

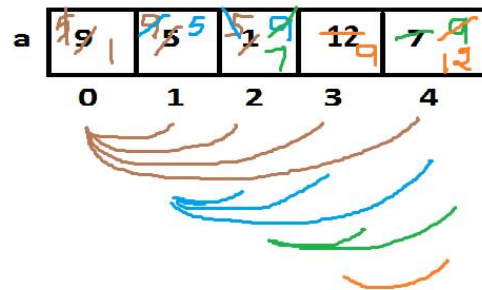
Sorting:

Arranging data in ascending or descending order.

Selection sort in Ascending order:

9	5	1	12	7
5	9	1	12	7
1	9	5	12	7
1	5	9	12	7
1	5	9	12	7
1	5	7	12	9
1	5	7	9	12

L	R
i	j
0	1,2,3,4
1	2,3,4
2	3,4
3	4



The screenshot shows the Turbo C++ (TC) IDE with a C program for sorting an array in descending order using bubble sort. The code is as follows:

```
#include<stdio.h>
#include<conio.h>
void main()
{
    int a[100],n,i,j,t;
    clrscr();
    printf("Enter array size 1-100 "); scanf("%d",&n);
    printf("Enter %d elements ",n);for(i=0;i<n;i++)scanf("%d",&a[i]);
    for(i=0; i<=n-2;i++ )
    {
        for(j=i+1;j<=n-1;j++)
        {
            if(a[i]>a[j]){t=a[i];a[i]=a[j];a[j]=t;}
        }
    }
    printf("Sorted Elements ");for(i=0;i<n;i++)printf("%4d",a[i]);_
    getch();
}
```

The program's execution output is shown below the code:

```
Enter array size 1-100 9
Enter 9 elements 3 9 0 4 3 -5 8 1 7
Sorted Elements  -5  0  1  3  3  4  7  8  9
```

The IDE interface includes a menu bar (File, Edit, Run, Compile, Project, Options, Debug, Break/watch), a status bar (Line 16, Col 63, Insert, Indent, Tab, Fill, Unindent, *, E:6PM.C), and a Windows taskbar at the bottom with various application icons and a system clock showing 6:32 PM on 26-Jul-24.

Descending order:

```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 13 Col 9 Insert Indent Tab Fill Unindent * E:6PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a[100],n,i,j,t;
clrscr();
printf("Enter array size 1-100 "); scanf("%d",&n);
printf("Enter %d elements ",n);for(i=0;i<n;i++)scanf("%d",&a[i]);
for(i=0; i<=n-2;i++ )
{
for(j=i+1;j<=n-1;j++)
{
if(a[i]<a[j]){t=a[i];a[i]=a[j];a[j]=t;}
}
}
printf("Sorted Elements ");for(i=0;i<n;i++)printf("%4d",a[i]);
getch();
}

TC
Enter array size 1-100 9
Enter 9 elements 4 8 1 0 6 -2 7 -4 3
Sorted Elements 8 7 6 4 3 1 0 -2 -4_
```

Bubble sort in Ascending order:

```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 14 Col 41 Insert Indent Tab Fill Unindent * E:6PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a[100],n,i,j,t;
clrscr();
printf("Enter array size 1-100 "); scanf("%d",&n);
printf("Enter %d elements ",n);for(i=0;i<n;i++)scanf("%d",&a[i]);
for(i=0; i<=n-2;i++ )
{
for(j=0;j<=n-i-2;j++)
{
if(a[j]>a[j+1]){t=a[j];a[j]=a[j+1];a[j+1]=t;}
}
}
printf("Sorted Elements ");for(i=0;i<n;i++)printf("%4d",a[i]);
getch();
}
```

Enter array size 1-100 9
Enter 9 elements 3 0 4 -1 7 3 -9 6 2
Sorted Elements -9 -1 0 2 3 3 4 6 7_

```

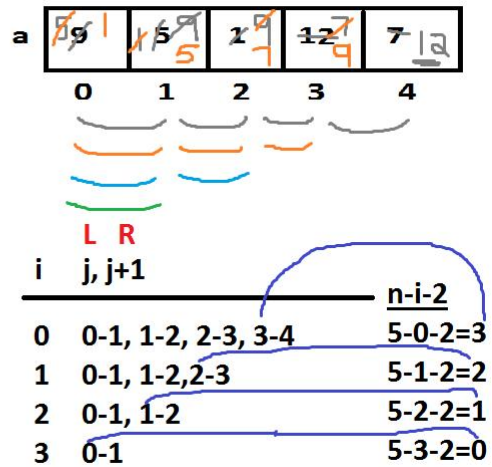
for( i=0; i<=n-2; i++ )
{
for( j=0; j<= n-i-2; j++)
{   L   R
if(a[j]>a[j+1])
{
t=a[j];a[j]=a[j+1];a[j+1]=t;
}
}
}

```

```

9  5  1  12 7
5  9  1  12 7
5  1  9  12 7
5  1  9  7  12
1  5  9  7  12
1  5  7  9  12

```

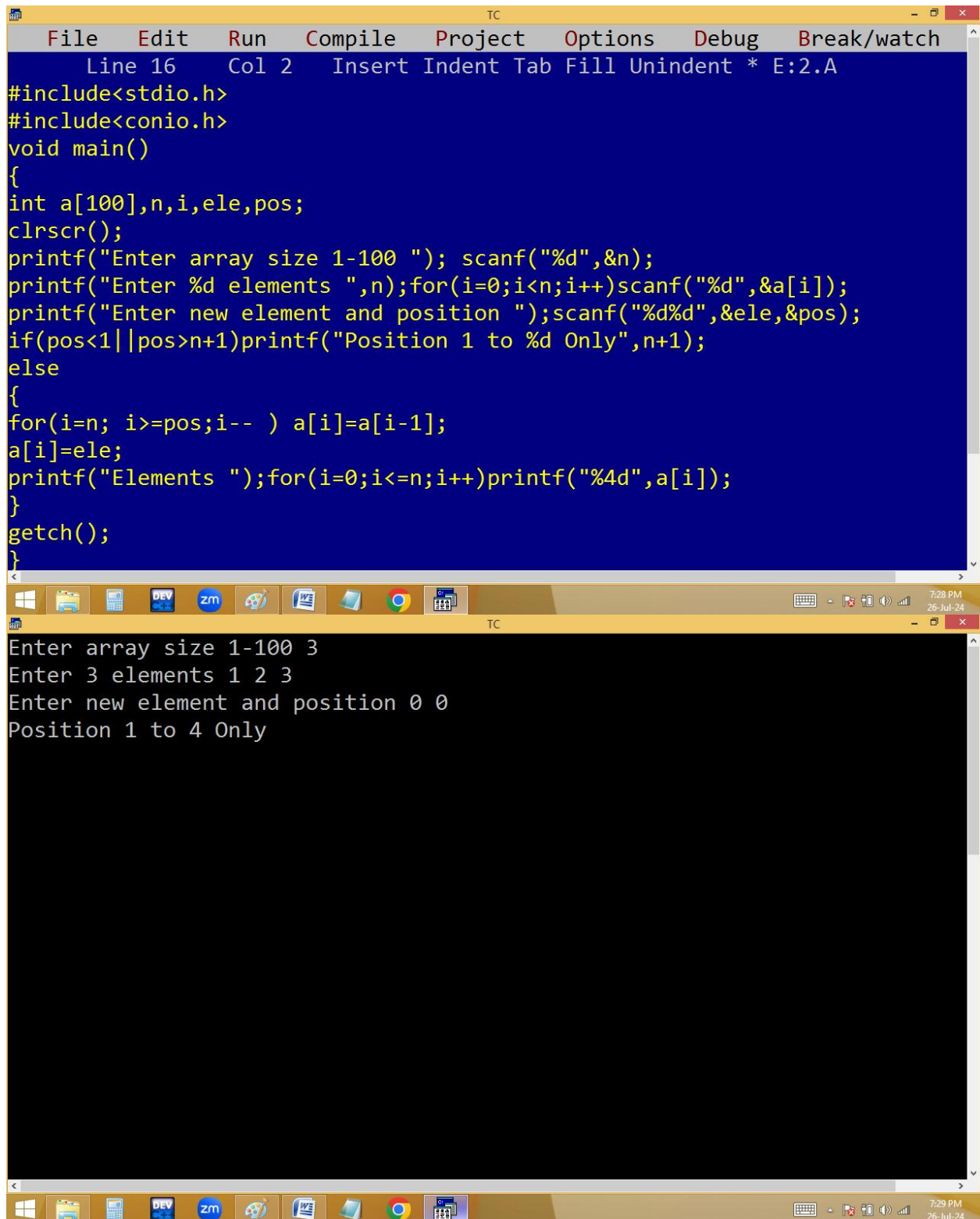


Descending order:

```
TC
File Edit Run Compile Project Options Debug Break/watch
Line 13 Col 9 Insert Indent Tab Fill Unindent * E:6PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a[100],n,i,j,t;
clrscr();
printf("Enter array size 1-100 "); scanf("%d",&n);
printf("Enter %d elements ",n);for(i=0;i<n;i++)scanf("%d",&a[i]);
for(i=0; i<=n-2;i++ )
{
for(j=0;j<=n-i-2;j++)
{
if(a[j]<a[j+1]){t=a[j];a[j]=a[j+1];a[j+1]=t;}
}
}
printf("Sorted Elements ");for(i=0;i<n;i++)printf("%4d",a[i]);
getch();
}

TC
Enter array size 1-100 7
Enter 7 elements 3 0 1 8 3 -1 7
Sorted Elements      8   7   3   3   1   0  -1_
```


Inserting a new element into array at specified position [push] Right shifting of array elements:



The image shows two windows from the Turbo C++ (TC) IDE. The top window displays the source code for a program that inserts a new element into an array at a specified position. The bottom window shows the program's execution output.

```
File Edit Run Compile Project Options Debug Break/watch
Line 16 Col 2 Insert Indent Tab Fill Unindent * E:2.A
#include<stdio.h>
#include<conio.h>
void main()
{
int a[100],n,i,ele,pos;
clrscr();
printf("Enter array size 1-100 "); scanf("%d",&n);
printf("Enter %d elements ",n);for(i=0;i<n;i++)scanf("%d",&a[i]);
printf("Enter new element and position ");scanf("%d%d",&ele,&pos);
if(pos<1||pos>n+1)printf("Position 1 to %d Only",n+1);
else
{
for(i=n; i>=pos;i-- ) a[i]=a[i-1];
a[i]=ele;
printf("Elements ");for(i=0;i<=n;i++)printf("%4d",a[i]);
}
getch();
}
```

Enter array size 1-100 3
Enter 3 elements 1 2 3
Enter new element and position 0 0
Position 1 to 4 Only


```
TC
Enter array size 1-100 3
Enter 3 elements 1 2 3
Enter new element and position 7 7
Position 1 to 4 Only
```

```
TC
Enter array size 1-100 3
Enter 3 elements 1 3 4
Enter new element and position 2 2
Elements    1    2    3    4_
```

```
TC
Enter array size 1-100 3
Enter 3 elements 1 2 3
Enter new element and position 0 1
Elements    0    1    2    3
```

```
TC
Enter array size 1-100 3
Enter 3 elements 1 2 3
Enter new element and position 4 4
Elements    1    2    3    4
```

+

$1 \geq 2$
 $2 \geq 2$ $a[2] = a[1]$
 $3 \geq 2$ $a[3] = a[2]$
 $i=4$ $4 \geq 2$ $a[4] = a[3]$
 for($i=n$; $i \geq pos$; $i--$) $a[i] = a[i-1]$;
 $3 \geq 2$

$a[i] = ele$;

$a[1] = 7$
 $3 = 8$

$\frac{n}{3}$ $\frac{p}{8}$

a	9	0	10	14	4
	0	1	2	3	4

n	ele	pos
4	7	2

5

$3 \geq 0$ $a[3] = a[2]$
 $2 \geq 0$ $a[2] = a[1]$
 $1 \geq 0$ $a[1] = a[0]$
 $0 \geq 0$ $a[0] = a[-1]$

Home work:

Deleting array element permanently from array: