C Programming Exercises: Array
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Problem 1

Write a program in C to count a total number of duplicate elements in an array.

```c
#include <stdio.h>
void main()
{
    int arr1[100];
    int arr2[100];
    int arr3[100];
    int n,mm=1,ctr=0;
    int i, j;

       printf("\n\nCount total number of duplicate elements in an array:\n");
       printf("-----------------------------------------------------------\n");

       printf("Input the number of elements to be stored in the array :");
       scanf("%d",&n);

       printf("Input %d elements in the array :\n",n);
       for(i=0;i<n;i++)
        {
          printf("element - %d : ",i);
          scanf("%d",&arr1[i]);
        }
/*------------------ copy in other array ------------------------------------*/
        for(i=0;i<n; i++)
        {
        arr2[i]=arr1[i];
        arr3[i]=0;
        }
/*-------------------- mark the elements are duplicate -------------------------*/
    for(i=0;i<n; i++)
        {
        for(j=0;j<n;j++)
            {
                if(arr1[i]==arr2[j])
                {
                arr3[j]=mm;
                mm++;
                }
            }
            mm=1;
        }
/*---------------- Prints the array ------------------------------------*/
   for(i=0; i<n; i++)
    {
      if(arr3[i]==2){ctr++;}
    }
      printf("The total number of duplicate elements found in the array is: %d \n", ctr);

      printf("\n\n");
}
```

Problem 2

Write a program in C to print all unique elements in an array.

```c
#include <stdio.h>
int main()
{
    int arr1[100], n,ctr=0;
    int i, j, k;
       printf("\n\nPrint all unique elements of an array:\n");
       printf("-----------------------------------------\n");
       printf("Input the number of elements to be stored in the array: ");
       scanf("%d",&n);
       printf("Input %d elements in the array :\n",n);
       for(i=0;i<n;i++)
            {
```

```
13            printf("element - %d : ",i);
14            scanf("%d",&arr1[i]);
15          }
16      printf("\nThe unique elements found in the array are: \n");
17      for(i=0; i<n; i++)
18      {
19          ctr=0;
20          for(j=0,k=n; j<k+1; j++)
21          {
22              /*Increment the counter when the seaarch value is duplicate.*/
23              if (i!=j)
24              {
25                 if(arr1[i]==arr1[j])
26                {
27                   ctr++;
28                }
29               }
30          }
31         if(ctr==0)
32          {
33            printf("%d ",arr1[i]);
34          }
35      }
36         printf("\n\n");
37  }
```

Problem 3

Write a program in C to merge two arrays of same size sorted in decending order.

```
1  #include <stdio.h>
2
3  void main()
4  {
5      int arr1[100], arr2[100], arr3[200];
6      int s1, s2, s3;
7      int i, j, k;
8         printf("\n\nMerge two arrays of same size sorted in decending order.\n");
9         printf("-----------------------------------------------------------\n");
10
11        printf("Input the number of elements to be stored in the first array :");
12        scanf("%d",&s1);
13
14        printf("Input %d elements in the array :\n",s1);
15        for(i=0;i<s1;i++)
16             {
17           printf("element - %d : ",i);
18           scanf("%d",&arr1[i]);
19         }
20
21
22        printf("Input the number of elements to be stored in the second array :");
23        scanf("%d",&s2);
24
25        printf("Input %d elements in the array :\n",s2);
26        for(i=0;i<s2;i++)
27             {
28           printf("element - %d : ",i);
29           scanf("%d",&arr2[i]);
30         }
31
32      /* size of merged array is size of first array and  size of second array */
33      s3 = s1 + s2;
34  /*----------------- insert in the third array-----------------------------------*/
35      for(i=0;i<s1; i++)
36          {
37              arr3[i] = arr1[i];
38           }
39       for(j=0;j<s2; j++)
40          {
41              arr3[i] = arr2[j];
42              i++;
43          }
44  /*----------------- sort the array in decending order --------------------------*/
```

```
    for(i=0;i<s3; i++)
         {
            for(k=0;k<s3-1;k++)
              {

                  if(arr3[k]<=arr3[k+1])
                   {
                     j=arr3[k+1];
                     arr3[k+1]=arr3[k];
                     arr3[k]=j;
                   }
               }
          }

/*---------------- Prints the merged array ----------------------------------*/
      printf("\nThe merged array in decending order is :\n");
     for(i=0; i<s3; i++)
     {
         printf("%d   ", arr3[i]);
     }
     printf("\n\n");
}
```

Problem 4

Write a program in C to count the frequency of each element of an array.

```
#include <stdio.h>

void main()
{
    int arr1[100], fr1[100];
    int n, i, j, ctr;


       printf("\n\nCount frequency of each element of an array:\n");
       printf("-------------------------------------------------\n");

       printf("Input the number of elements to be stored in the array :");
       scanf("%d",&n);

       printf("Input %d elements in the array :\n",n);
       for(i=0;i<n;i++)
            {
          printf("element - %d : ",i);
          scanf("%d",&arr1[i]);
          fr1[i] = -1;
        }
    for(i=0; i<n; i++)
    {
        ctr = 1;
        for(j=i+1; j<n; j++)
        {
            if(arr1[i]==arr1[j])
            {
                ctr++;
                fr1[j] = 0;
            }
        }

        if(fr1[i]!=0)
        {
            fr1[i] = ctr;
        }
    }
    printf("\nThe frequency of all elements of array : \n");
    for(i=0; i<n; i++)
    {
        if(fr1[i]!=0)
        {
            printf("%d occurs %d times\n", arr1[i], fr1[i]);
        }
    }
}
```

Problem 5

Write a program in C to separate odd and even integers in separate arrays.

```c
#include <stdio.h>

void main()
 {
    int arr1[10], arr2[10], arr3[10];
    int i,j=0,k=0,n;
       printf("\n\nSeparate odd and even integers in separate arrays:\n");
       printf("-------------------------------------------------------\n");

       printf("Input the number of elements to be stored in the array :");
       scanf("%d",&n);

       printf("Input %d elements in the array :\n",n);
       for(i=0;i<n;i++)
            {
          printf("element - %d : ",i);
          scanf("%d",&arr1[i]);
        }

    for(i=0;i<n;i++)
    {
    if (arr1[i]%2 == 0)
    {
       arr2[j] = arr1[i];
       j++;
    }
    else
    {
       arr3[k] = arr1[i];
       k++;
    }
    }

    printf("\nThe Even elements are : \n");
    for(i=0;i<j;i++)
    {
    printf("%d ",arr2[i]);
    }

    printf("\nThe Odd elements are :\n");
    for(i=0;i<k;i++)
    {
    printf("%d ", arr3[i]);
    }
    printf("\n\n");
 }
```

Problem 6

Write a program in C to find the second largest element in an array.

```c
#include <stdio.h>

void main(){
  int arr1[50],n,i,j=0,lrg,lrg2nd;

       printf("\n\nFind the second largest element in an array :\n");
       printf("-------------------------------------------------\n");

       printf("Input the size of array : ");
       scanf("%d", &n);
    /* Stored values into the array*/
       printf("Input %d elements in the array :\n",n);
       for(i=0;i<n;i++)
            {
          printf("element - %d : ",i);
          scanf("%d",&arr1[i]);
```

```
        }
/* find location of the largest element in the array */
//   lrg=arr1[0];
   lrg=0;
  for(i=0;i<n;i++)
  {
      if(lrg<arr1[i])
      {
           lrg=arr1[i];
           j = i;
      }
  }

/* ignore the largest element and find the 2nd largest element in the array */
   lrg2nd=0;
  for(i=0;i<n;i++)
  {
     if(i==j)
        {
          i++;  /* ignoring the largest element */
          i--;
        }
      else
        {
          if(lrg2nd<arr1[i])
         {
               lrg2nd=arr1[i];
            }
        }
  }

  printf("The Second largest element in the array is :  %d \n\n", lrg2nd);
}
```

Problem 7

Write a program in C to find the second smallest element in an array.

```
#include <stdio.h>

void main()
{
  int arr1[50],n,i,j=0,sml,sml2nd;

       printf("\n\nFind the second smallest element in an array :\n");
       printf("-------------------------------------------------\n");

       printf("Input the size of array : ");
       scanf("%d", &n);
    /* Stored values into the array*/
       printf("Input %d elements in the array (value must be <9999) :\n",n);
       for(i=0;i<n;i++)
            {
          printf("element - %d : ",i);
          scanf("%d",&arr1[i]);
        }
/* find location of the smallest element in the array */
   sml=arr1[0];
  for(i=0;i<n;i++)
  {
      if(sml>arr1[i])
      {
           sml=arr1[i];
           j = i;
      }
  }

/* ignore the smallest element and find the 2nd smallest element in the array */
   sml2nd=99999;
  for(i=0;i<n;i++)
  {
     if(i==j)
        {
```

```
36            i++;  /* ignoring the smallest element */
37            i--;
38          }
39        else
40          {
41            if(sml2nd>arr1[i])
42           {
43                  sml2nd=arr1[i];
44              }
45          }
46    }
47
48    printf("The Second smallest element in the array is :  %d \n\n", sml2nd);
49 }
```

Problem 8

Write a program in C for addition of two Matrices of same size.

```
1  #include <stdio.h>
2  void main()
3  {
4    int arr1[50][50],brr1[50][50],crr1[50][50],i,j,n;
5
6          printf("\n\nAddition of two Matrices :\n");
7          printf("------------------------------\n");
8           printf("Input the size of the square matrix (less than 5): ");
9          scanf("%d", &n);
10
11      /* Stored values into the array*/
12         printf("Input elements in the first matrix :\n");
13         for(i=0;i<n;i++)
14          {
15              for(j=0;j<n;j++)
16              {
17                 printf("element - [%d],[%d] : ",i,j);
18                 scanf("%d",&arr1[i][j]);
19              }
20          }
21
22         printf("Input elements in the second matrix :\n");
23         for(i=0;i<n;i++)
24          {
25              for(j=0;j<n;j++)
26              {
27                 printf("element - [%d],[%d] : ",i,j);
28                 scanf("%d",&brr1[i][j]);
29              }
30          }
31     printf("\nThe First matrix is :\n");
32    for(i=0;i<n;i++)
33      {
34        printf("\n");
35        for(j=0;j<n;j++)
36             printf("%d\t",arr1[i][j]);
37      }
38
39    printf("\nThe Second matrix is :\n");
40    for(i=0;i<n;i++)
41      {
42        printf("\n");
43        for(j=0;j<n;j++)
44        printf("%d\t",brr1[i][j]);
45      }
46 /* calculate the sum of the matrix */
47     for(i=0;i<n;i++)
48          for(j=0;j<n;j++)
49               crr1[i][j]=arr1[i][j]+brr1[i][j];
50     printf("\nThe Addition of two matrix is : \n");
51     for(i=0;i<n;i++){
52          printf("\n");
53          for(j=0;j<n;j++)
54               printf("%d\t",crr1[i][j]);
55     }
```

```
56    printf("\n\n");
57 }
```

Problem 9: nâng cao

Write a program in C for multiplication of two square Matrices.

```
#include <stdio.h>

void main()
{
  int arr1[50][50],brr1[50][50],crr1[50][50],i,j,k,r1,c1,r2,c2,sum=0;

       printf("\n\nMultiplication of two Matrices :\n");
       printf("-----------------------------------\n");

  printf("\nInput the rows and columns of first matrix : ");
  scanf("%d %d",&r1,&c1);
  printf("\nInput the rows and columns of second matrix : ");
  scanf("%d %d",&r2,&c2);
  if(c1!=r2){
      printf("Mutiplication of Matrix is not possible.");
      printf("\nColumn of first matrix and row of second matrix must be same.");
  }
  else
      {
       printf("Input elements in the first matrix :\n");
       for(i=0;i<r1;i++)
        {
            for(j=0;j<c1;j++)
            {
               printf("element - [%d],[%d] : ",i,j);
               scanf("%d",&arr1[i][j]);
            }
        }
       printf("Input elements in the second matrix :\n");
       for(i=0;i<r2;i++)
        {
            for(j=0;j<c2;j++)
            {
               printf("element - [%d],[%d] : ",i,j);
               scanf("%d",&brr1[i][j]);
            }
        }
     printf("\nThe First matrix is :\n");
        for(i=0;i<r1;i++)
            {
            printf("\n");
            for(j=0;j<c1;j++)
            printf("%d\t",arr1[i][j]);
            }

    printf("\nThe Second matrix is :\n");
        for(i=0;i<r2;i++)
            {
            printf("\n");
            for(j=0;j<c2;j++)
            printf("%d\t",brr1[i][j]);
            }
//multiplication of matrix
      for(i=0;i<r1;i++)
         for(j=0;j<c2;j++)
          crr1[i][j]=0;
            for(i=0;i<r1;i++)    //row of first matrix
                {
                  for(j=0;j<c2;j++)    //column of second matrix
                    {
                      sum=0;
                        for(k=0;k<c1;k++)
                          sum=sum+arr1[i][k]*brr1[k][j];
                          crr1[i][j]=sum;
                    }
                }
  printf("\nThe multiplication of two matrices is : \n");
```

```
  for(i=0;i<r1;i++)
     {
        printf("\n");
        for(j=0;j<c2;j++)
         {
           printf("%d\t",crr1[i][j]);
         }
     }
  }
printf("\n\n");
}
```

Write a program in C to find transpose of a given matrix.

```
#include <stdio.h>

void main()

  {
  int arr1[50][50],brr1[50][50],i,j,r,c;

       printf("\n\nTranspose of a Matrix :\n");
       printf("---------------------------\n");
       printf("\nInput the rows and columns of the matrix : ");
       scanf("%d %d",&r,&c);

       printf("Input elements in the first matrix :\n");
       for(i=0;i<r;i++)
        {
            for(j=0;j<c;j++)
            {
               printf("element - [%d],[%d] : ",i,j);
               scanf("%d",&arr1[i][j]);
            }
        }

    printf("\nThe matrix is :\n");
       for(i=0;i<r;i++)
            {
            printf("\n");
            for(j=0;j<c;j++)
            printf("%d\t",arr1[i][j]);
            }

  for(i=0;i<r;i++)
     {
      for(j=0;j<c;j++)
            {
                   brr1[j][i]=arr1[i][j];
            }
      }

      printf("\n\nThe transpose of a matrix is : ");
      for(i=0;i<c;i++){
      printf("\n");
      for(j=0;j<r;j++){
           printf("%d\t",brr1[i][j]);
      }
  }
      printf("\n\n");
}
```

Problem 10

Write a program in C to find sum of right diagonals of a matrix.

```
#include <stdio.h>

void main()

   {
     int i,j,arr1[50][50],sum=0,n;

       printf("\n\nFind sum of right diagonals of a matrix :\n");
       printf("----------------------------------------\n");
```

```
10
11      printf("Input the size of the square matrix : ");
12      scanf("%d", &n);
13      printf("Input elements in the first matrix :\n");
14        for(i=0;i<n;i++)
15         {
16              for(j=0;j<n;j++)
17              {
18                 printf("element - [%d],[%d] : ",i,j);
19                 scanf("%d",&arr1[i][j]);
20                 if (i==j) sum= sum+arr1[i][j];
21              }
22         }
23
24
25      printf("The matrix is :\n");
26      for(i=0;i<n;i++)
27      {
28        for(j=0;j<n ;j++)
29          printf("% 4d",arr1[i][j]);
30         printf("\n");
31      }
32
33        printf("Addition of the right Diagonal elements is :%d\n",sum);
34     }
```

Problem 11

Write a program in C to print or display the lower/upper triangular of a given matrix.

```
1  #include <stdio.h>
2
3  void main()
4     {
5    int arr1[10][10],i,j,n;
6    float determinant=0;
7
8
9         printf("\n\nDisplay the lower triangular of a given matrix :\n");
10        printf("-------------------------------------------------------\n");
11
12
13      printf("Input the size of the square matrix : ");
14      scanf("%d", &n);
15      printf("Input elements in the first matrix :\n");
16        for(i=0;i<n;i++)
17         {
18              for(j=0;j<n;j++)
19              {
20                 printf("element - [%d],[%d] : ",i,j);
21                 scanf("%d",&arr1[i][j]);
22              }
23         }
24      printf("The matrix is :\n");
25      for(i=0;i<n;i++)
26      {
27        for(j=0;j<n ;j++)
28          printf("% 4d",arr1[i][j]);
29         printf("\n");
30      }
31
32     printf("\nSetting zero in lower triangular matrix\n");
33     for(i=0;i<n;i++){
34        printf("\n");
35        for(j=0;j<n;j++)
36             if(i<=j)
37               printf("% 4d",arr1[i][j]);
38             else
39               printf("% 4d",0);
40    }
41         printf("\n\n");
42  }
```

Problem 12

Write a program in C to calculate determinant of a 3×3 matrix.

```c
#include <stdio.h>

void main()
   {
  int arr1[10][10],i,j,n;
  int det=0;


       printf("\n\nCalculate the determinant of a 3 x 3 matrix :\n");
       printf("-------------------------------------------------\n");

     printf("Input elements in the first matrix :\n");
       for(i=0;i<3;i++)
        {
            for(j=0;j<3;j++)
            {
               printf("element - [%d],[%d] : ",i,j);
               scanf("%d",&arr1[i][j]);
            }
        }
     printf("The matrix is :\n");
     for(i=0;i<3;i++)
     {
       for(j=0;j<3 ;j++)
         printf("% 4d",arr1[i][j]);
        printf("\n");
     }

  for(i=0;i<3;i++)
      det = det + (arr1[0][i]*(arr1[1][(i+1)%3]*arr1[2][(i+2)%3] - arr1[1][(i+2)%3]*arr1[
          2][(i+1)%3]));

  printf("\nThe Determinant of the matrix is: %d\n\n",det);
}
```

Problem 13

Write a program in C to accept two matrices and check whether they are equal.

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


void main()
{
   int arr1[50][50], brr1[50][50];
   int i, j, r1, c1, r2, c2, flag =1;

       printf("\n\nAccept two matrices and check whether they are equal :\n ");
       printf("-------------------------------------------------------------\n");

   printf("Input Rows and Columns of the 1st matrix :");
   scanf("%d %d", &r1, &c1);

   printf("Input Rows and Columns of the 2nd matrix :");
   scanf("%d %d", &r2,&c2);
     printf("Input elements in the first matrix :\n");
       for(i=0;i<r1;i++)
        {
            for(j=0;j<c1;j++)
            {
               printf("element - [%d],[%d] : ",i,j);
               scanf("%d",&arr1[i][j]);
            }
        }
       printf("Input elements in the second matrix :\n");
       for(i=0;i<r2;i++)
        {
            for(j=0;j<c2;j++)
            {
```

```
32                 printf("element - [%d],[%d] : ",i,j);
33                 scanf("%d",&brr1[i][j]);
34              }
35          }
36       printf("The first matrix is :\n");
37       for(i=0;i<r1;i++)
38       {
39         for(j=0;j<c1 ;j++)
40           printf("% 4d",arr1[i][j]);
41          printf("\n");
42       }
43       printf("The second matrix is :\n");
44       for(i=0;i<r2;i++)
45       {
46         for(j=0;j<c2 ;j++)
47           printf("% 4d",brr1[i][j]);
48          printf("\n");
49       }
50    /* Comparing two matrices for equality */
51
52    if(r1 == r2 && c1 == c2)
53    {
54          printf("The Matrices can be compared : \n");
55          for(i=0; i<r1; i++)
56          {
57               for(j=0; j<c2; j++)
58               {
59               if(arr1[i][j] != brr1[i][j])
60               {
61                    flag = 0;
62                    break;
63               }
64               }
65          }
66     }
67     else
68     {  printf("The Matrices Cannot be compared :\n");
69        exit(1);
70     }
71     if(flag == 1 )
72     printf("Two matrices are equal.\n\n");
73     else
74     printf("But,two matrices are not equal\n\n");
75 }
```

Problem 14

Write a program in C to find a pair with given sum in the array.

```
1  #include <stdio.h>
2  void checkForSum (int arr1[], int n, int s)
3  {
4      // read upto to the last element - 1
5      for (int i = 0; i < n - 1; i++)
6      {
7         // read i'th element to last element
8          for (int j = i + 1; j < n; j++)
9          {
10              // if given sum is found
11              if (arr1[i] + arr1[j] == s)
12              {
13                  printf("Pair of elements can make the given sum by the value of index %d
                        and %d", i, j);
14                  return;
15              }
16          }
17     }
18     printf("No Pair can make the given sum.");
19 }
20
21 int main()
22 {
23     int arr1[] = { 6, 8, 4, -5, 7, 9 };
24     int s = 15;
```

```
    printf("The given array : ");
    int n = sizeof(arr1)/sizeof(arr1[0]);
     for (int i = 0; i <= n - 1; i++)
    {
    printf("%d  ",arr1[i]);
    }
    printf("\nThe given sum : %d\n",s);
    printf("\n");
    checkForSum(arr1, n, s);
    return 0;
}
```

Problem 15

Write a program in C to find the missing number from a given array. There are no duplicates in list. Expected Output : the given array is : 1 3 4 2 5 6 9 8 -> The missing number is : 7

```
#include <stdio.h>

int pickMissNumber(int *arr1, int ar_size)
{
    int i, sum = 0, n = ar_size + 1;
    for(i = 0; i < ar_size; i++)
    {
        sum = sum + arr1[i];
    }

    return (n*(n+1))/2 - sum;
}

int main()
{
    int i;
    int arr1[] = {1, 3, 4, 2, 5, 6, 9, 8};

    int ctr = sizeof(arr1)/sizeof(arr1[0]);
    printf("The given array is :  ");

    for(i = 0; i < ctr; i++)
    {
    printf("%d  ", arr1[i]);
    }
    printf("\n");

 printf("The missing number is : %d \n", pickMissNumber(arr1, ctr));
 return 0;
}
```

Problem 16

Write a program in C to count the number of triangles can be fromed from a given array.

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

int compare(const void* one, const void* two)
{
    return *(int*)one > *(int*)two;
}
int CountNumberOfTriangles (int *arr1, int arr_size)
{
    int ctrTriangle = 0, i, j, k;
    qsort(arr1, arr_size, sizeof(int), compare);

    for(i = 0; i < arr_size-2; ++i)
    {

        for (j = i+1; j < arr_size; ++j)
        {
            k = j +1;
            while (k < arr_size && (arr1[i] + arr1[j])> arr1[k])
            {
```

```
21              k++;
22             }
23             ctrTriangle += k - j - 1;
24         }
25     }
26     return ctrTriangle;
27 }
28 int main()
29 {
30     int arr1[] =  {6, 18, 9, 7, 10};
31     int n = sizeof(arr1)/sizeof(arr1[0]);
32     int i;
33  //------------- print original array ------------------
34     printf("The given array is :  ");
35     for(i = 0; i < n; i++)
36     {
37     printf("%d  ", arr1[i]);
38     }
39     printf("\n");
40 //-----------------------------------------------------
41     printf("Number of possible triangles can be formed from the array is: %d\n",
42            CountNumberOfTriangles(arr1, n));
43     return 0;
44 }
```

Problem 17

Write a program in C to check whether an array is subset of another array.

```
1  #include <stdio.h>
2  int chkSubsetArray(int *arr1 , int arr1_size, int *arr2, int arr2_size)
3  {
4      int i, j;
5      for (i = 0; i < arr2_size; i++)
6      {
7          for (j = 0; j < arr1_size; j++)
8          {
9             if(arr2[i] == arr1[j])
10               break;
11         }
12         if(j == arr1_size)
13            return 0;
14     }
15     return 1;
16 }
17 int main()
18 {
19     int arr1[] = {4, 8, 7, 11, 6, 9, 5, 0, 2};
20     int arr2[] = {5, 4, 2, 0, 6};
21     int n1 = sizeof(arr1)/sizeof(arr1[0]);
22     int i;
23     int n2 = sizeof(arr2)/sizeof(arr2[0]);
24  //------------- print first array ------------------
25     printf("The given first array is :  ");
26     for(i = 0; i < n1; i++)
27     {
28     printf("%d  ", arr1[i]);
29     }
30     printf("\n");
31  //------------- print second array ------------------
32     printf("The given second array is :  ");
33     for(i = 0; i < n2; i++)
34     {
35     printf("%d  ", arr2[i]);
36     }
37     printf("\n");
38 //-----------------------------------------------------
39     if(chkSubsetArray(arr1, 9, arr2, 4))
40       printf("The second array is the subset of first array.");
41     else
42       printf("The second array is not a subset of first array");
43
44     return 0;
45 }
```

Problem 18

Write a program in C to move all zeroes to the end of a given array.

```c
#include <stdio.h>

void PickOutZeros (int *arr1, int arr_size)
{
    int tmp, lft = 0, rgt = arr_size-1;
    while(rgt > lft)
    {
     while(arr1[lft] != 0)
         lft++;
     while(arr1[rgt] == 0)
         rgt--;
     if(lft < rgt)
     {
            tmp = arr1[lft];
            arr1[lft] = arr1[rgt];
            arr1[rgt] = tmp;
        }
    }
}

int main()
{
    int arr1[] = {2, 5, 7, 0, 4, 0, 7, -5, 8, 0};
   int n = sizeof(arr1)/sizeof(arr1[0]);
   int i;
    //------------- print original array ------------------
    printf("The given array is :  ");
    for(i = 0; i < n; i++)
    {
    printf("%d  ", arr1[i]);
    }
    printf("\n");
//-----------------------------------------------------
    PickOutZeros(arr1, n);
    printf("The new array is: \n");
    for(i = 0; i < n; i++)
    {
     printf("%d ", arr1[i]);
    }
    return 0;
}
```

Problem 19

Write a program in C to Count all possible paths from top left to bottom right of a $m \times n$

```c
#include <stdio.h>

int PathCounting(int m, int n)
{
    int ctr[m][n];
    for (int i = 0; i < m; i++)
        {
        ctr[i][0] = 1;
        }
    for (int j = 0; j < n; j++)
        {
        ctr[0][j] = 1;
        }
    for (int i = 1; i < m; i++)
    {
        for (int j = 1; j < n; j++)
            {
            ctr[i][j] = ctr[i-1][j] + ctr[i][j-1];
            }
    }
    return ctr[m-1][n-1];
```

```
22 }
23
24 int main()
25 {
26     int p,q;
27     p=4;
28     q=4;
29     printf("The size of matrix is : %d, %d\n",p,q);
30     printf("The all possible paths from top left to bottom right is: %d \n",PathCounting(
           p,q));
31 }
```