VP Vidyalankar Polytechnic	DEPARTMENT OF COMPUTER ENGINEERING

Subject: - DSU	**Subject Code:** 313301
Semester: - III	**Course:** Computer Engineering
Laboratory No: L003	**Name of Subject Teacher:** Prof. Imran S.
Name of Student: Mohd Saad Khan	**Roll Id: -** 24203A0007
Experiment No:	6
Title of Experiment	* Write a 'C' Program to Sort an Array of numbers using Bubble Sort Method.

Aim: Write a 'C' Program to Sort an Array of numbers using Bubble Sort Method.

Algorithm:

Step 1: Start
Step 2: Declare an integer array a[100] and variables i, n
Step 3: Clear screen using clrscr()
Step 4: Print "Enter the size of the array"
Step 5: Scan value of n from keyboard
Step 6: Print "Enter the elements in the array"
Step 7: Run a loop from i = 0 to i < n
Step 7.1: Scan each element and store it in a[i]
Step 8: Call the function sort(a, n)
Step 9: Inside the sort() function
Step 9.1: Declare variables i, j, temp
Step 9.2: Run a loop from i = 0 to i < n
Step 9.2.1: Run a nested loop from j = 0 to j < n
Step 9.2.1.1: If a[j+1] < a[j], then
Step 9.2.1.1.1: Swap a[j] and a[j+1] using temp
Step 10: After returning from function, print "Sorted Array"
Step 11: Run a loop from i = 0 to i < n
Step 11.1: Print each element a[i]
Step 12: Stop

Code:

```
 ≡  File  Edit  Search  Run  Compile  Debug  Project  Options    Window  Help
[■]═══════════════ SAAD57.C ═══════════════1=[↕]
#include<stdio.h>
#include<conio.h>
void sort(int [],int);

void main()
{
int a[100],i,n;
clrscr();
printf("Enter the size of the array: ");
scanf("%i",&n);
printf("Enter the elements in the array: \n");
for(i=0;i<n;i++)
{
scanf("%i",&a[i]);
}
sort(a,n);
printf("\nSorted Array: \n");
for(i=0;i<n;i++)
{
printf("%i \n",a[i]);
}
═══ 21:78 ═══
F1 Help  Alt-F8 Next Msg  Alt-F7 Prev Msg  Alt-F9 Compile  F9 Make  F10 Menu
 ≡  File  Edit  Search  Run  Compile  Debug  Project  Options    Window  Help
[■]═══════════════ SAAD57.C ═══════════════1=[↕]
getch();
}

void sort(int a[],int n)
{
int i,j,temp;
for(i=0;i<n;i++)
{
for(j=0;j<n;j++)
{
if(a[j+1]<a[j])
{
temp=a[j];
a[j]=a[j+1];
a[j+1]=temp;
}
}
}
}
═══ 41:78 ═══
F1 Help  Alt-F8 Next Msg  Alt-F7 Prev Msg  Alt-F9 Compile  F9 Make  F10 Menu
```

Output: -

```
Enter the size of the array: 5
Enter the elements in the array:
5
4
3
2
1

Sorted Array:
1
2
3
4
5
```

Practical Related Questions:

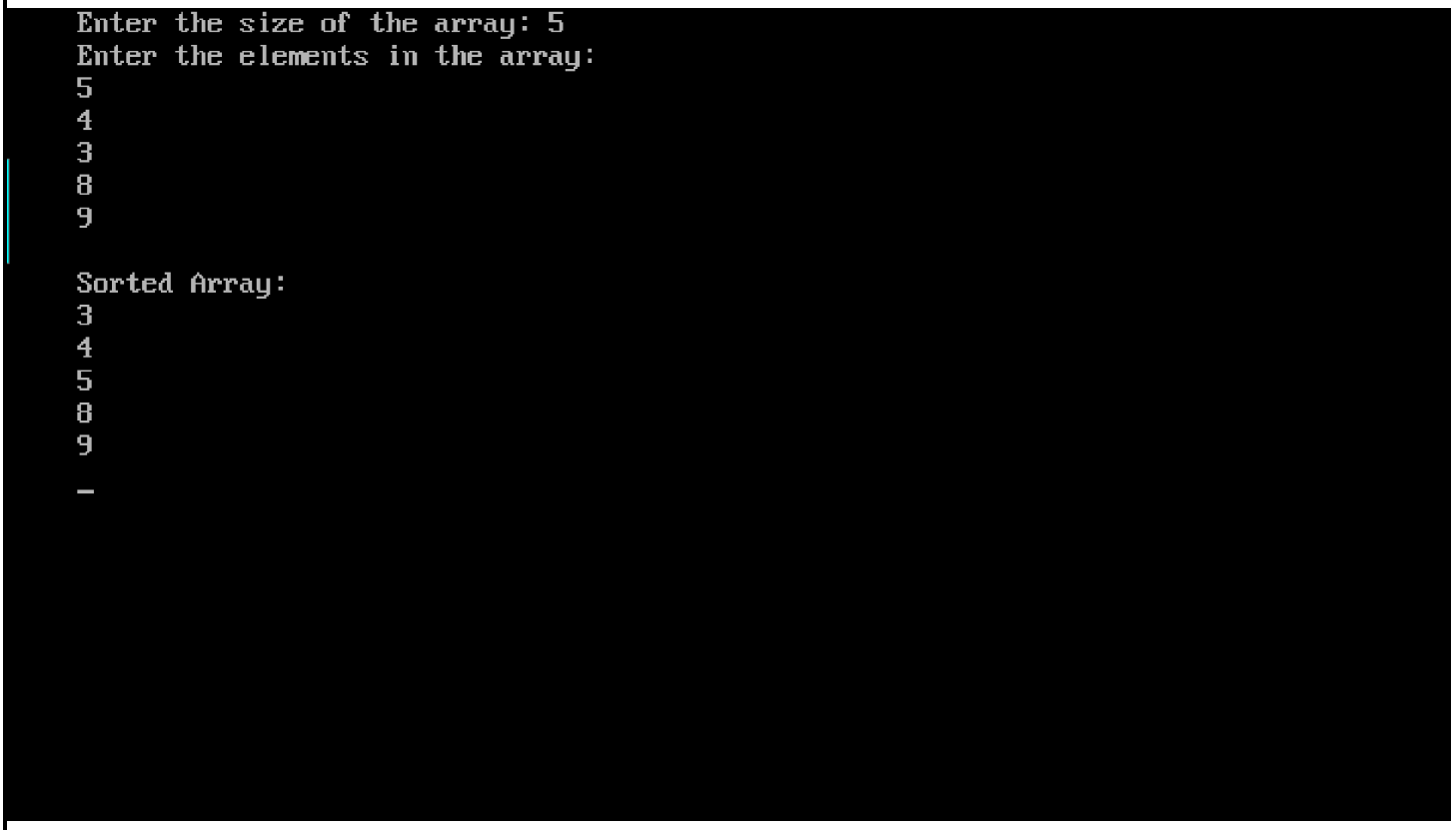
1. **Optimize the Bubble Sort algorithm to stop early if the array is already sorted.**
   Ans:

```
≡ File  Edit  Search  Run  Compile  Debug  Project  Options  Window  Help
[■]═══ SAAD57.C ═══1=[↕]
#include<stdio.h>
#include<conio.h>
void sort(int [],int);

void main()
{
int a[100],i,n;
clrscr();
printf("Enter the size of the array: ");
scanf("%i",&n);
printf("Enter the elements in the array: \n");
for(i=0;i<n;i++)
{
scanf("%i",&a[i]);
}
sort(a,n);
printf("\nSorted Array: \n");
for(i=0;i<n;i++)
{
printf("%i \n",a[i]);
}
═══ 1:1 ═══
F1 Help  Alt-F8 Next Msg  Alt-F7 Prev Msg  Alt-F9 Compile  F9 Make  F10 Menu
[■]═══ SAAD57.C ═══1=[↕]
getch();
}

void sort(int a[],int n)
{
int i,j,temp,found=0;
for(i=0;i<n;i++)
{
for(j=0;j<n;j++)
{
if(a[j+1]<a[j])
{
found=1;
temp=a[j];
a[j]=a[j+1];
a[j+1]=temp;
}
}
if(found==0)
{
break;
═══ 1:1 ═══
[■]═══ SAAD57.C ═══1=[↕]
}
}
}
```

Output:


Enter the size of the array: 5
Enter the elements in the array:
5
4
3
8
9
Sorted Array:
3
4
5
8
9

2. **Modify the Bubble Sort algorithm to sort an array in descending order.**
   Ans:

```
 ≡  File  Edit  Search  Run  Compile  Debug  Project  Options    Window  Help
[■]═══════════════ SAAD57.C ═══════════════1=[↕]
#include<stdio.h>
#include<conio.h>
void sort(int [],int);

void main()
{
int a[100],i,n;
clrscr();
printf("Enter the size of the array: ");
scanf("%i",&n);
printf("Enter the elements in the array: \n");
for(i=0;i<n;i++)
{
scanf("%i",&a[i]);
}
sort(a,n);
printf("\nSorted Array: \n");
for(i=0;i<n;i++)
{
printf("%i \n",a[i]);
}
═══ 21:78 ═══
F1 Help  Alt-F8 Next Msg  Alt-F7 Prev Msg  Alt-F9 Compile  F9 Make  F10 Menu
 ≡  File  Edit  Search  Run  Compile  Debug  Project  Options    Window  Help
[■]═══════════════ SAAD57.C ═══════════════1=[↕]
getch();
}

void sort(int a[],int n)
{
int i,j,temp;
for(i=0;i<n;i++)
{
for(j=0;j<n;j++)
{
if(a[j+1]>a[j])
{
temp=a[j];
a[j]=a[j+1];
a[j+1]=temp;
}
}
}
}
═══ 41:78 ═══
F1 Help  Alt-F8 Next Msg  Alt-F7 Prev Msg  Alt-F9 Compile  F9 Make  F10 Menu
```

Output:

```
Enter the size of the array: 5
Enter the elements in the array:
1
2
3
4
5

Sorted Array:
5
4
3
2
1
```

Marks Obtained			**Dated signature of Teacher**
Process Related (35)	**Product Related (15)**	**Total (50)**	