1



```
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab8_stack_appl> cd "d:\my codes\DSA_clg\lab8_stack_appl\" ; if ($?) { g++ q1.cpp -o q1 } ; if ($?) {
 .\q1 }
Enter infix : a+b*c-d+e
prefix : +-+a*bcde
Stack underflow
PS D:\my codes\DSA_clg\lab8_stack_appl> █
```
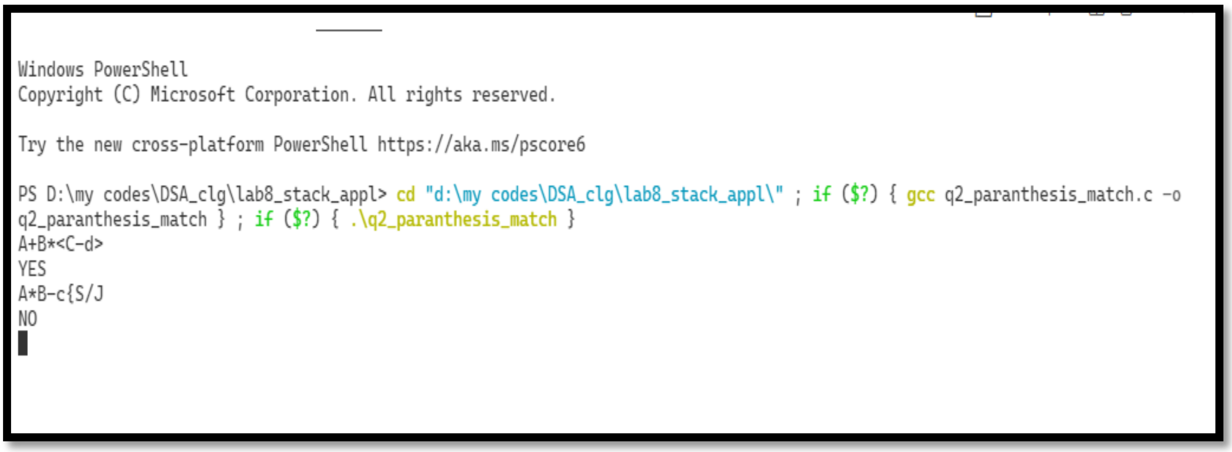

```
/* 2. Two brackets are considered to be a matche
d pair if the an opening bracket
(i.e., (, [, or { ) occurs to the left of a clos
ing bracket (i.e., ), ], or })
 of the exact same type. There are three types o
f matched pairs of brackets: [], {}, and (). A m
atching pair of brackets is not balanced if the
set of brackets it encloses are not matched. WAP
 to determine whether the input sequence of brac
kets is balanced or not. If a string is balanced
, it print YES on a new line; otherwise, print N
O on a new line.
Example: Input: {[()]} and Output: YES
Input: {[(])} and Output: NO
*/
#include <stdio.h>
#include <string.h>
#include <math.h>
#include <stdlib.h>
int same(char a,char b)
    {
    if(a=='['&& b==']')
        return 1;
    if(a=='{'&& b=='}')
        return 1;
    if(a=='('&& b==')')
        return 1;
    return 0;
}
int check(char *a)
    {
    char stack[1001],top=-1;
        for(int j=0;j<strlen(a);j++)
            {
         if(a[j]=='['||a[j]=='{'||a[j]=='(')
              stack[++top]=a[j];
           if(a[j]==']'||a[j]=='}'||a[j]==')')
               {
               if(top==-1)
                   {
               return 0;
               }
               else
                   {
                   if(!same(stack[top--],a[j]))
                       {
               return 0;
               }
           }
        }
}
    if(top!=-1)
                {
               return 0;
            }
    return 1;
```

```
}
int main() {
char a[1001];
    int n,valid;
    scanf("%d",&n);
     for(int i=0;i<n;i++)
        {
     scanf("%s",a);
         valid = check(a);
         if(valid==1)
             printf("YES\n");
    else
        printf("NO\n");
     }
    return 0;
}
```

OUTPUT-2



```
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab8_stack_appl> cd "d:\my codes\DSA_clg\lab8_stack_appl\" ; if ($?) { gcc q2_paranthesis_match.c -o
q2_paranthesis_match } ; if ($?) { .\q2_paranthesis_match }
A+B*<C-d>
YES
A*B-c{S/J
NO
```
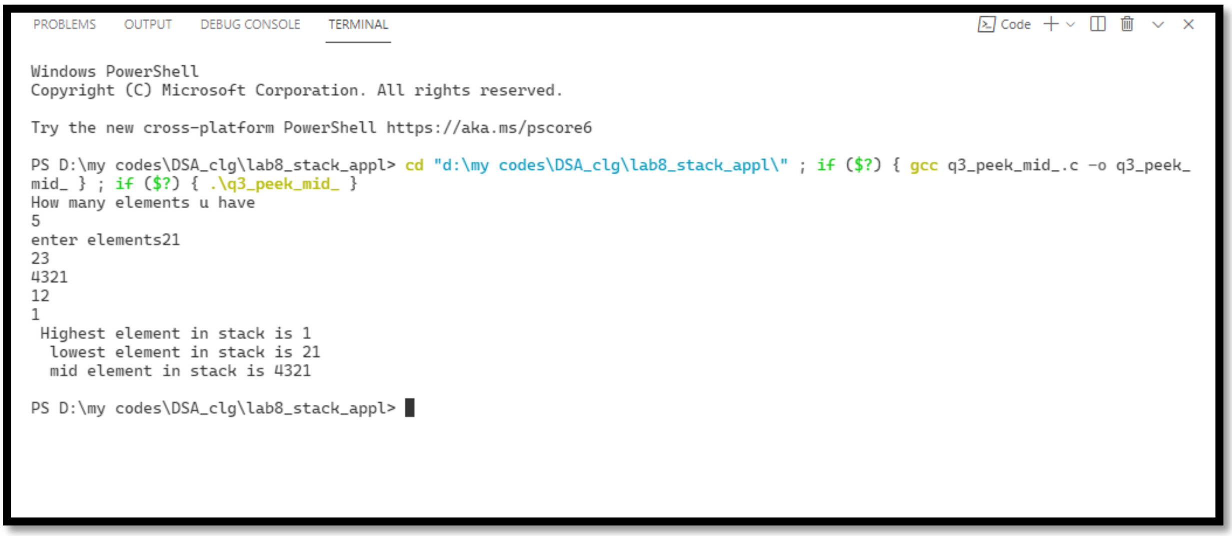

```
/*3. WAP to implement a stack which will support
 three additional operations in addition to push
 and pop.Those are
```

```
a) peekLowestElement - return the lowest element in the stack without removing it from the stack
b) peekHighestElement - return the highest element in the stack without removing it from the stack
c) peekMiddleElement - return the (size/2+1)th lowest element in the stack without removing it from the stack.
*/

#include <stdio.h>
#include <stdlib.h>

struct stack
{
    int size;
    int *s;
    int top;
};

void peek_hig(struct stack temp)
{


        if (temp.top != -1)
            printf(" Highest element in stack is %d\n " ,temp.s[temp.top]);

}

void peek_low(struct stack temp)
{
        while (temp.top != 0)
        {
          temp.top--;
        }
            printf(" lowest element in stack is
%d\n ",  temp.s[temp.top]);

}

void peek_mid(struct stack temp)
{

for (int i = 0; i < temp.size/2; i++)
{
     temp.top--;
}


            printf(" mid element in stack is %d\
n ",  temp.s[temp.top]);

}
int main()
{
    struct stack st;
    printf("How many elements u have\n");
    scanf("%d", &st.size);
    st.top = -1;
    st.s = (int *)malloc(sizeof(st.size));
    printf("enter elements");
    for (int i = 0; i < st.size; i++)
    {
        st.top++;
        scanf("%d", &st.s[st.top]);
    }

    peek_hig(st);
    peek_low(st);
    peek_mid(st);

    return 0;
}
```

OUTPUT-3



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab8_stack_appl> cd "d:\my codes\DSA_clg\lab8_stack_appl\" ; if ($?) { gcc q3_peek_mid_.c -o q3_peek_
mid_ } ; if ($?) { .\q3_peek_mid_ }
How many elements u have
5
enter elements21
23
4321
12
1
 Highest element in stack is 1
  lowest element in stack is 21
  mid element in stack is 4321

PS D:\my codes\DSA_clg\lab8_stack_appl> █
```

```
#include<stdio.h>
#include<stdlib.h>
struct stack
{
    int size;
    int top;
    int *s;
};
```

```
void create_stack(struct stack *st,int n)
{
    st->size=n;
    st->top=-1;
    st->s=(int *)malloc((st->size)*sizeof(int));
}

int isEmpty(struct stack *st)
{
    if(st->top==-1)
       return 1;
    else
       return 0;
}

void push(struct stack *st, int x)
{
        st->top++;
        st->s[st->top]=x;
}

int pop(struct stack *st)
{
    int x=-1;
    if(!isEmpty(st))
        x=st->s[st->top--];
    return x;
}

void display(struct stack st)
{
    int i;
    if(isEmpty(&st))
```

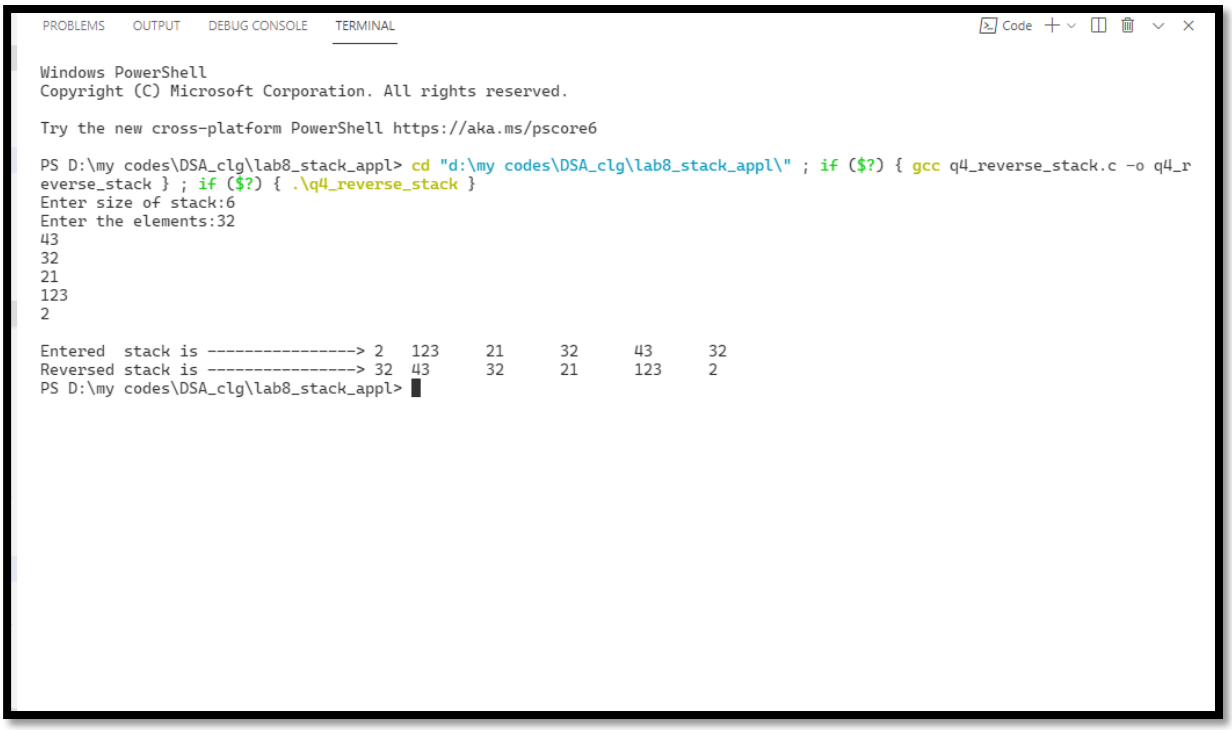
```
        printf("Stack is empty");
    else
    {
        for(i=st.top;i>=0;--i)
            printf("%d\t",st.s[i]);
    }
}

void Reverse(struct stack *st,struct stack *stNe
w)
{
       int i;
       for(i=st->top;i>=0;i--)
          push(stNew,pop(st));
}

int main()
{
    struct stack S,SNew;
    int n,i,x;
    printf("Enter size of stack:");
    scanf("%d",&n);
    create_stack(&S,n);
    printf("Enter the elements:");
    for(i=0;i<n;i++)
    {
                    scanf("%d",&x);
                    push(&S,x);
    }
    printf("\nEntered  stack is ----------------
> ");
    display(S);
    create_stack(&SNew,n);
    Reverse(&S,&SNew);
    printf("\nReversed stack is ----------------
> ");
    display(SNew);

    return 0;
}
```

OUTPUT-4



```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\my codes\DSA_clg\lab8_stack_appl> cd "d:\my codes\DSA_clg\lab8_stack_appl\" ; if ($?) { gcc q4_reverse_stack.c -o q4_r
everse_stack } ; if ($?) { .\q4_reverse_stack }
Enter size of stack:6
Enter the elements:32
43
32
21
123
2

Entered  stack is ----------------> 2   123     21      32      43      32
Reversed stack is ----------------> 32  43      32      21      123     2
PS D:\my codes\DSA_clg\lab8_stack_appl> █
```