# DATA STRUCTURES AND ALGORITHM

## ASSIGNMENT 3

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## Exercise 2: Arrays and Sorting

## QUESTION:

Given a sequence of n numbers (real or integers), write an algorithm and the corresponding code to arrange the given n numbers are arranged in such a way that all the negative numbers (if any) are arranged in a descending order and all the positive numbers are arranged in an ascending order with zero (if it is in the input) appearing between the smallest negative number and the smallest positive number. If 7, 3, 2, 4 the output should be 2, 3, 4, 7. If −7, −3, 2, 4 the output should be −3, −7, 2, 4.

## ALGORITHM

(a,n)

{// a is an array of n elements(containing +ve and -ve numbers)

```
 for(int i =0; i<n; i++){   //for separating +ve and -ve numbers in 2 different arrays
    if(arr[i]>=0){
       pos[a] = arr[i];
       a++;
    }
    else{
       neg[b] = arr[i];
       b++;
    }
 }
 for (int i = 1; i < a; i++) //for arranging +ve numbers in given order
 {
    for (int j = i; j > 0; j--)
    {
       if(pos[j-1]>pos[j]){
          int temp = pos[j];
```

```
            pos[j] = pos[j-1];
            pos[j-1] = temp; }
      }


  }
  for (int i = 1; i < b; i++) //for arranging -ve numbers in given order
  {
     for (int j = i; j > 0; j--)
     {
        if(neg[j-1]<neg[j]){
            int temp = neg[j];
            neg[j] = neg[j-1];
            neg[j-1] = temp;
        }
     }
  }
}// end of algorithm
```

CODE:

```
#include <stdio.h>
int main(){
   int n;
   scanf("%d",&n);
   int arr[n];
   for(int i=0; i<n; i++){
      scanf("%d",&arr[i]);
   }
   int a=0, b=0;
   int pos[6];
   int neg[6];
```

```
for(int i =0; i<n; i++){
    if(arr[i]>=0){
        pos[a] = arr[i];
        a++;
    }
    else{
        neg[b] = arr[i];
        b++;
    }
}
for (int i = 1; i < a; i++)
{
    for (int j = i; j > 0; j--)
    {
        if(pos[j-1]>pos[j]){
            int temp = pos[j];
            pos[j] = pos[j-1];
            pos[j-1] = temp;
        }
    }
}

for (int i = 1; i < b; i++)
{
    for (int j = i; j > 0; j--)
    {
        if(neg[j-1]<neg[j]){
            int temp = neg[j];
            neg[j] = neg[j-1];
```

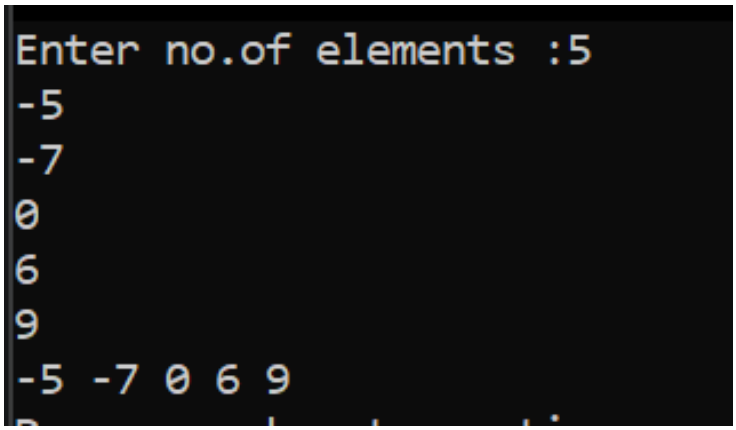
```
                neg[j-1] = temp;
            }
        }
    }

    for (int i = 0; i < b; i++)
    {
        printf("%d ",neg[i]);
    }
    for (int i = 0; i < a; i++)
    {
        printf("%d ",pos[i]);
    }
    return 0;
}
```

```c
#include <stdio.h>
int main(){
    int n;
    printf("Enter no.of elements :");
    scanf("%d",&n);
    int arr[n];

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

    int a=0, b=0;

    int pos[6];
    int neg[6];
    for(int i =0; i<n; i++){
        if(arr[i]>=0){
            pos[a] = arr[i];
            a++;
        }
        else{
            neg[b] = arr[i];
            b++;
        }
    }
```

```
    for (int i = 1; i < a; i++)
    {
        for (int j = i; j > 0; j--)
        {
            if(pos[j-1]>pos[j]){
                int temp = pos[j];
                pos[j] = pos[j-1];
                pos[j-1] = temp;
            }
        }
    }

    for (int i = 1; i < b; i++)
    {
        for (int j = i; j > 0; j--)
        {
            if(neg[j-1]<neg[j]){
                int temp = neg[j];
                neg[j] = neg[j-1];
                neg[j-1] = temp;
            }
        }
    }
```

```
    for (int i = 0; i < b; i++)
    {
        printf("%d ",neg[i]);
    }
    for (int i = 0; i < a; i++)
    {
        printf("%d ",pos[i]);
    }
    return 0;
}
```

OUTPUT:




QUESTION:

Given an array of n integers. Sort the elements in even index locations elements in ascending order and the odd positioned elements in the descending order. Apply Selection sort to sort the elements.

ALGORITHM

```
(a,n)
{// a is an array of n elements(containing even and odd numbers)
  for(int i =0; i<n; i++){ //for separating even and odd numbers in 2 different arrays
     if(arr[i]%2==0){
        even[a] = arr[i];
        a++;
     }
     else{
        odd[b] = arr[i];
        b++;
     }
   }
```

```
  for (int i = 1; i < a; i++) //for arranging even numbers in given order
  {
     for (int j = i; j > 0; j--)
     {
        if(even[j-1]>even[j]){
           int temp = even[j];
           even[j] = even[j-1];
           even[j-1] = temp;
        }
     }
  }
  for (int i = 1; i < b; i++) //for arranging -ve numbers in given order
  {
     for (int j = i; j > 0; j--)
     {
        if(odd[j-1]<odd[j]){
           int temp = odd[j];
           odd[j] = odd[j-1];
           odd[j-1] = temp;
        }
     }
  }
}// end of algorithm
```

CODE:

```
#include <stdio.h>
int main(){
   int n;
   printf("Enter no.of elements : ");
```

```
scanf("%d",&n);
int arr[n];

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

int a=0, b=0;

int even[6];
int odd[6];
for(int i =0; i<n; i++){
    if(arr[i]%2==0){
        even[a] = arr[i];
        a++;
    }
    else{
        odd[b] = arr[i];
        b++;
    }
}
for (int i = 1; i < a; i++)
{
    for (int j = i; j > 0; j--)
    {
        if(even[j-1]>even[j]){
            int temp = even[j];
            even[j] = even[j-1];
            even[j-1] = temp;
```

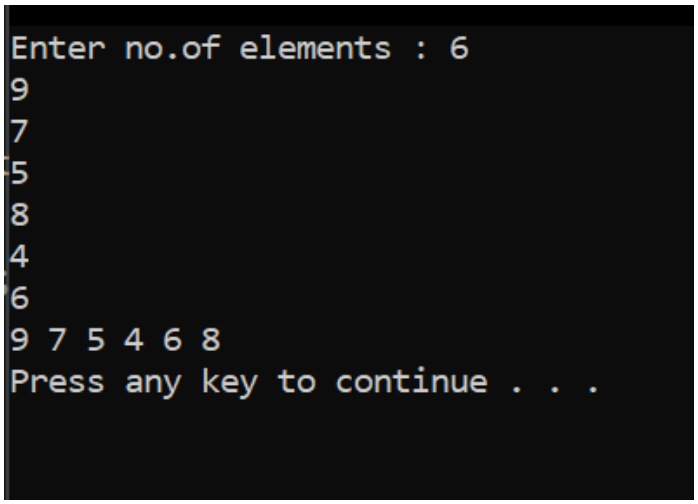
```
            }
        }
    }

    for (int i = 1; i < b; i++)
    {
        for (int j = i; j > 0; j--)
        {
            if(odd[j-1]<odd[j]){
                int temp = odd[j];
                odd[j] = odd[j-1];
                odd[j-1] = temp;
            }
        }
    }

    for (int i = 0; i < b; i++)
    {
        printf("%d ",odd[i]);
    }
    for (int i = 0; i < a; i++)
    {
        printf("%d ",even[i]);
    }
    return 0;
}
```

```c
#include <stdio.h>
int main(){
    int n;
    printf("Enter no.of elements : ");
    scanf("%d",&n);
    int arr[n];

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

    int a=0, b=0;

    int even[6];
    int odd[6];
    for(int i =0; i<n; i++){
        if(arr[i]%2==0){
            even[a] = arr[i];
            a++;
        }
        else{
            odd[b] = arr[i];
            b++;
        }
    }
```

```
    for (int i = 1; i < a; i++)
    {
        for (int j = i; j > 0; j--)
        {
            if(even[j-1]>even[j]){
                int temp = even[j];
                even[j] = even[j-1];
                even[j-1] = temp;
            }
        }
    }

    for (int i = 1; i < b; i++)
    {
        for (int j = i; j > 0; j--)
        {
            if(odd[j-1]<odd[j]){
                int temp = odd[j];
                odd[j] = odd[j-1];
                odd[j-1] = temp;
            }
        }
    }
```

```
    for (int i = 0; i < b; i++)
    {
        printf("%d ",odd[i]);
    }
    for (int i = 0; i < a; i++)
    {
        printf("%d ",even[i]);
    }
    return 0;
}
```

OUTPUT:


Enter no.of elements : 6
9
7
5
8
4
6
9 7 5 4 6 8
Press any key to continue . . .