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ROLL NUMBER - 2005776

SUBJECT - DSA LAB 3

DATE - 17/8/2021

CLASS - B14

BRANCH - CSE

/*Addition , multiplication and display are include in a single program*/

Question1:
WAP to create an array that represents a polynomial expression with single variable (i.e. 5x7-3x5+x2+9) and display the polynomial by using user defined functions for creation , Display , addition of two polynomials and multiplication of the two polynomials.

```
#include <stdio.h>

void print(int poly[], int n);
void add(int A[], int B[], int m, int n);
void multi(int A[], int B[], int m, int n);

int main()
{

   int m, n;
   puts("Creation of Polynomial P");
   printf("Enter number of terms in poly1: ");
   scanf("%d", &m);
   puts("");
   int A[m];
   puts("Enter the terms in poly1 in increasing order :");
   for (int i = 0; i < m; ++i)
   {
      scanf("%d", &A[i]);
   }
   printf("Enter number of terms in poly2: ");
   scanf("%d", &n);
   puts("");
   int B[n];
   puts("Enter the terms in poly2 in increasing order :");
   for (int i = 0; i < n; ++i)
   {
      scanf("%d", &B[i]);
   }
   add(A, B, m, n);
   multi(A, B, m, n);
   return 0;
}
void print(int poly[], int n)
{
   for (int i = 0; i < n; i++)
   {
      printf("%d", poly[i]);
      if (i != 0)
         printf("x^%d", i);
      if (i != n - 1)
         printf(" + ");
   }
   puts("");
}
```

```
void add(int A[], int B[], int m, int n)
{
   int size = (m > n) ? m : n;

   int sum[size];
   if (m > n)
   {
      for (int i = 0; i < m; i++)
         sum[i] = A[i];

      for (int i = 0; i < n; i++)
         sum[i] += B[i];
   }
   else
   {
      for (int i = 0; i < n; i++)
         sum[i] = B[i];

      for (int i = 0; i < m; i++)
         sum[i] += A[i];
   }
   puts("The addition of polynomial is :");
   print(sum, size);
}
void multi(int A[], int B[], int m, int n)
{
   int size = m + n - 1;
   int P[size];

   for (int i = 0; i < size; i++)
      P[i] = 0;

   for (int i = 0; i < m; i++)
   {
      for (int j = 0; j < n; j++)
         P[i + j] += A[i] * B[j];
   }
   puts("The multiplication of polynomial is :");
   print(P, size);
}
```

```
PS D:\KIIT_NOTES\2nd year sem_3\dsa_lab\17_8_2021> ./polyAdd
Creation of Polynomial P
Enter number of terms in poly1: 3

Enter the terms in poly1 in increasing order :
1 2 3
Enter number of terms in poly2: 4

Enter the terms in poly2 in increasing order :
5 6 7 8
The addition of polynomial is :
6 + 8x^1 + 10x^2 + 8x^3
The multiplication of polynomial is :
5 + 16x^1 + 34x^2 + 40x^3 + 37x^4 + 24x^5
PS D:\KIIT_NOTES\2nd year sem_3\dsa_lab\17_8_2021>
```

Question2:
A matrix m × n that has relatively few non-zero entries is called sparse matrix. WAP to represent a sparse matrix in 3-tuple format by using array.

```
#include <stdio.h>

int main()
{
   int r, c;
   int count = 0;
   puts("Enter the number of rows and columns :");
   scanf("%d%d", &r, &c);
   int arr[r][c];
   int numEle = r * c;

   puts("Enter the elements of the matrix :");
   for (int i = 0; i < r; ++i)
   {
      for (int j = 0; j < c; ++j)
      {
         scanf("%d", &arr[i][j]);
         if (arr[i][j] == 0)
            count++;
      }
   }
   //printing the entered matrix
   puts("printing the entered matrix :");
   for (int i = 0; i < r; ++i)
   {
      for (int j = 0; j < c; ++j)
      {
         printf("%d ", arr[i][j]);
      }
      puts("");
   }

   //check for sparse matrix

   if (count < 0.5 * numEle)
   {
      puts("The entered matrix is not a sparse matrix ");
   }
   else
   {
      printf("ROW\tCOLUMN\tELEMENT\n");

      for (int i = 0; i < r; ++i)
      {
         for (int j = 0; j < c; ++j)
         {

            if (arr[i][j] != 0)
            {
               printf("%d \t %d \t %d \n", i, j, arr[i][j]);
```

```
        }
      }
    }
  }

  return 0;
}
```

```
PS D:\KIIT_NOTES\2nd year sem_3\dsa_lab\17_8_2021> ./sparseMatrix
Enter the number of rows and columns :
2 4
Enter the elements of the matrix :
1 0 2 0
0 4 0 0
printing the entered matrix :
1 0 2 0
0 4 0 0
ROW     COLUMN  ELEMENT
0        0       1
0        2       2
1        1       4
PS D:\KIIT_NOTES\2nd year sem_3\dsa_lab\17_8_2021>
```