ARRAYS

It is collection of homogeneous [same type] variables.

Array is nothing but collection of contiguous memory locations, where we can store and manage more than one value of same type under one name.

It is a derived data type.

It is an implicit / internal pointer.

It is a implicit const pointer

It is one of data structure.

Advantages:

Generally to store several values of same type, we have to declare several variables. Here we have to remember all these variable names also. When the program is too big, it is very difficult to remember all the variable names. In this situation, the only solution is array.

Array reduce program length.

Array minimize the errors.

In functions to carry several values of same type at a time, we are using arrays.

It allows to arrange our data in a order.

Disadvantage:

Array size is Constant Positive Integer value. Due to this we are not able to change the array size at run time. Sometimes it causes memory wastage / shortage.

In C language we are using

1. **One dimensional arrays**
2. **Multi dimensional arrays**

<u>One dimensional arrays:</u>

- **An array with one row and several columns.**
- **An array with single subscripting operator [ ] is called one dimensional array.**
- **It is an implicit single pointer.**

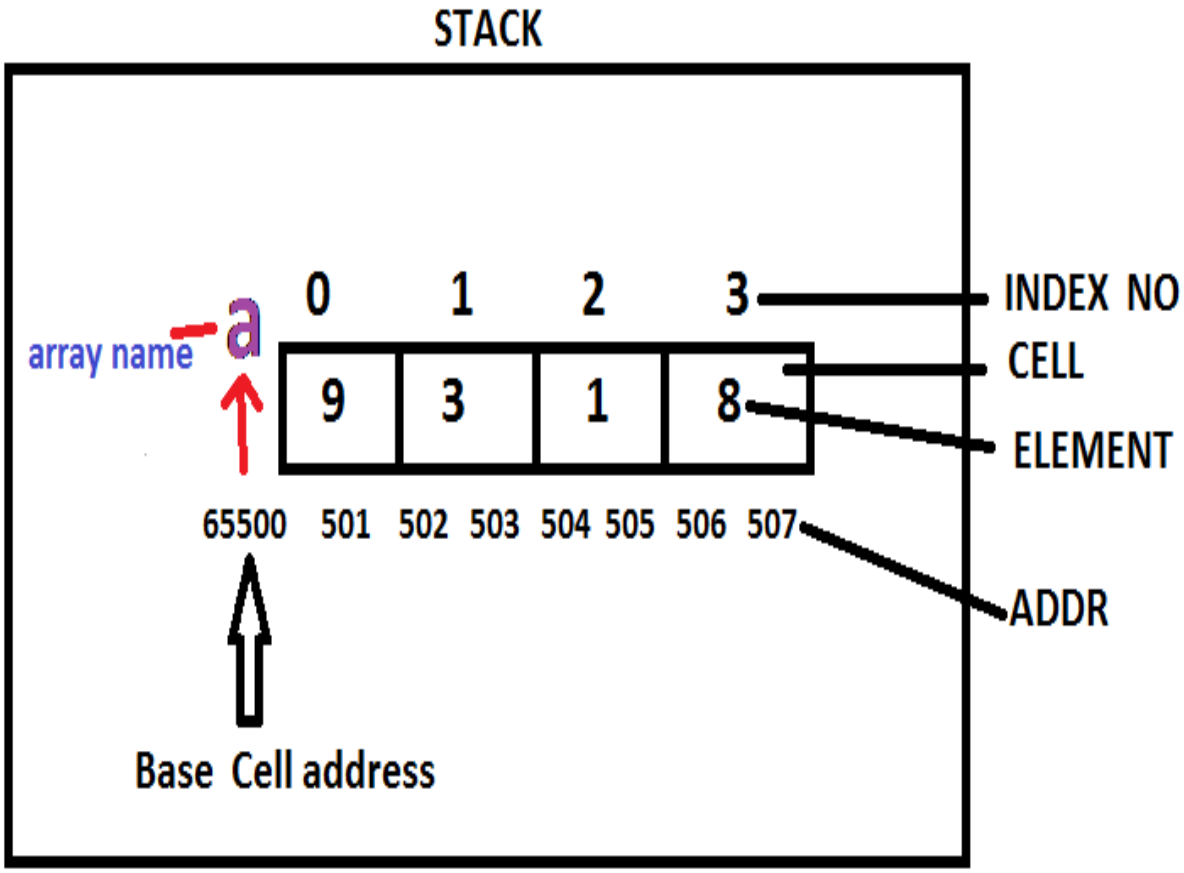
<u>Syntax</u>:

datatype variable[size] = {elements};

Eg:

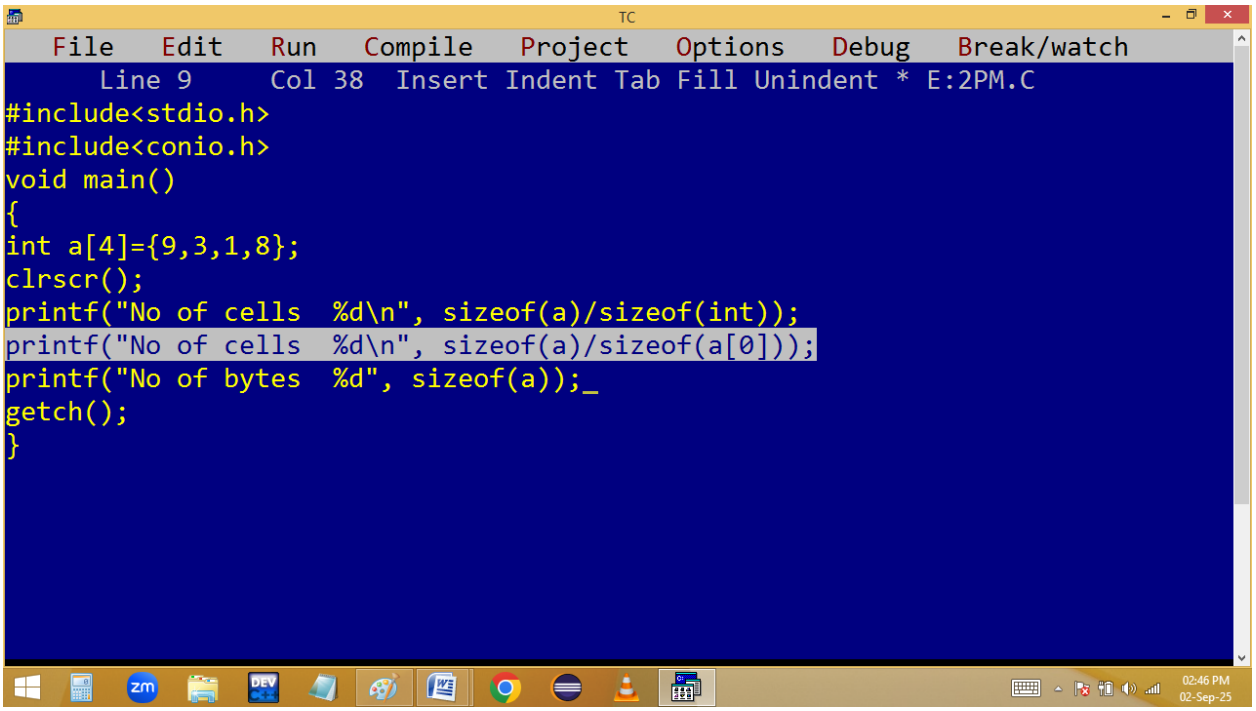
```
int  a[4] = { 9, 3, 1, 8 };
```

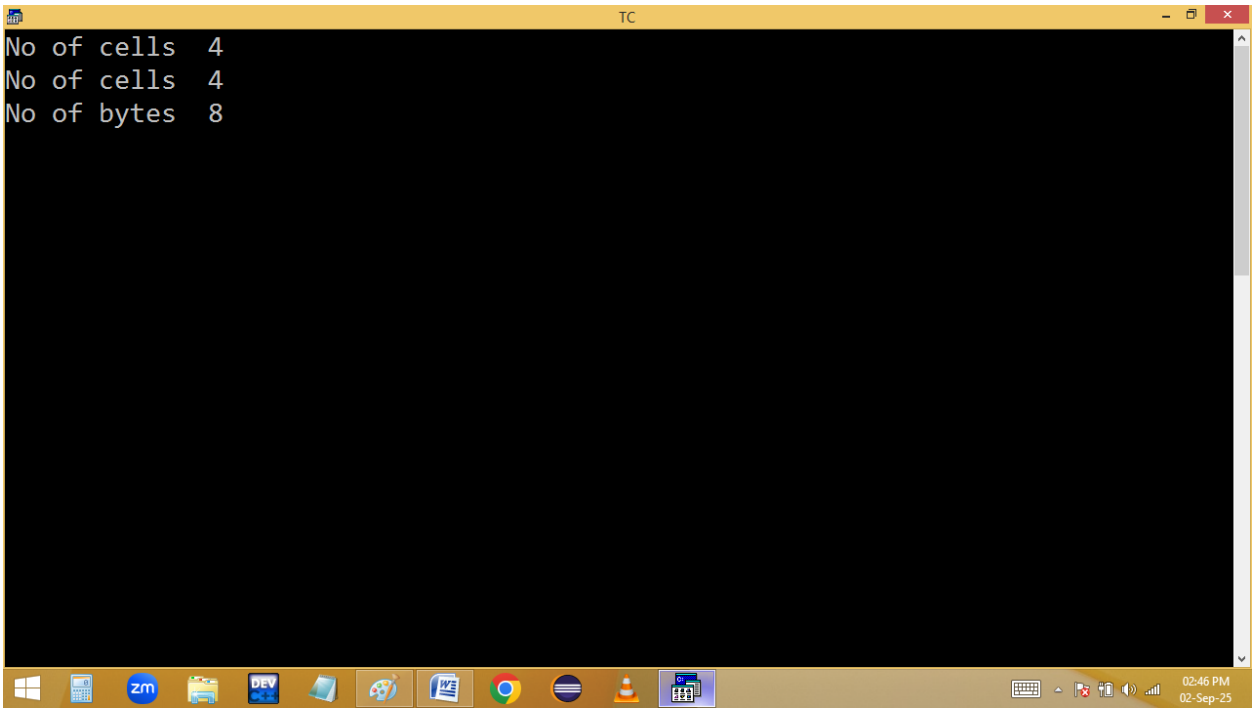
<u>Memory allocation for array:</u>



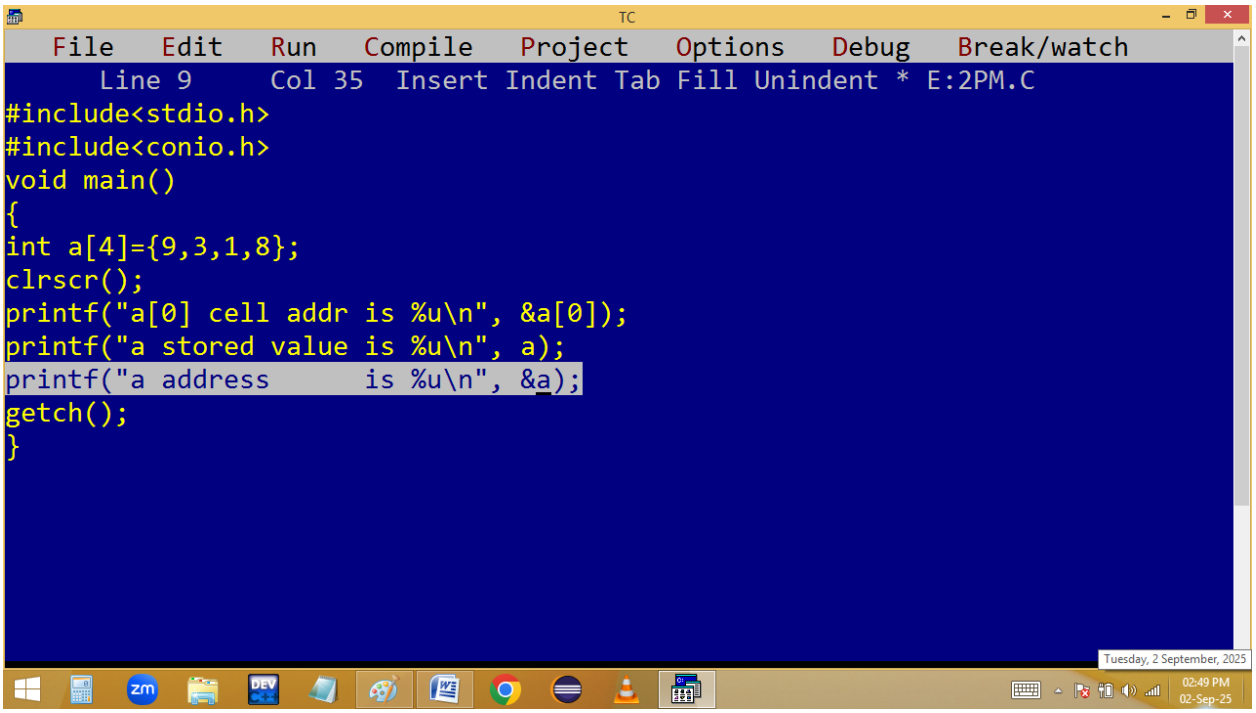
Array is implicit pointer because of array variable stores base cell [0 cell 1st byte] address. Hence array variable value and 0 cell address both are same.

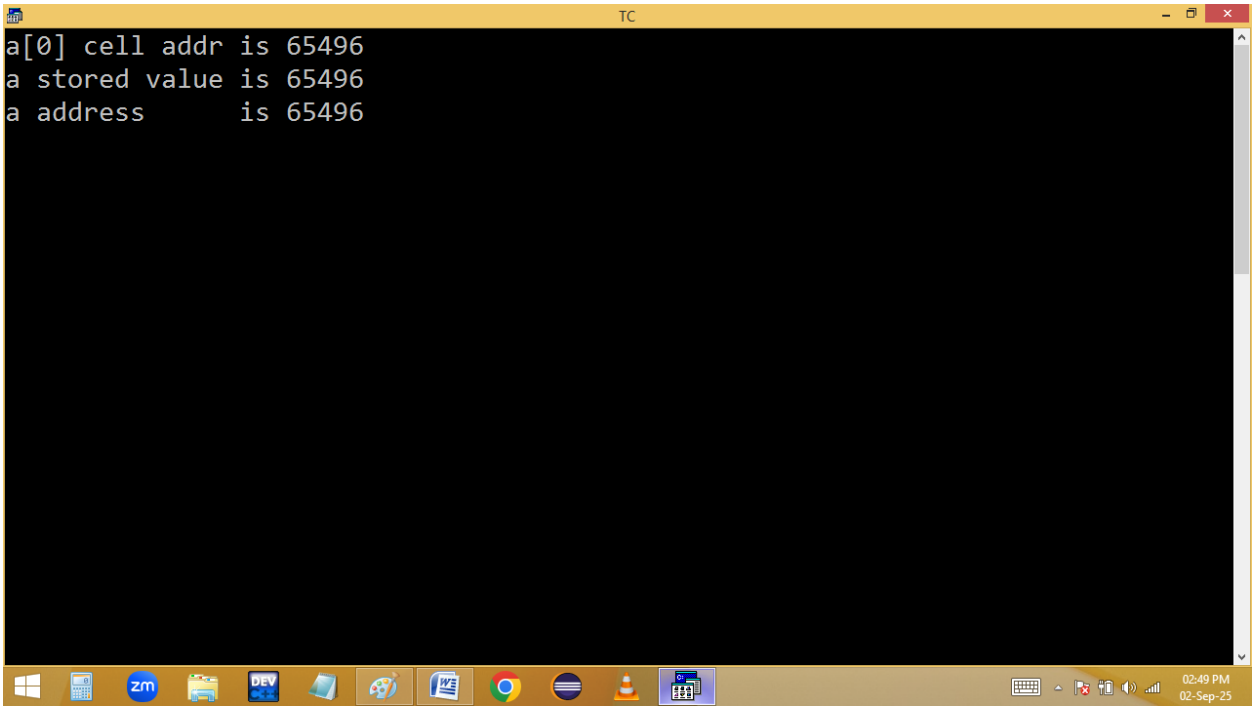
Finding array size:

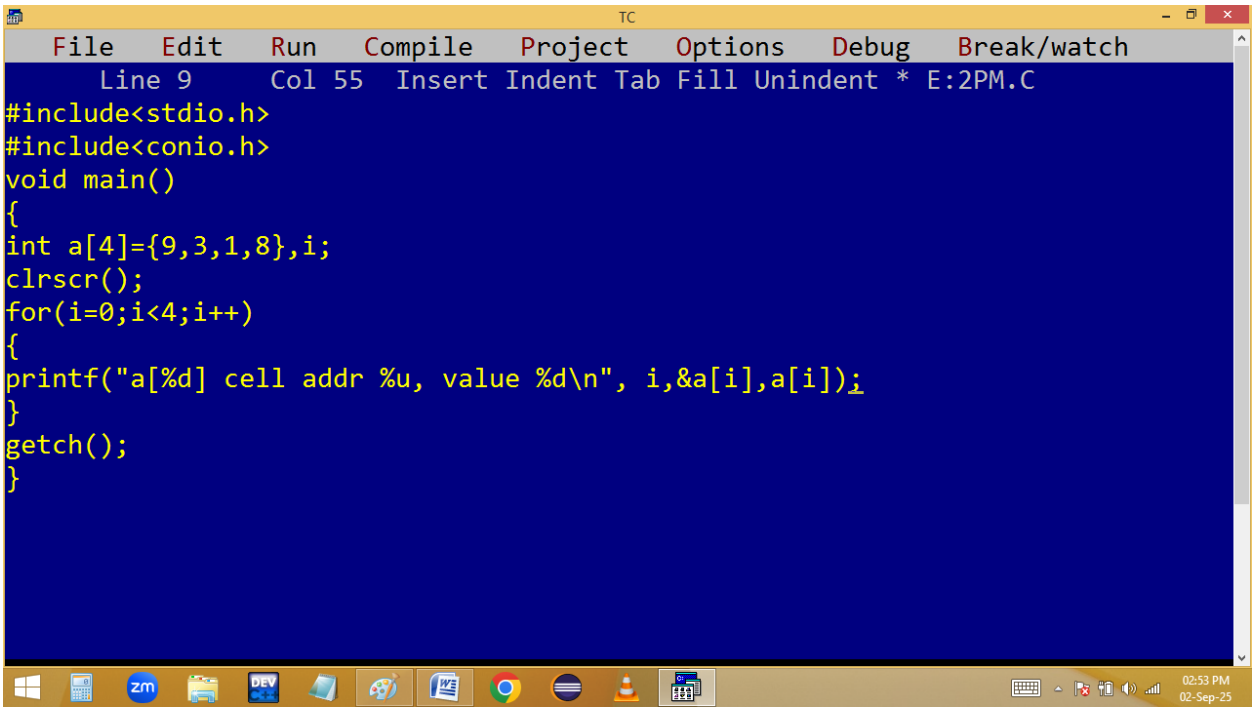

TC
File Edit Run Compile Project Options Debug Break/watch
Line 9 Col 38 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a[4]={9,3,1,8};
clrscr();
printf("No of cells %d\n", sizeof(a)/sizeof(int));
printf("No of cells %d\n", sizeof(a)/sizeof(a[0]));
printf("No of bytes %d", sizeof(a));
getch();
}

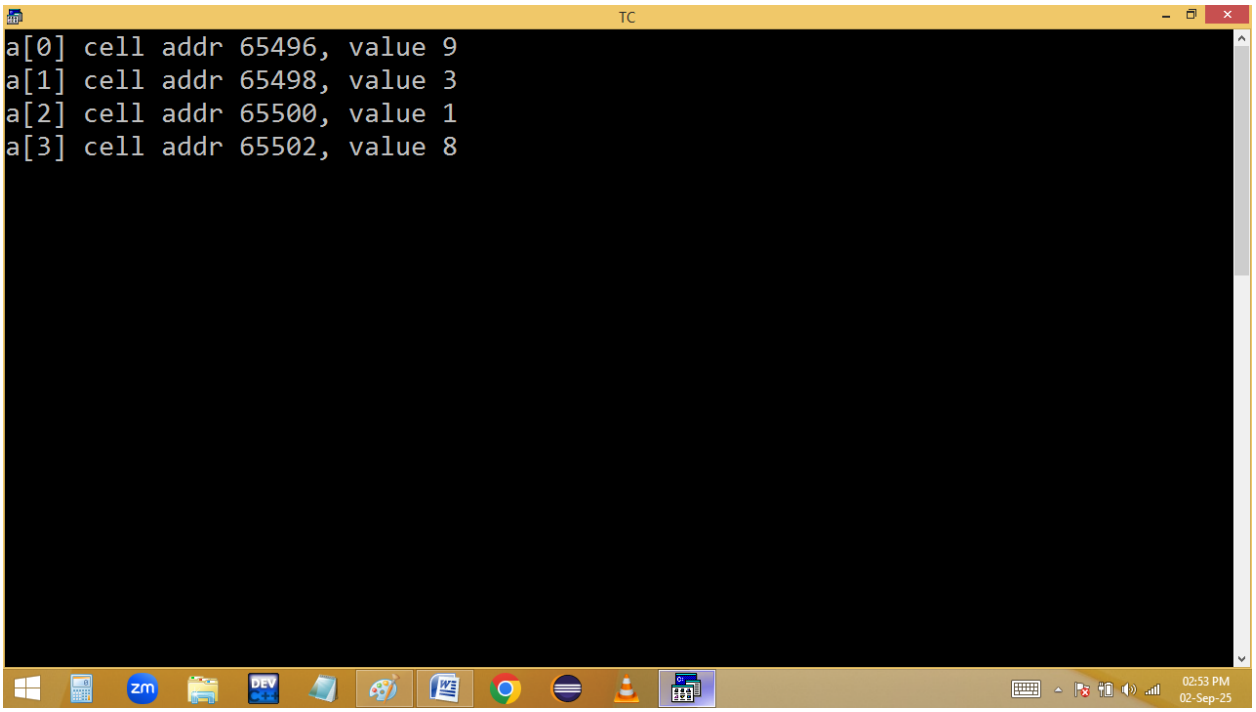

TC
No of cells 4
No of cells 4
No of bytes 8

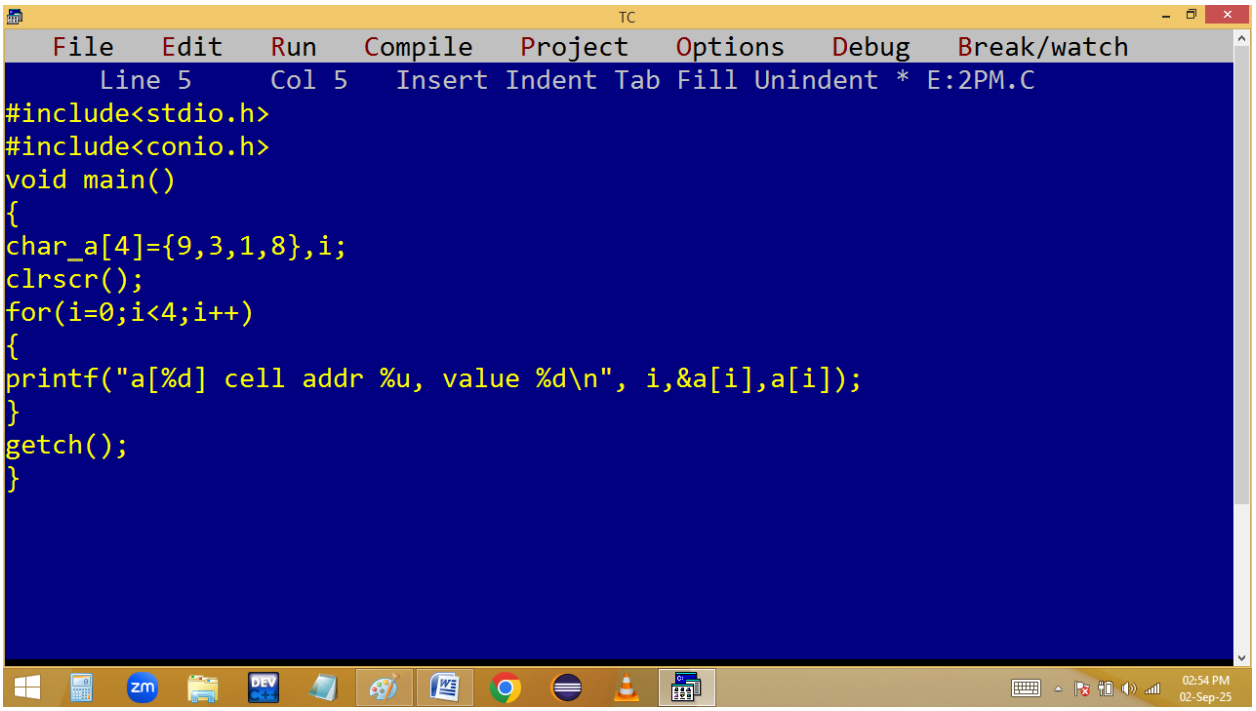
Finding array address:

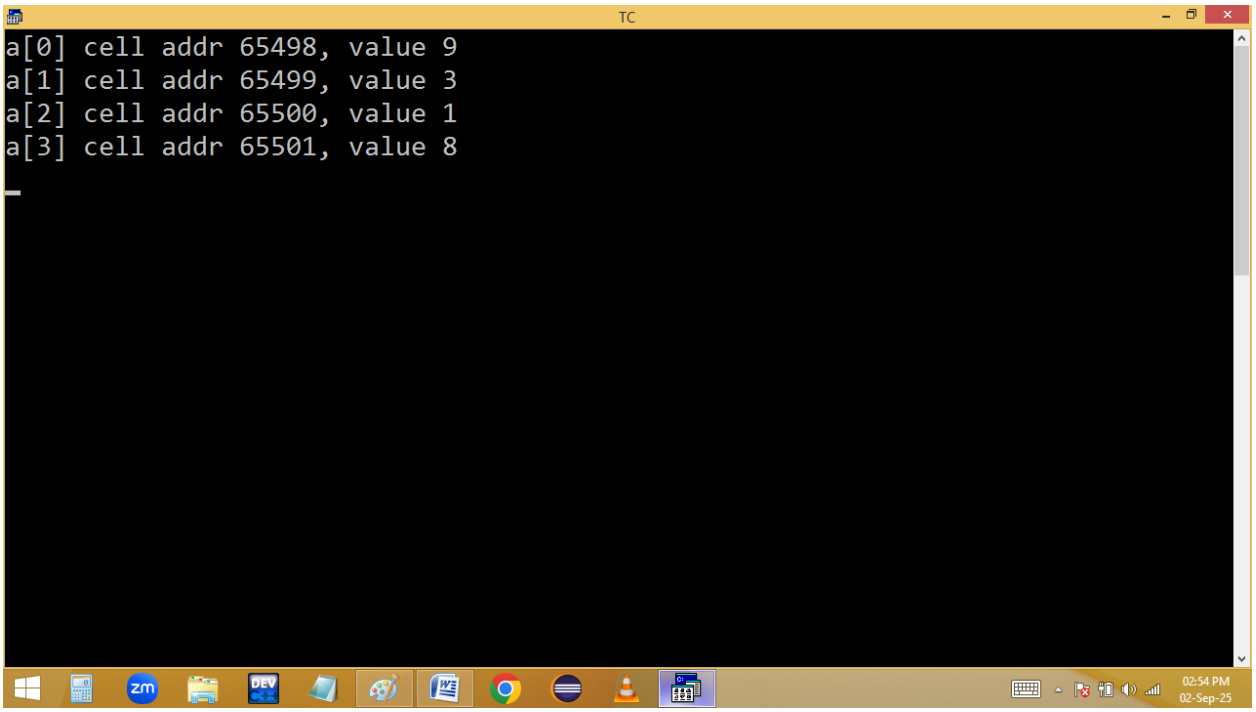


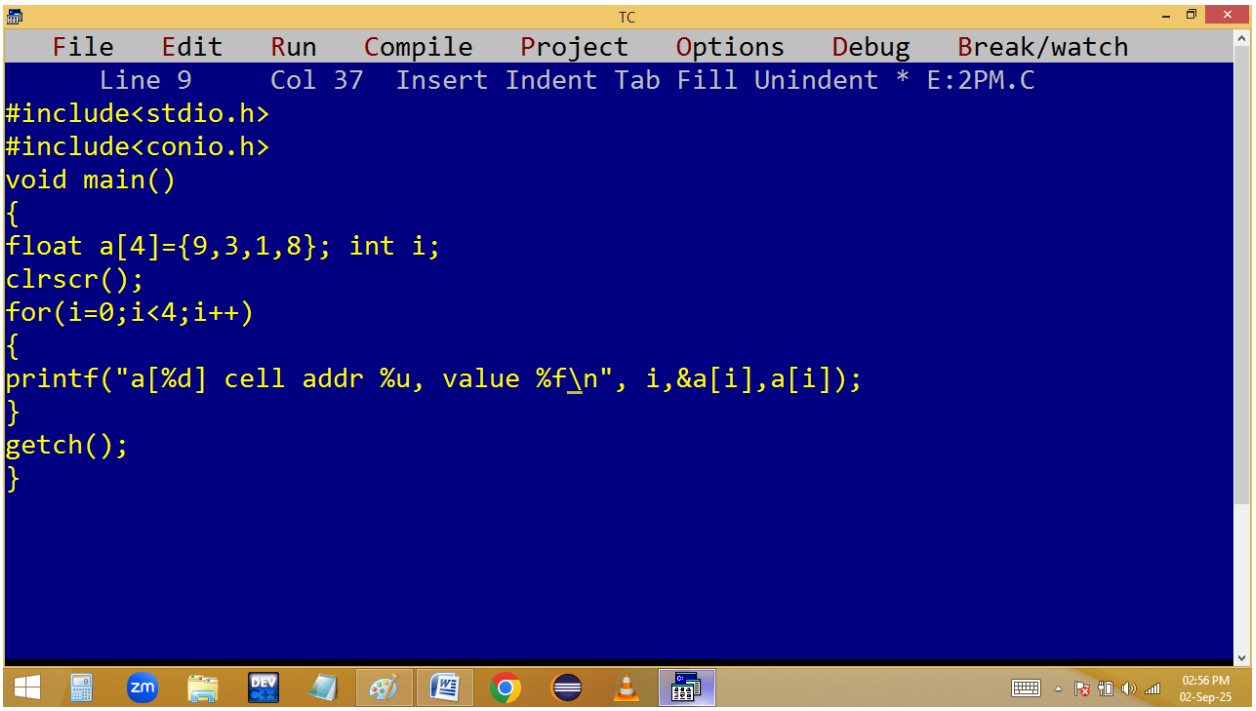


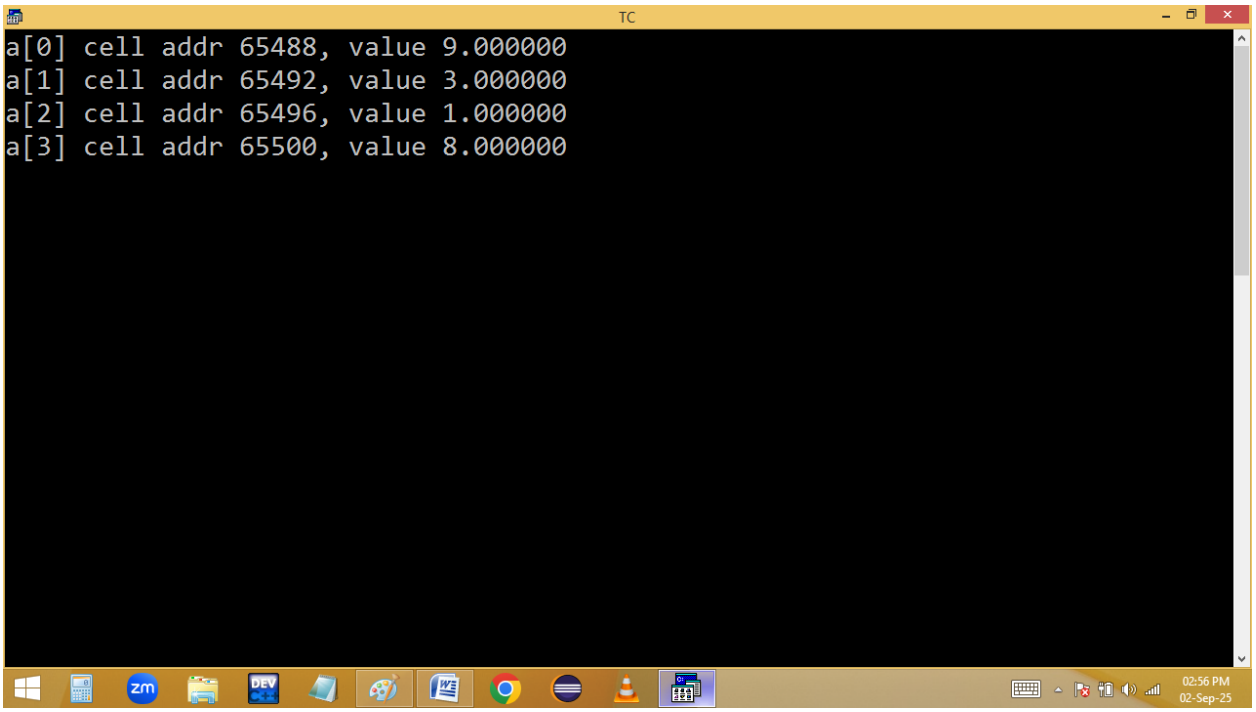

TC
File Edit Run Compile Project Options Debug Break/watch
Line 9 Col 55 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a[4]={9,3,1,8},i;
clrscr();
for(i=0;i<4;i++)
{
printf("a[%d] cell addr %u, value %d\n", i,&a[i],a[i]);
}
getch();
}

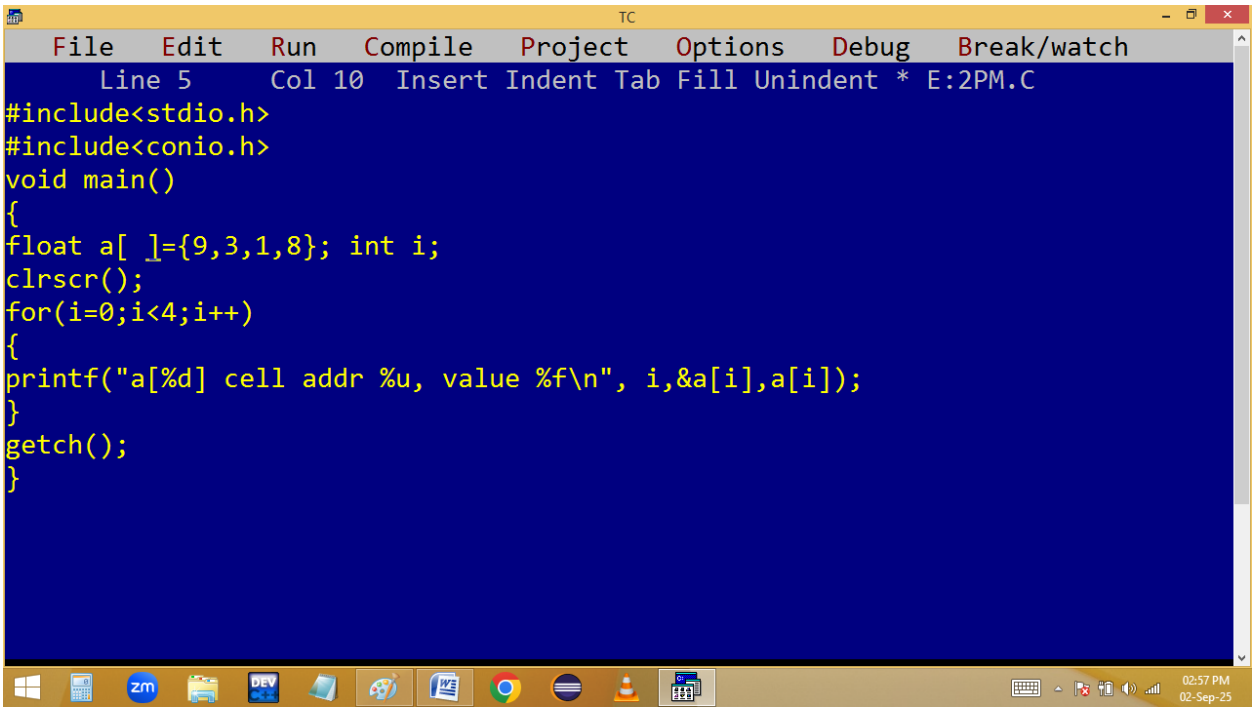

TC
a[0] cell addr 65496, value 9
a[1] cell addr 65498, value 3
a[2] cell addr 65500, value 1
a[3] cell addr 65502, value 8

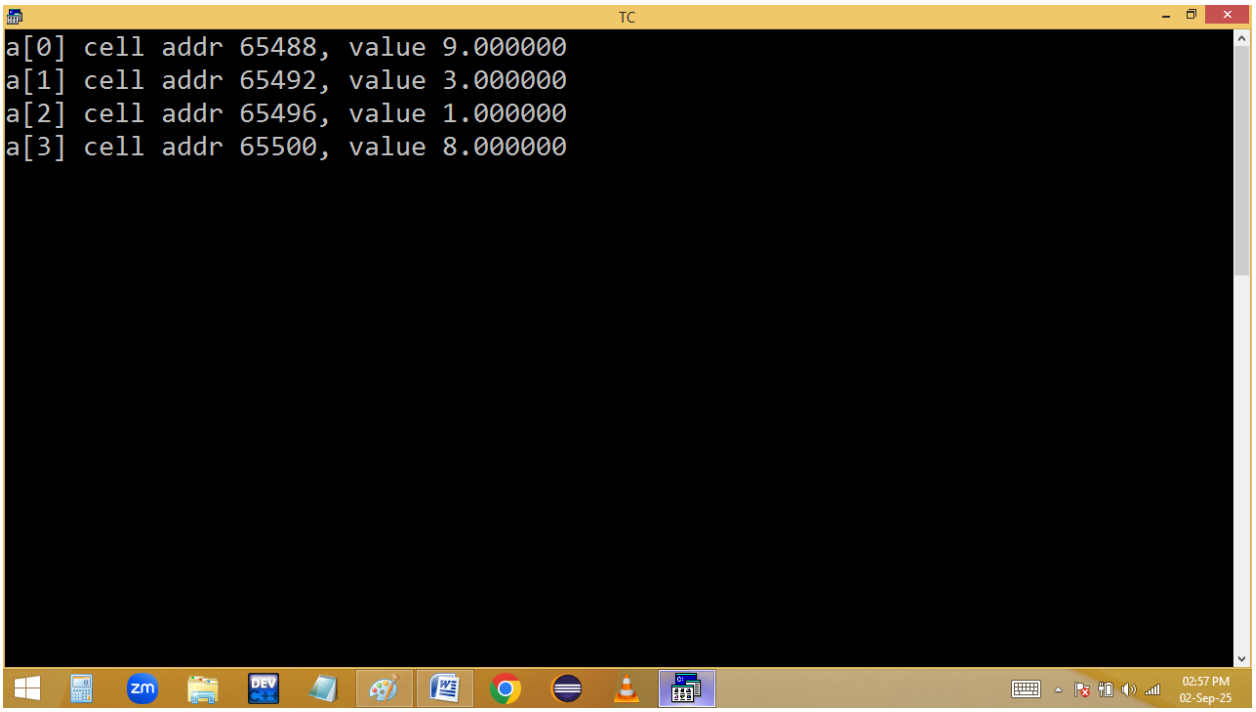

TC
File Edit Run Compile Project Options Debug Break/watch
Line 5 Col 5 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
char_a[4]={9,3,1,8},i;
clrscr();
for(i=0;i<4;i++)
{
printf("a[%d] cell addr %u, value %d\n", i,&a[i],a[i]);
}
getch();
}


TC
a[0] cell addr 65498, value 9
a[1] cell addr 65499, value 3
a[2] cell addr 65500, value 1
a[3] cell addr 65501, value 8

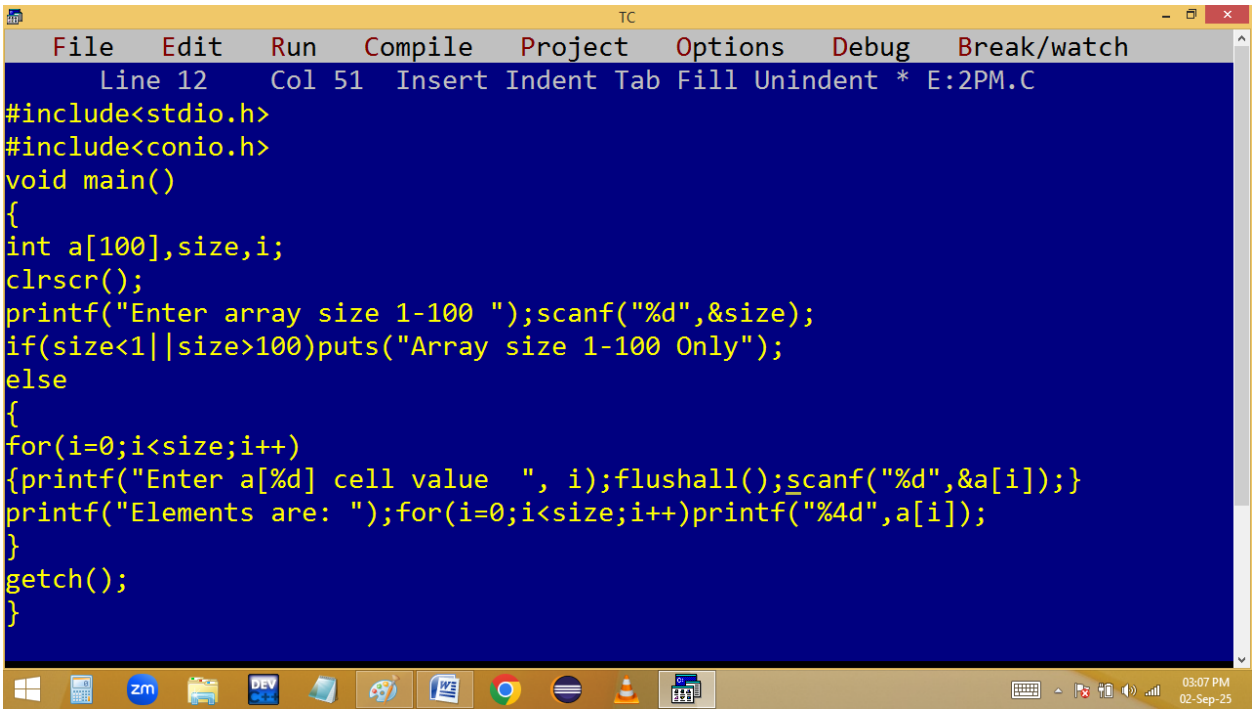

TC
File Edit Run Compile Project Options Debug Break/watch
Line 9 Col 37 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
float a[4]={9,3,1,8}; int i;
clrscr();
for(i=0;i<4;i++)
{
printf("a[%d] cell addr %u, value %f\n", i,&a[i],a[i]);
}
getch();
}

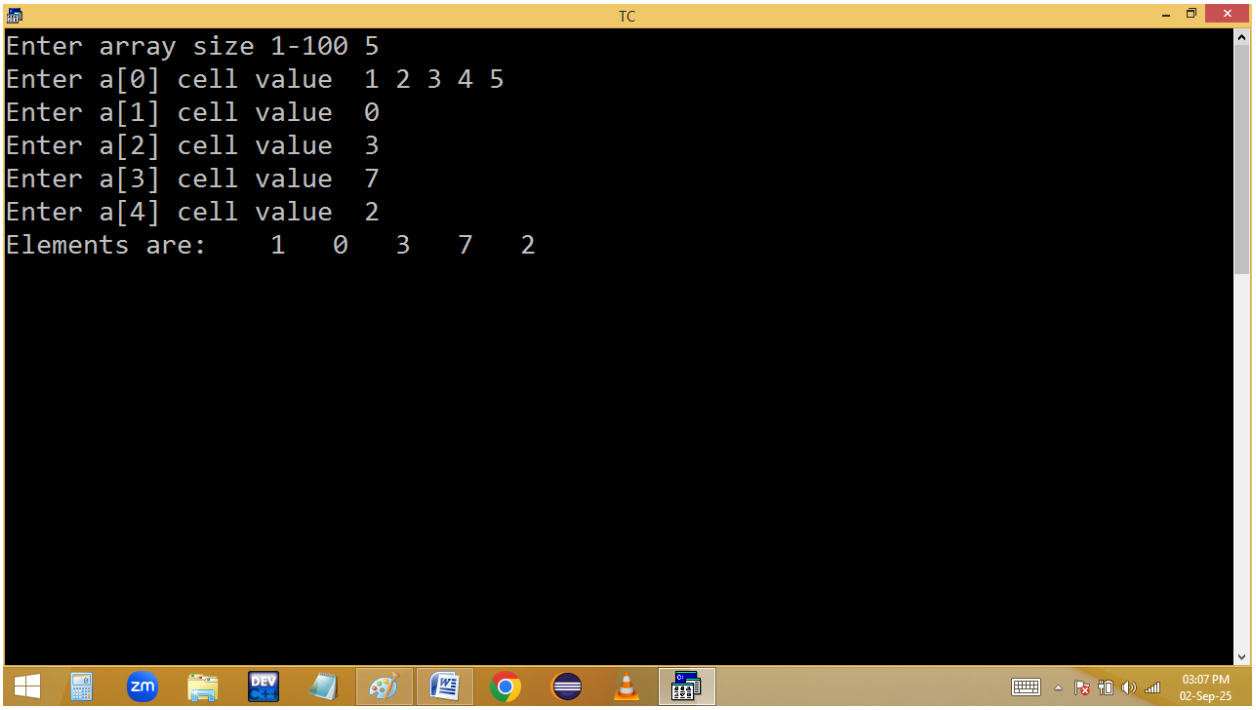

TC
a[0] cell addr 65488, value 9.000000
a[1] cell addr 65492, value 3.000000
a[2] cell addr 65496, value 1.000000
a[3] cell addr 65500, value 8.000000

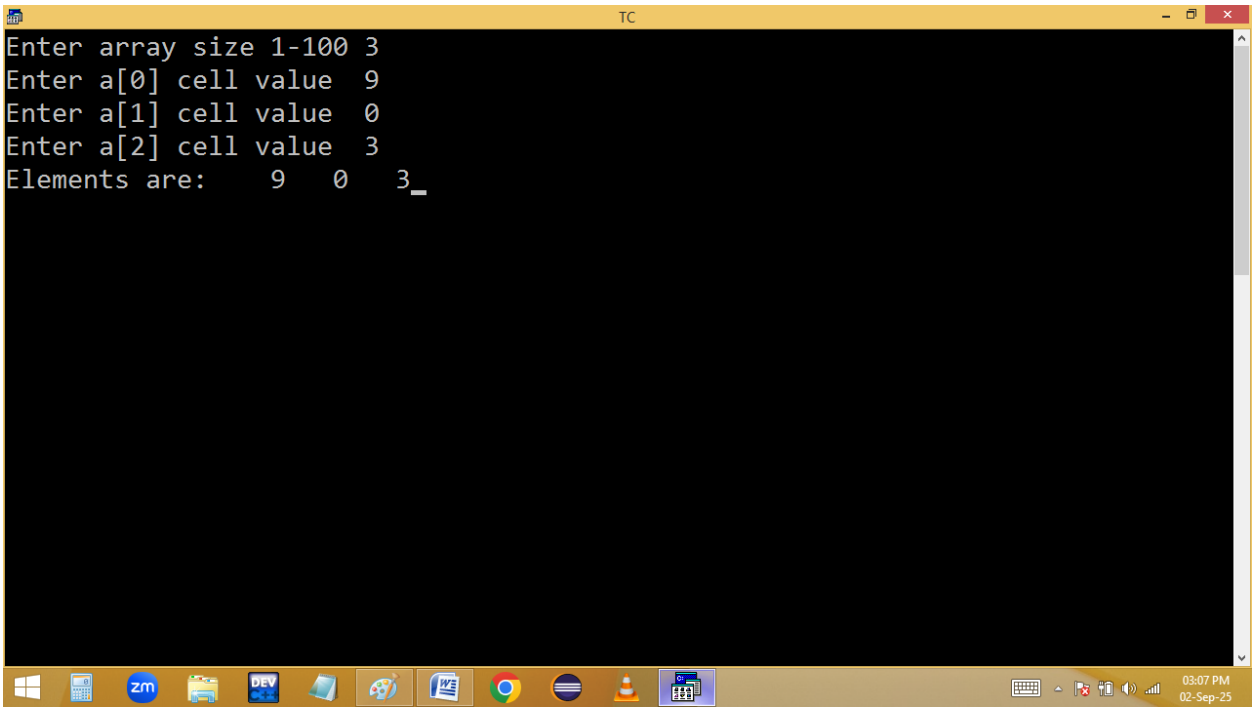

TC
File Edit Run Compile Project Options Debug Break/watch
Line 5 Col 10 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
float a[ ]={9,3,1,8}; int i;
clrscr();
for(i=0;i<4;i++)
{
printf("a[%d] cell addr %u, value %f\n", i,&a[i],a[i]);
}
getch();
}

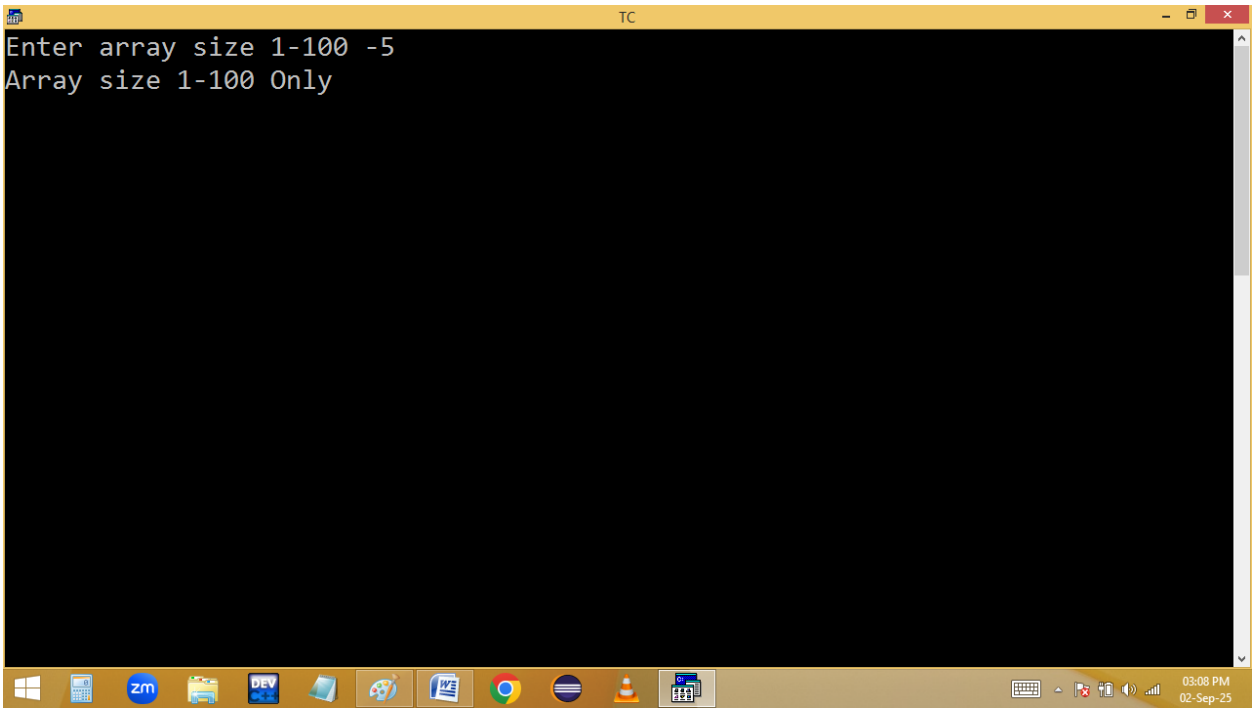

TC
a[0] cell addr 65488, value 9.000000
a[1] cell addr 65492, value 3.000000
a[2] cell addr 65496, value 1.000000
a[3] cell addr 65500, value 8.000000

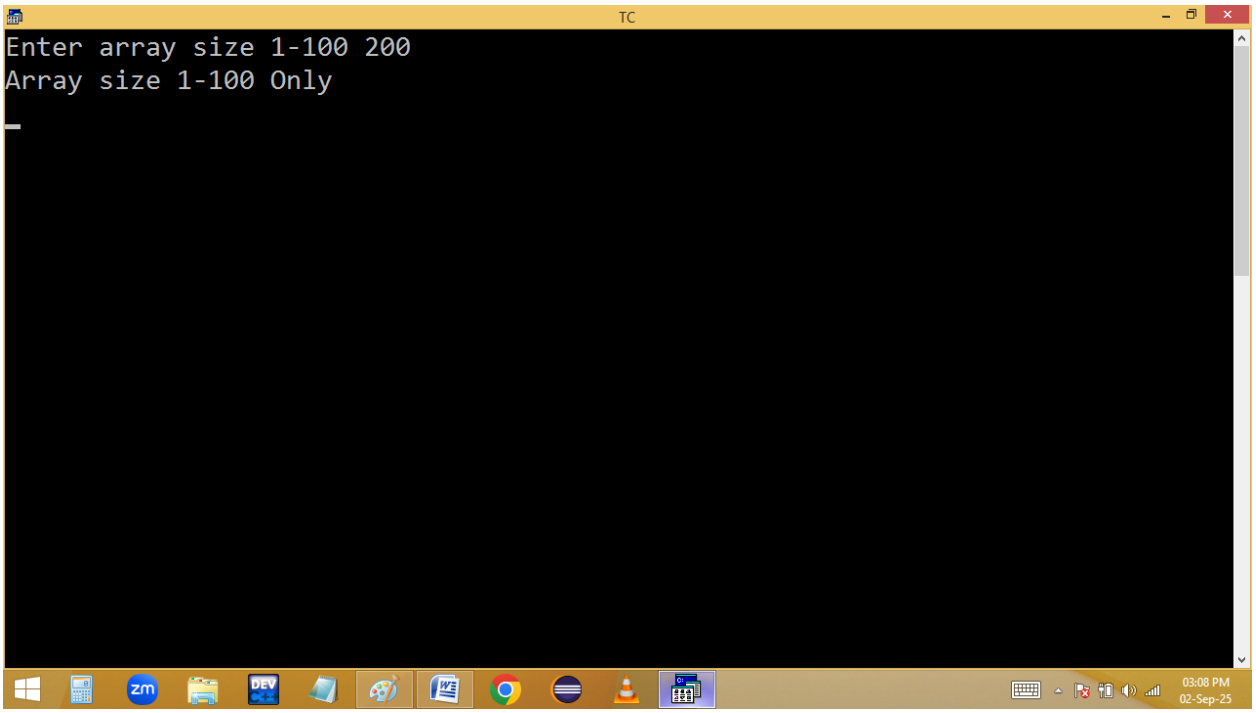
Reading and printing array elements at runtime:



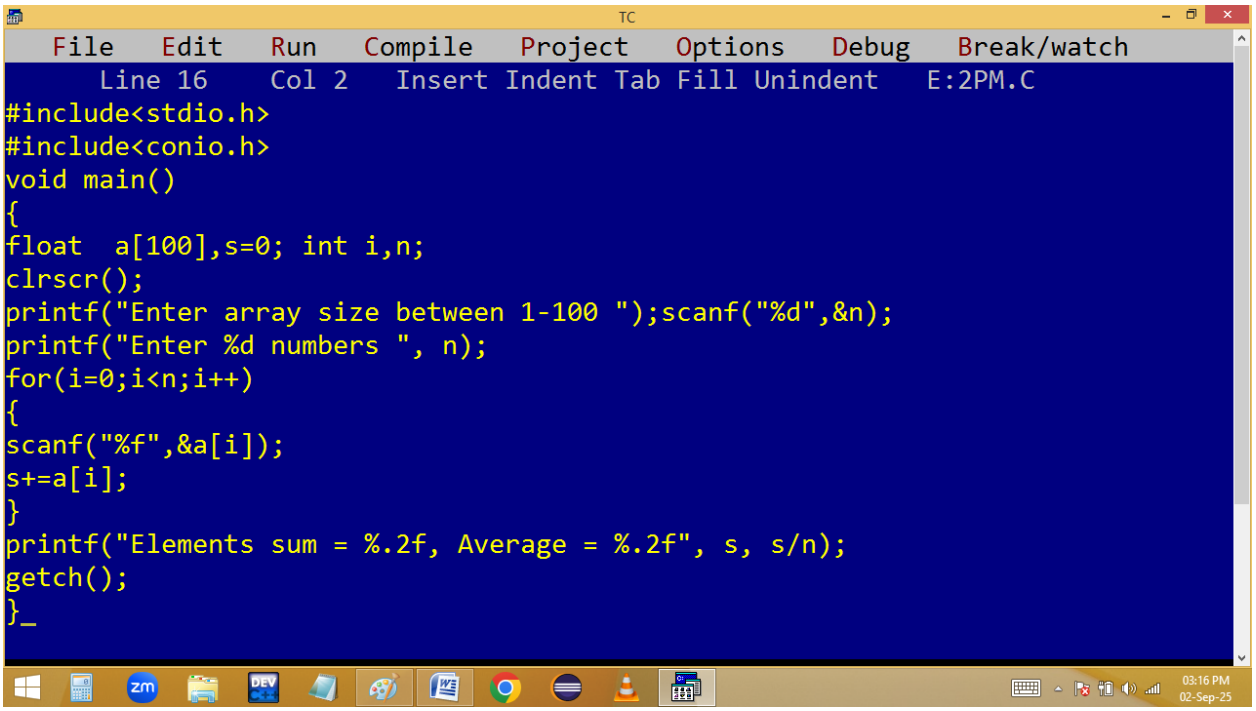


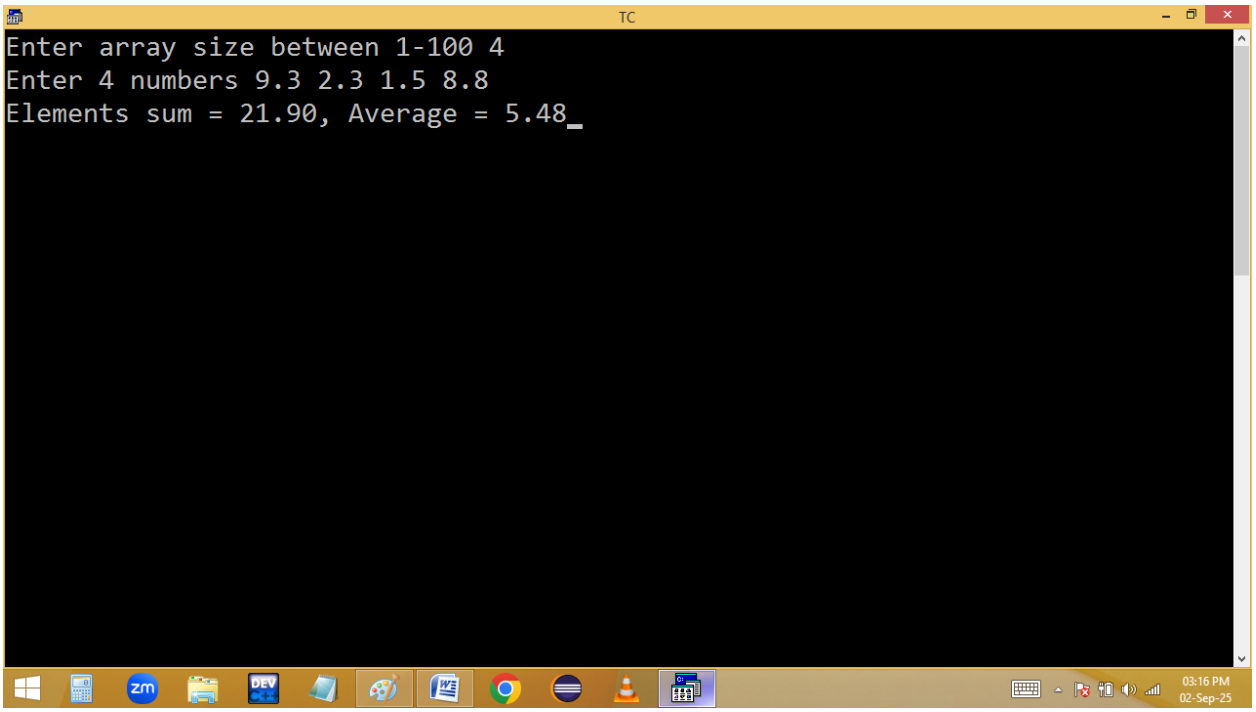

TC
Enter array size 1-100 3
Enter a[0] cell value 9
Enter a[1] cell value 0
Enter a[2] cell value 3
Elements are: 9 0 3
03:07 PM
02-Sep-25

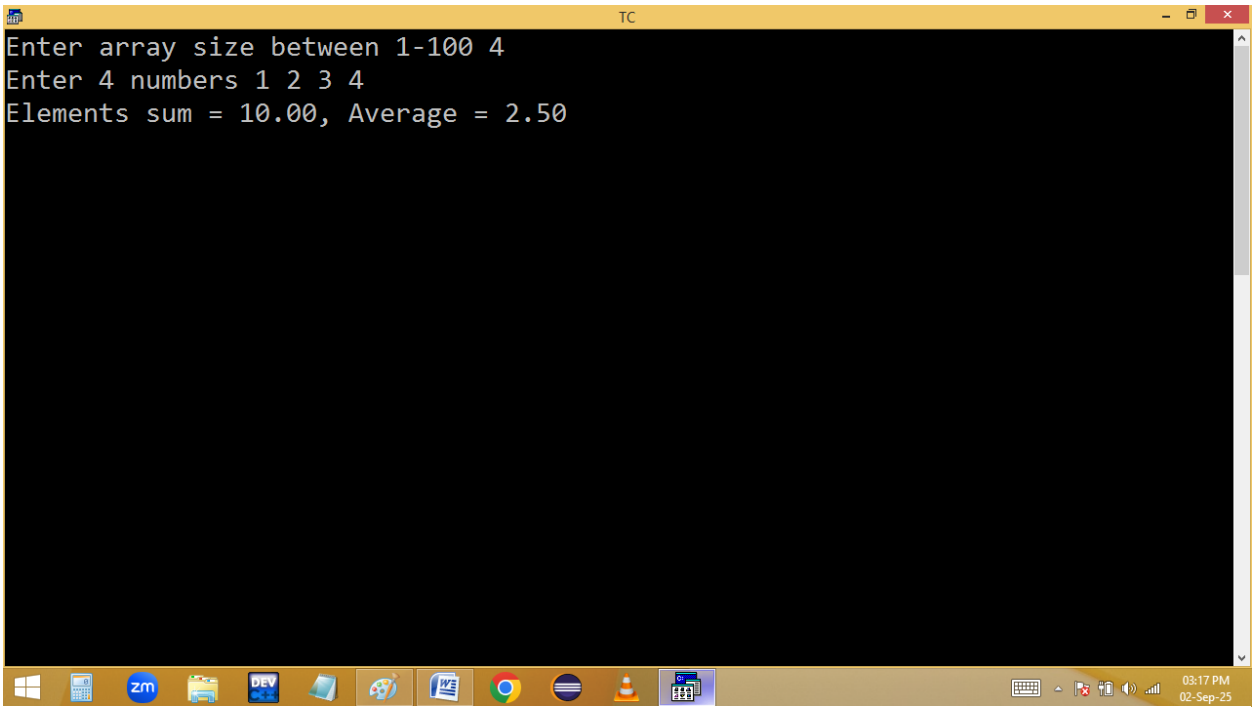

TC
Enter array size 1-100 -5
Array size 1-100 Only
03:08 PM
02-Sep-25



Read n elements into array and find the elements sum and average?


TC
File Edit Run Compile Project Options Debug Break/watch
Line 16 Col 2 Insert Indent Tab Fill Unindent E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
float a[100],s=0; int i,n;
clrscr();
printf("Enter array size between 1-100 ");scanf("%d",&n);
printf("Enter %d numbers ", n);
for(i=0;i<n;i++)
{
scanf("%f",&a[i]);
s+=a[i];
}
printf("Elements sum = %.2f, Average = %.2f", s, s/n);
getch();
}

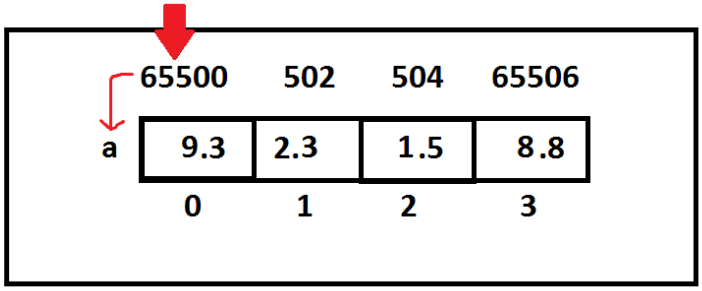

TC
Enter array size between 1-100 4
Enter 4 numbers 9.3 2.3 1.5 8.8
Elements sum = 21.90, Average = 5.48



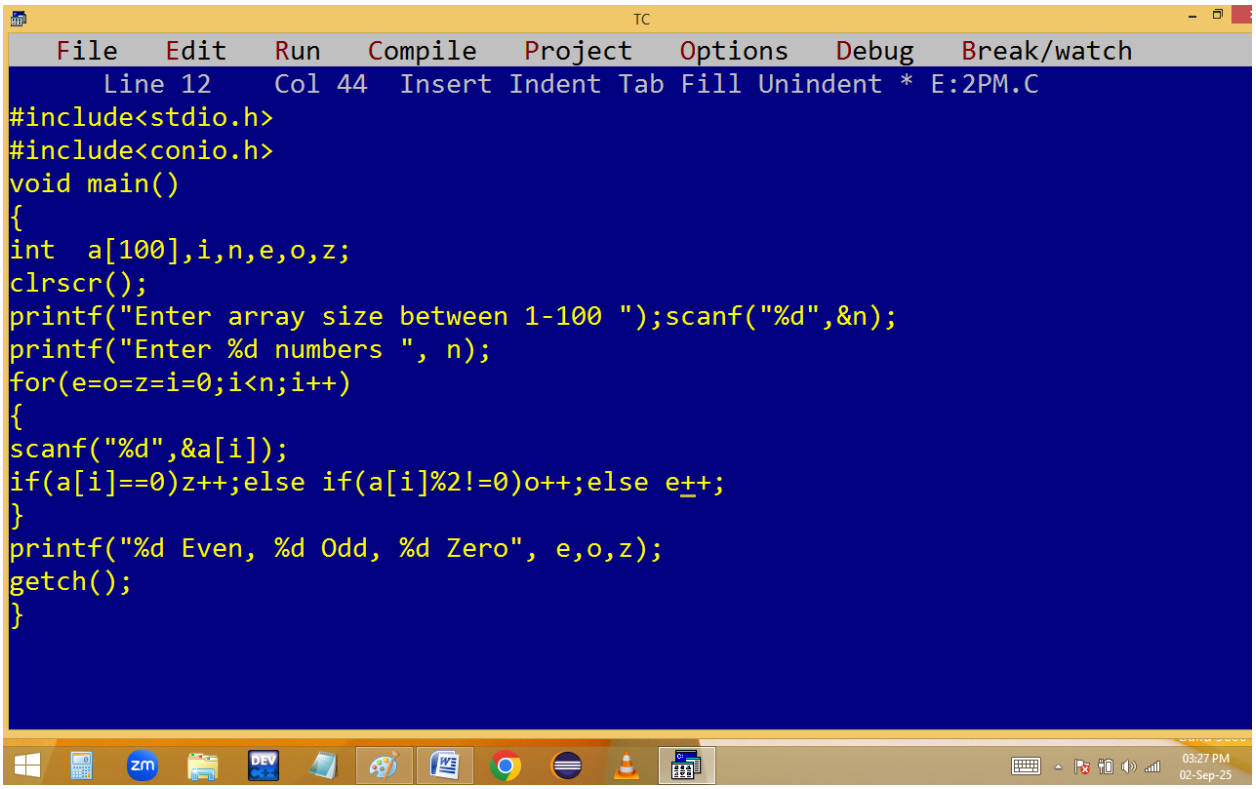

```
for( i=0;i<4;i++)
{
scanf("%f",&a[i]);
s+=a[i];
}

p("Sum=%.2f, Avg=%.2f",s,s/4);
```

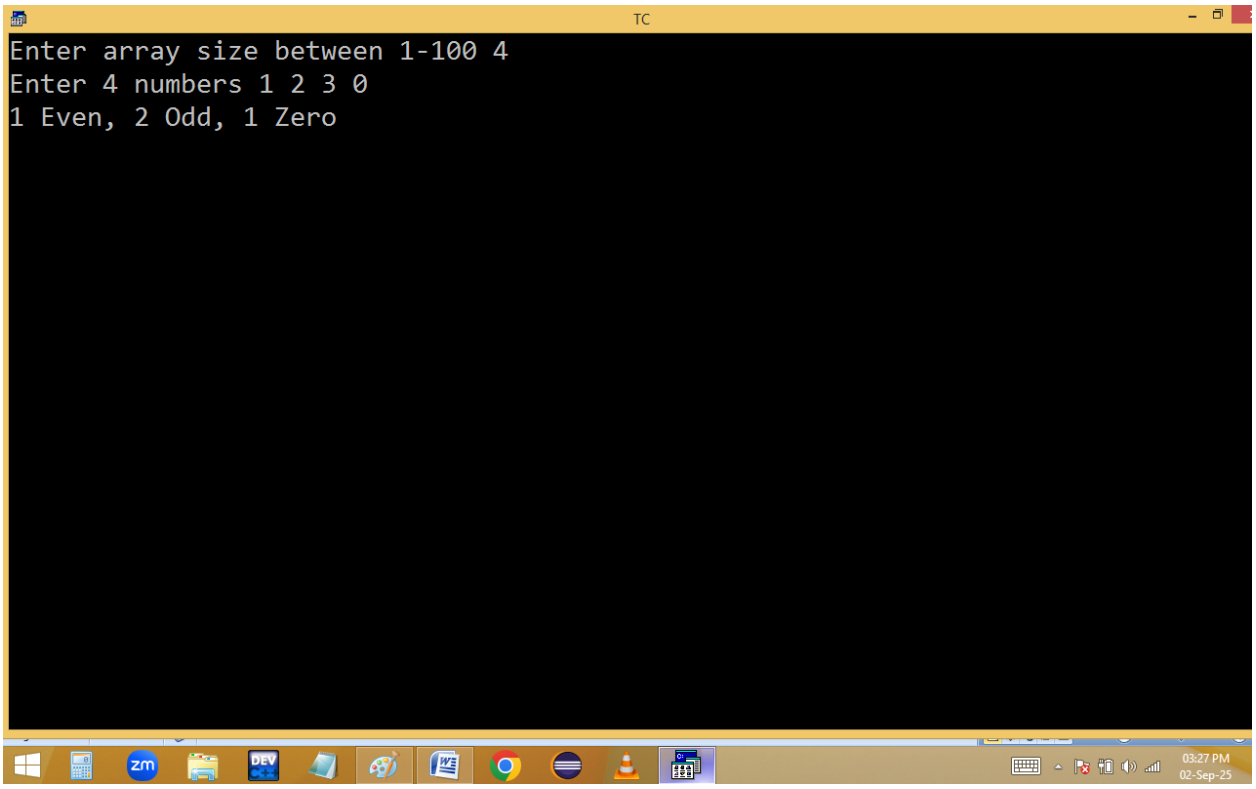
i	s
0	0+
1	9.3
2	2-3
3	1.5
	8.8
	21.90

Base addr



Finding no of even/odd/zero elements in array:


TC
File Edit Run Compile Project Options Debug Break/watch
Line 12 Col 44 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a[100],i,n,e,o,z;
clrscr();
printf("Enter array size between 1-100 ");scanf("%d",&n);
printf("Enter %d numbers ", n);
for(e=o=z=i=0;i<n;i++)
{
scanf("%d",&a[i]);
if(a[i]==0)z++;else if(a[i]%2!=0)o++;else e++;
}
printf("%d Even, %d Odd, %d Zero", e,o,z);
getch();
}



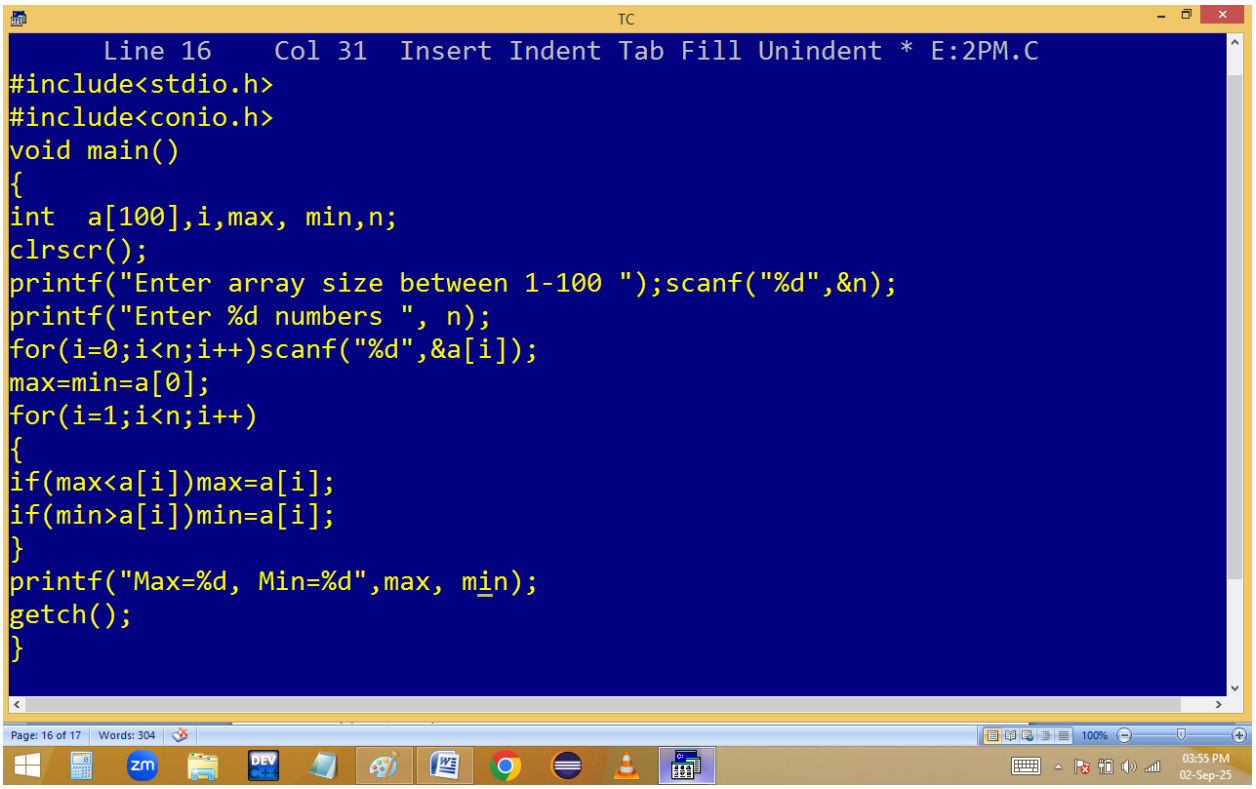

```
for(i=0;i<4;i++)
{
scanf("%d",&a[i]);
if(a[i]==0)z++;
else if(a[i]%2==0)e++;
else o++;
}
p( e, o, z );
```

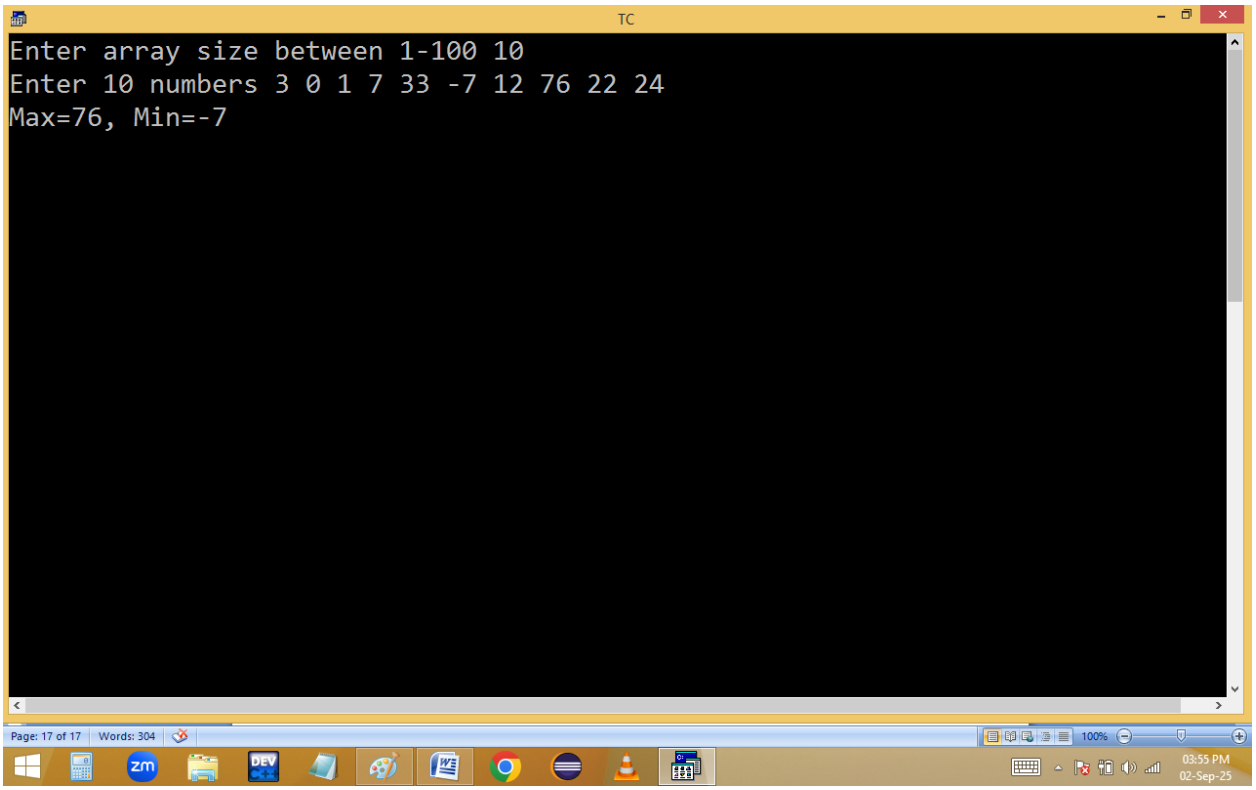
i	e	o	z
0	0	0	0
1		1	1
2	1	2	
3			

Base addr

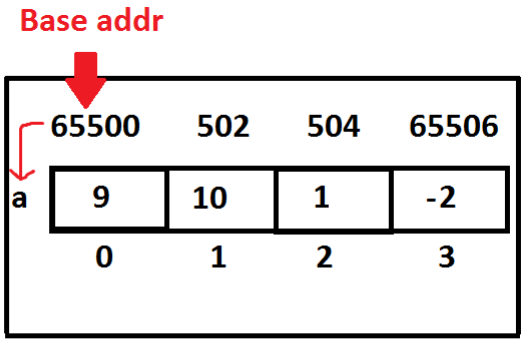
	65500	502	504	65506
a	9	0	1	2
	0	1	2	3

Finding max, min elements of array:


TC
Line 16 Col 31 Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
void main()
{
int a[100],i,max, min,n;
clrscr();
printf("Enter array size between 1-100 ");scanf("%d",&n);
printf("Enter %d numbers ", n);
for(i=0;i<n;i++)scanf("%d",&a[i]);
max=min=a[0];
for(i=1;i<n;i++)
{
if(max<a[i])max=a[i];
if(min>a[i])min=a[i];
}
printf("Max=%d, Min=%d",max, min);
getch();
}
Page: 16 of 17
Words: 304
100%
03:55 PM
02-Sep-25


TC
Enter array size between 1-100 10
Enter 10 numbers 3 0 1 7 33 -7 12 76 22 24
Max=76, Min=-7
Page: 17 of 17
Words: 304
100%
03:55 PM
02-Sep-25

i max min
1 9 9




```
for(i=1;i<4;i++)
{   9 < 10
if(max<a[i])max=a[i];
if(min>a[i])min=a[i];
}
p( max,  min );
```

Home work:

1. Arrange array elements in reverse order permanently.
2. Decimal to binary conversion

   Eg: **20 ==> 10100**