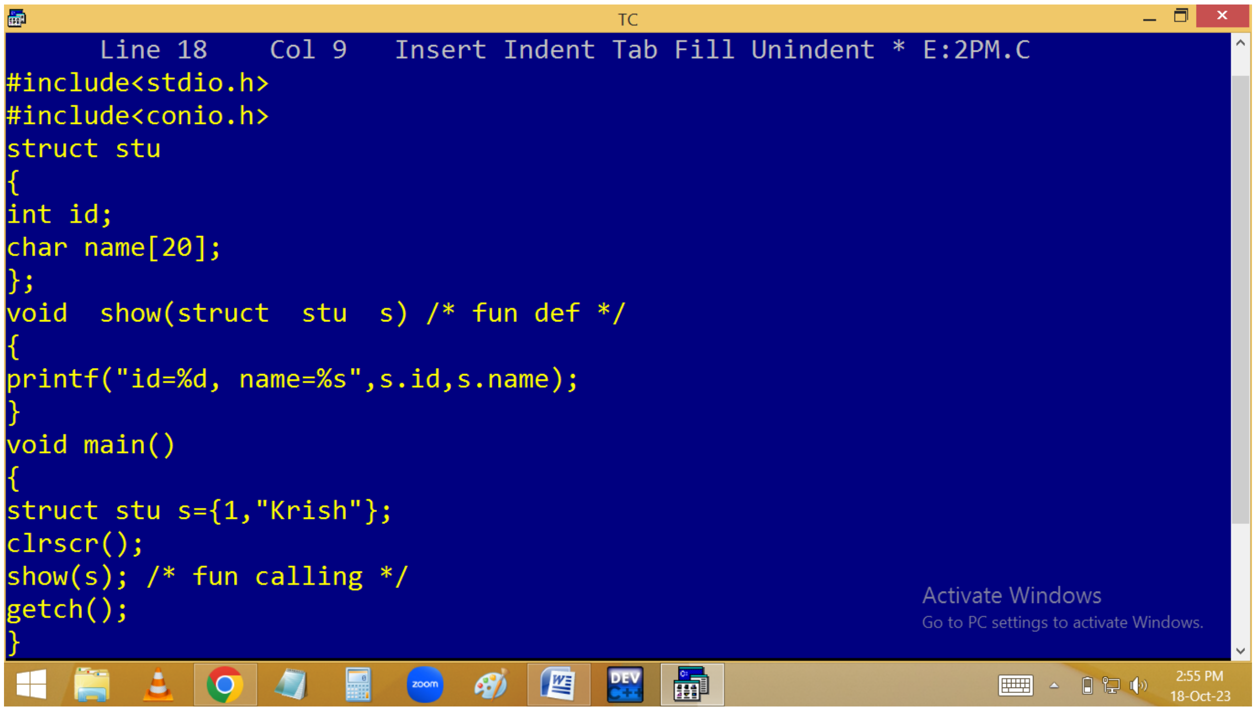
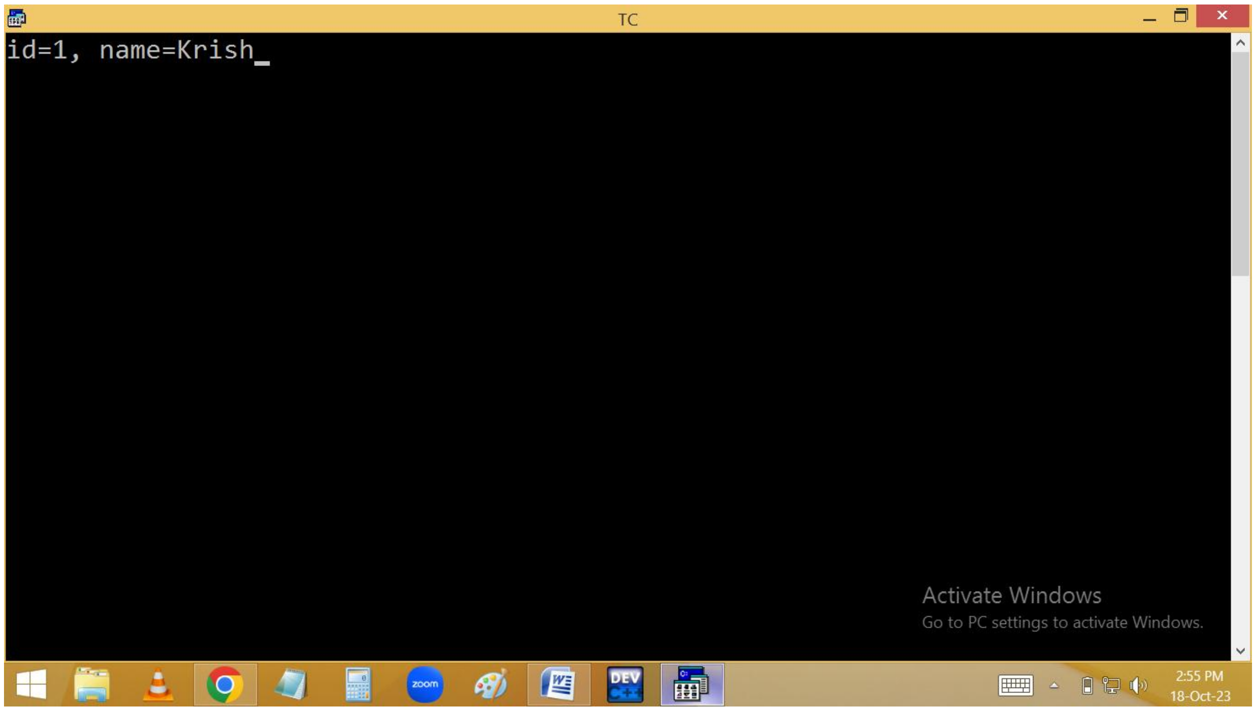
Passing structure to function:

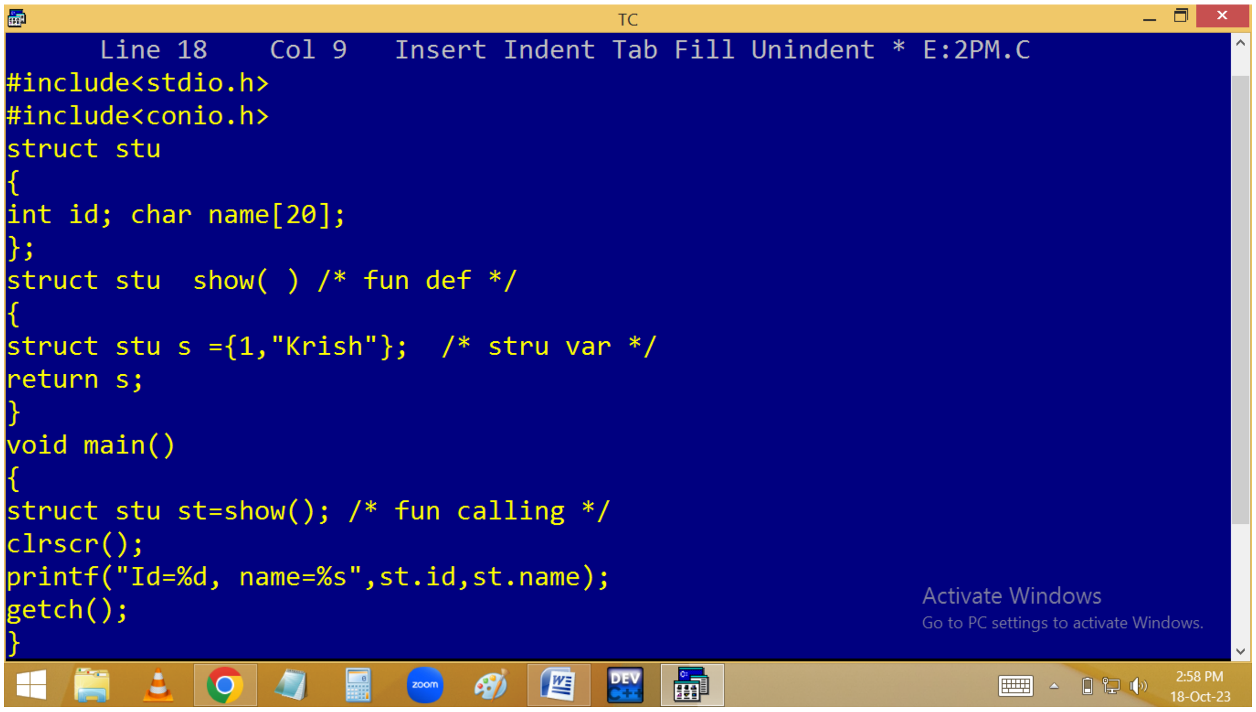


```
      Line 18     Col 9    Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
struct stu
{
int id;
char name[20];
};
void  show(struct  stu  s) /* fun def */
{
printf("id=%d, name=%s",s.id,s.name);
}
void main()
{
struct stu s={1,"Krish"};
clrscr();
show(s); /* fun calling */
getch();
}
```

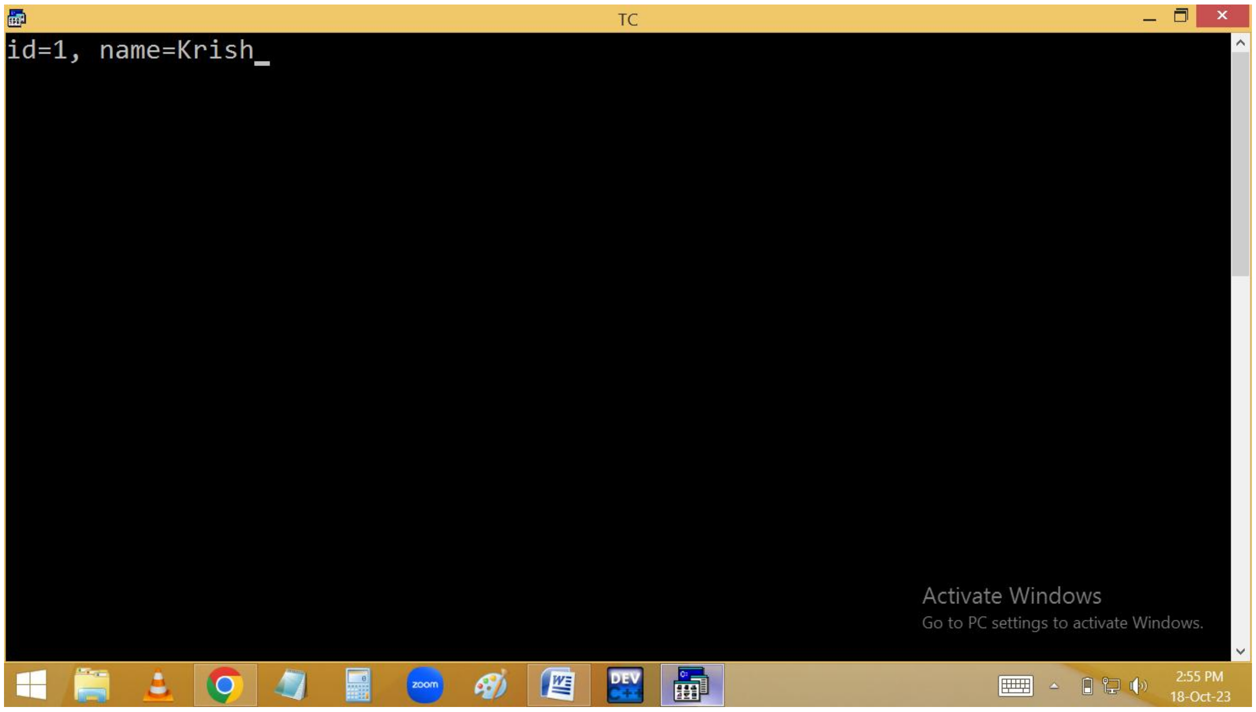


```
id=1, name=Krish_
```

Function returning object:



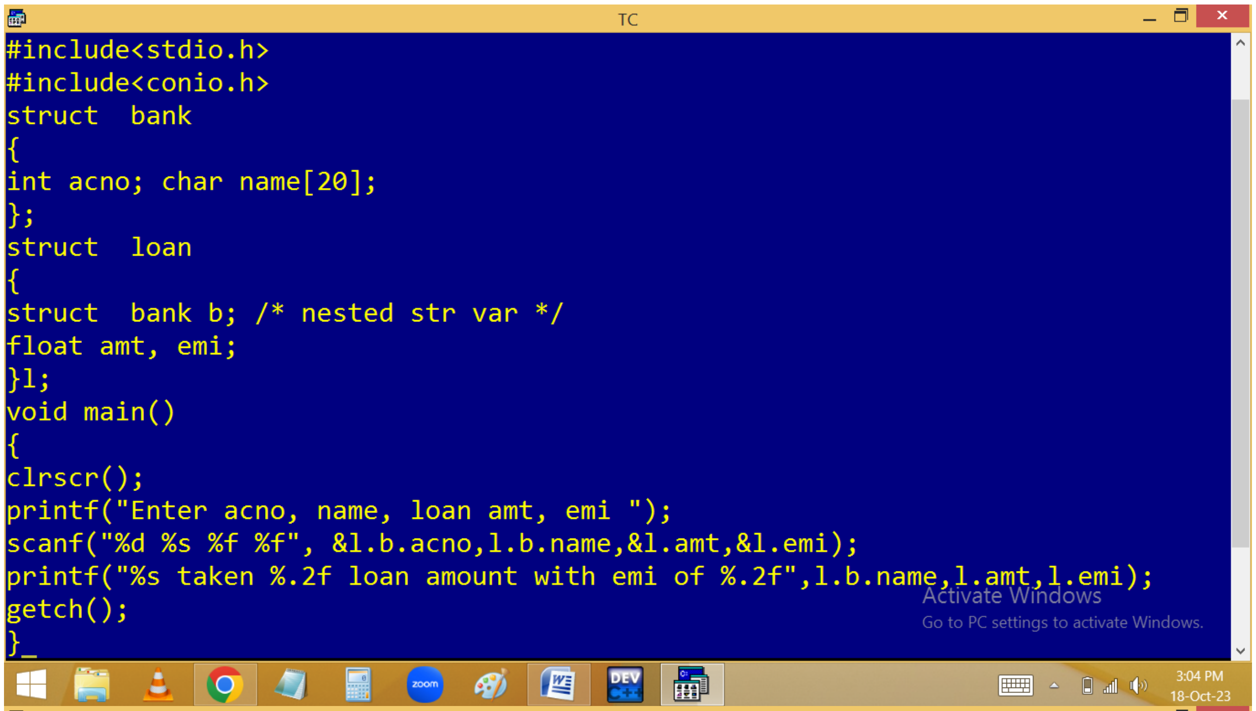
```
      Line 18     Col 9    Insert Indent Tab Fill Unindent * E:2PM.C
#include<stdio.h>
#include<conio.h>
struct stu
{
int id; char name[20];
};
struct stu  show( ) /* fun def */
{
struct stu s ={1,"Krish"};  /* stru var */
return s;
}
void main()
{
struct stu st=show(); /* fun calling */
clrscr();
printf("Id=%d, name=%s",st.id,st.name);
getch();
}
```



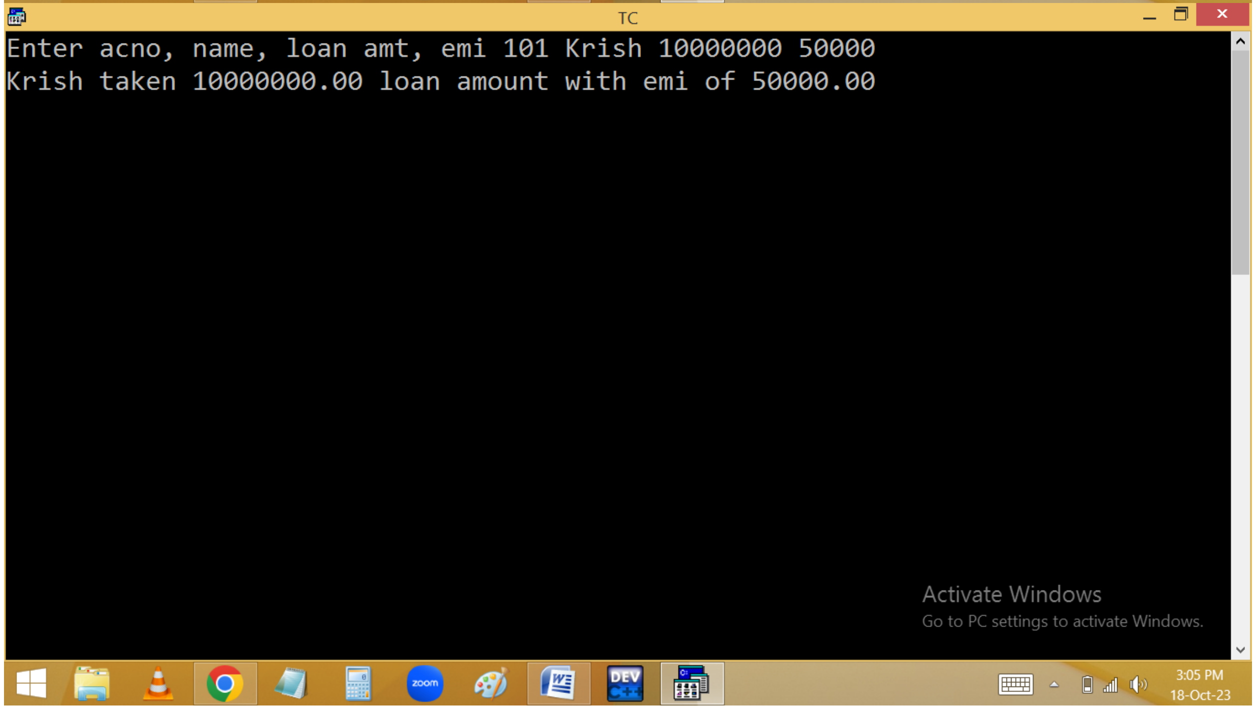
```
id=1, name=Krish_
```

Nested / embedded structure:

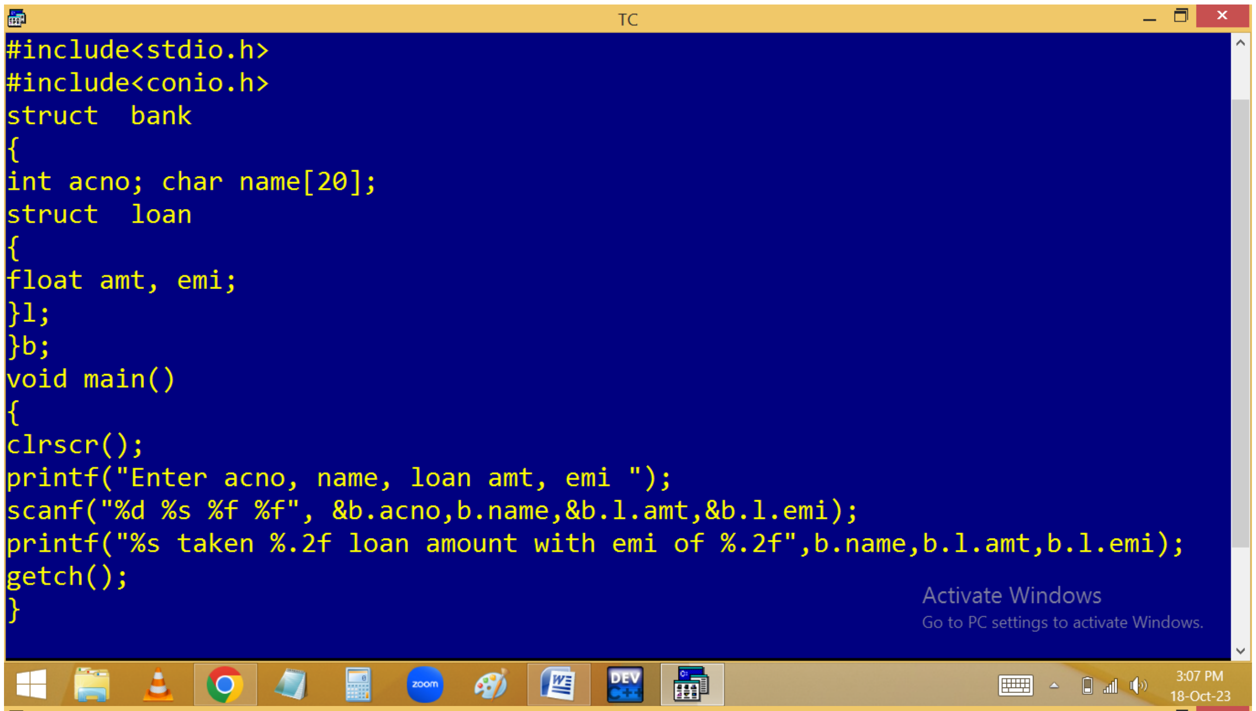
Declaring a structure variable / structure within another structure. It allows the concept of reusability.



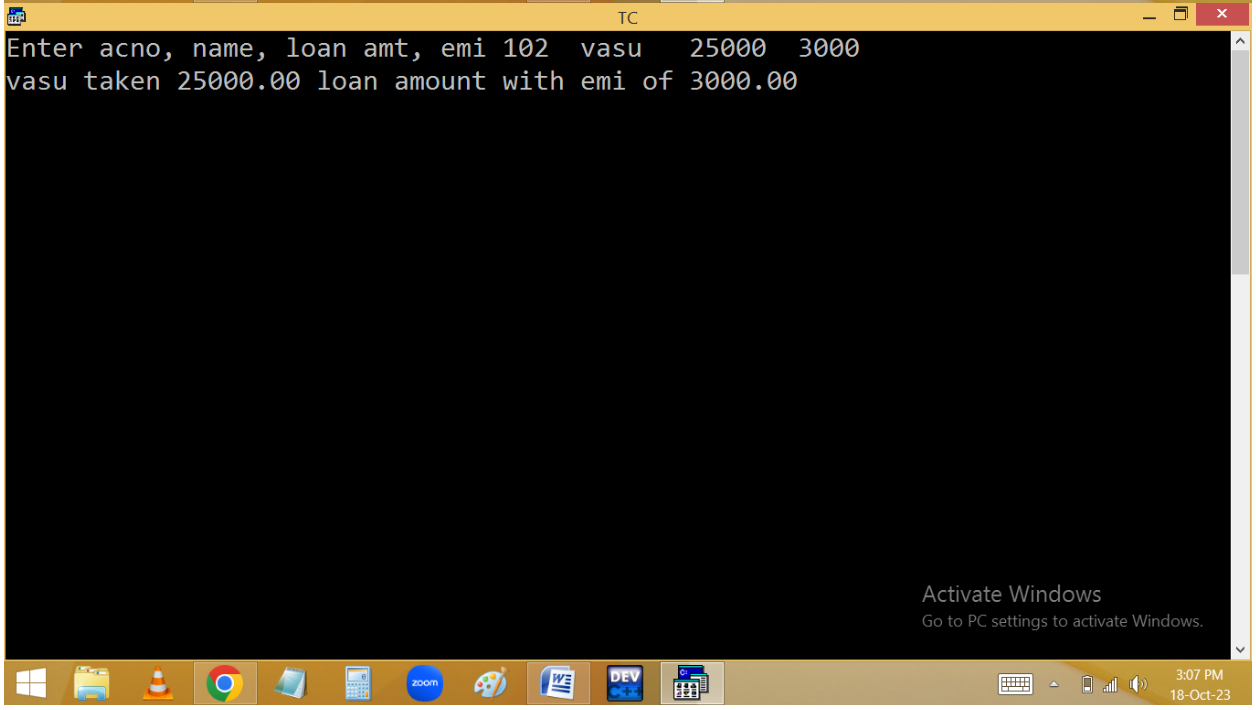
```
#include<stdio.h>
#include<conio.h>
struct  bank
{
int acno; char name[20];
};
struct  loan
{
struct  bank b; /* nested str var */
float amt, emi;
}l;
void main()
{
clrscr();
printf("Enter acno, name, loan amt, emi ");
scanf("%d %s %f %f", &l.b.acno,l.b.name,&l.amt,&l.emi);
printf("%s taken %.2f loan amount with emi of %.2f",l.b.name,l.amt,l.emi);
getch();
}_
```



```
Enter acno, name, loan amt, emi 101 Krish 10000000 50000
Krish taken 10000000.00 loan amount with emi of 50000.00
```



```
#include<stdio.h>
#include<conio.h>
struct  bank
{
int acno; char name[20];
struct  loan
{
float amt, emi;
}l;
}b;
void main()
{
clrscr();
printf("Enter acno, name, loan amt, emi ");
scanf("%d %s %f %f", &b.acno,b.name,&b.l.amt,&b.l.emi);
printf("%s taken %.2f loan amount with emi of %.2f",b.name,b.l.amt,b.l.emi);
getch();
}
```

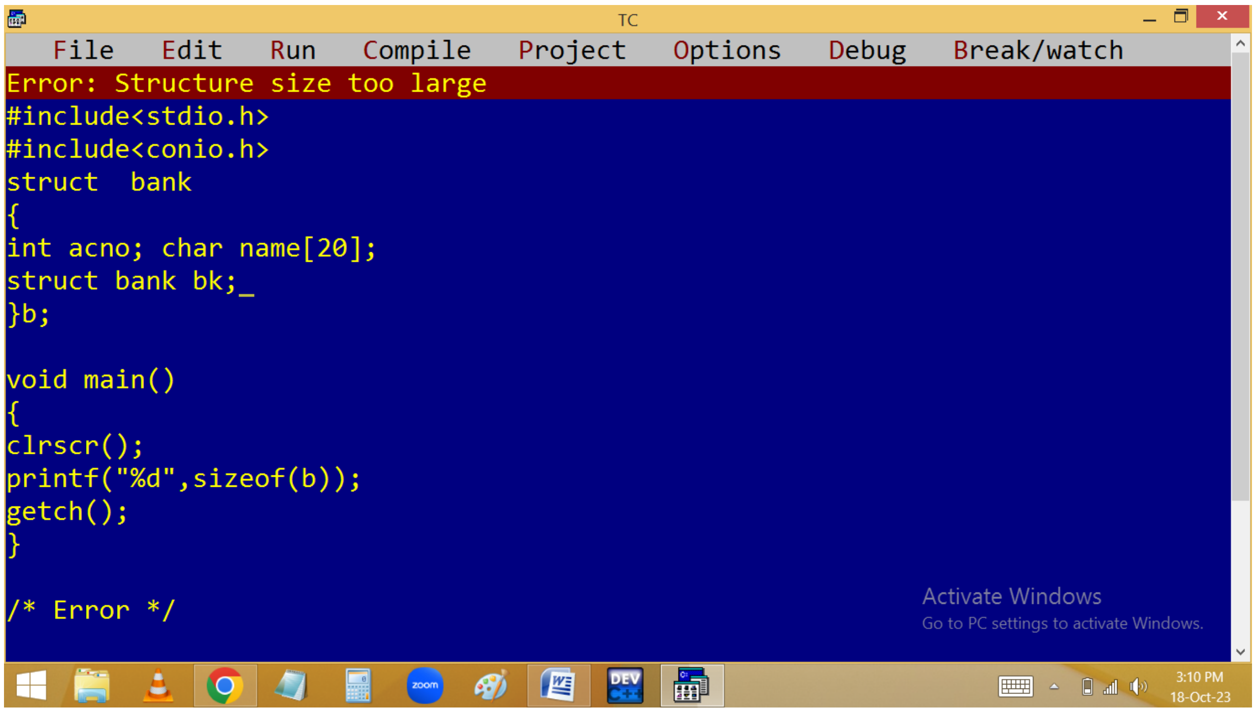


```
Enter acno, name, loan amt, emi 102  vasu   25000  3000
vasu taken 25000.00 loan amount with emi of 3000.00
```

Self referenced / self referential structure:

Declaring pointer structure variable of same structure within the structure is called self referential structure. It is used in data structures to manage the linked list, stacks and queues.

It is not possible to create the normal structure variable within the same structure. Because of it causes memory overflow. In this situation we have to declare the structure variable using a pointer.

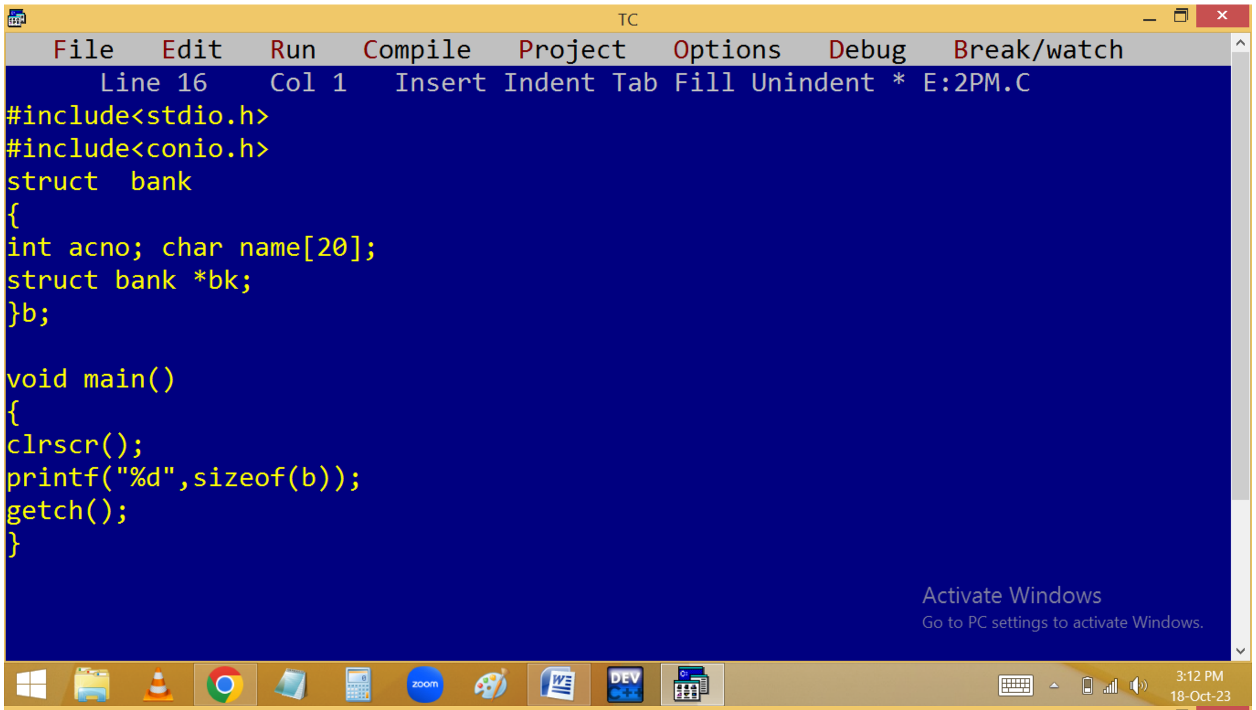

TC
File Edit Run Compile Project Options Debug Break/watch

```
Error: Structure size too large
#include<stdio.h>
#include<conio.h>
struct  bank
{
int acno; char name[20];
struct bank bk;_
}b;

void main()
{
clrscr();
printf("%d",sizeof(b));
getch();
}

/* Error */
```

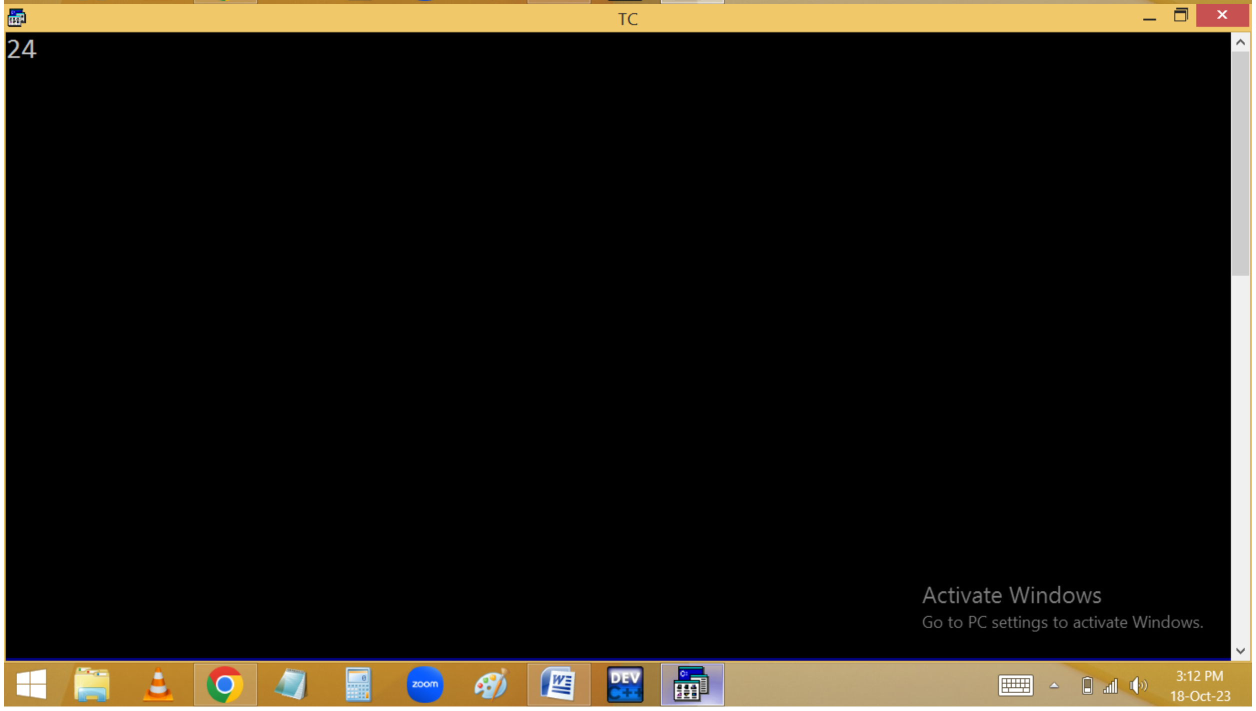
Activate Windows
Go to PC settings to activate Windows.
3:10 PM
18-Oct-23



TC
File Edit Run Compile Project Options Debug Break/watch
Line 16 Col 1 Insert Indent Tab Fill Unindent * E:2PM.C
Activate Windows
Go to PC settings to activate Windows.
3:12 PM
18-Oct-23

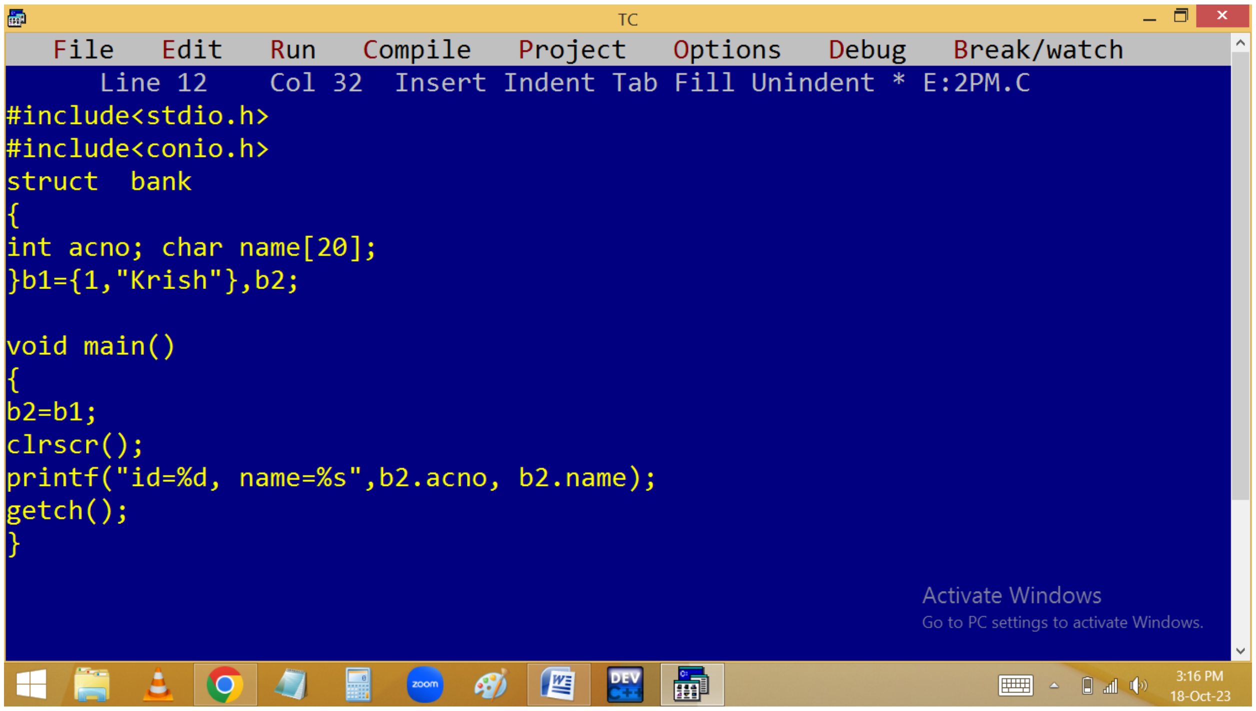
```
#include<stdio.h>
#include<conio.h>
struct  bank
{
int acno; char name[20];
struct bank *bk;
}b;

void main()
{
clrscr();
printf("%d",sizeof(b));
getch();
}
```



```
24
```

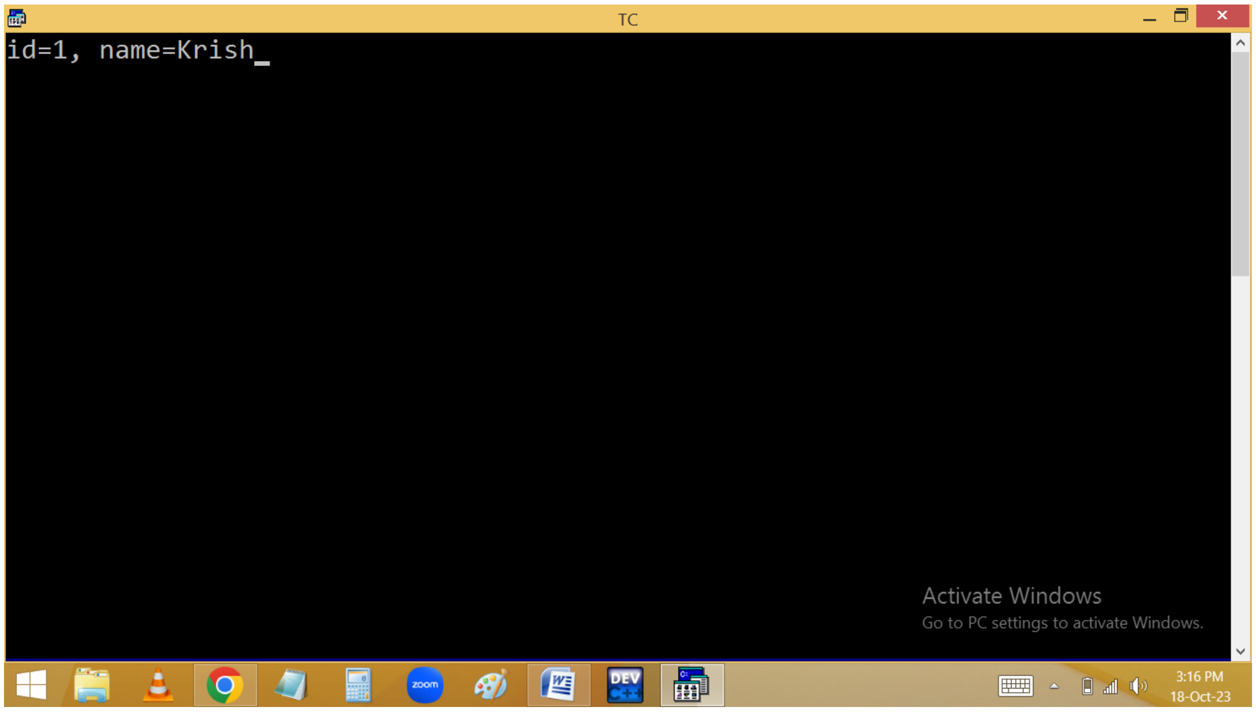
Coping structure data:


TC
File Edit Run Compile Project Options Debug Break/watch
Line 12 Col 32 Insert Indent Tab Fill Unindent * E:2PM.C

```
#include<stdio.h>
#include<conio.h>
struct  bank
{
int acno; char name[20];
}b1={1,"Krish"},b2;

void main()
{
b2=b1;
clrscr();
printf("id=%d, name=%s",b2.acno, b2.name);
getch();
}
```

Activate Windows
Go to PC settings to activate Windows.
3:16 PM
18-Oct-23



```
id=1, name=Krish_
```

UNION

It is a user defined data type.

union is a keyword.

Like the structures unions are also used to place several variables of different data types under one name. But the main difference is all union members are having common memory/ one memory.

In structure memory allocated for all the structure members separately. But in union one memory allocated and it is used by all the union members. We can access all the structure members at a time. But in union one member is active at a time. Structure size is sum of all the structure members. Union size is biggest union member size.

There is a situation where we have several options and user has to select one then go for union.

Syntax:

```
union    [ <union-tag-name> ]
{
```

```
datatype    variable1;
                                  }  Union members
datatype   variable2;
} union variables;
```

➔Declaration and Accessing of union members is similar to the structures.

Eg: Finding union size:

```
#include<stdio.h>
#include<conio.h>
union   stu
{
int  id;
char name[20];
float fee;
}s;
void main()
{
printf("Union size  %d bytes", sizeof(s));
getch();
}
```

Output: Union size 20 bytes.

Eg:

Direct Initialization of union members:

Note: In union only the first member is initialized directly.

```
#include<stdio.h>
#include<conio.h>
union  stu
{
int  id;
char name[20];
float fee;
}s={1001,"krish",10000};
void main()
```

```
{
clrscr();
printf("Id=%d\nName=%s\nFee=%.2f",s.id,
s.name, s.fee);
getch();
}
```

Output: Initializer syntax error

Solution: s = {1001} ;

Eg:

Accessing union members:

```
#include<stdio.h>
#include<conio.h>
union  sample
{
int a;
long int b;
};
void main()
{
union   sample  s;
clrscr();
s.a=100;
printf("a = %d\n", s.a);
s.b=200;
printf("b = %ld", s.b);
getch();
}
```

Output

```
a = 100
b = 200
```

Differences between structure and union:

STRUCTURE	UNION
All the structure	Only one union member

members are active at a time.	is active at a time.
memory is allocated for all the structure members	memory allocated for the variable, which requires more memory in the union.
All the structure members initialized at a time.	Only the first member of union is initialized.
Structure size is sum of all the structure members.	Union size is the biggest variable data type size in the entire union.
They are useful to declare a compound data type to group data members related to person or item etc.	It is useful in certain situation where the user will select any one data member from group of data members.

enum   / enumeration

It allows to store several integer values in the form of identifiers.

It is a user defined data type.

enum is a keyword.

It is similar to the structure, which allows to store several values. But the difference is it stores only the integers in text format [identifiers].

Syntax:

```
enum   [<tag_name>]
{
Identifier1, Identifier2, ….
}
[Variable=value];
```

Here the identifier numbers started with 0 ,1, 2,..and end with N-1 implicitly. We can change this series manually.

Eg: 1

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

```
enum  week
{
sun, mon, tue, wed, thu, fri, sat
}
day=sun;
void main()
{
clrscr();
printf(“Sunday is %dst day of the
week”,day+1);
getch();
}
```

Output: **Sun**day is 1st day of the week

Eg: 2

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

```
enum
{
police=100, fire, ambulance=108
}e=fire;
void main()
{
clrscr();
printf("Dialing  %d service…", e);
getch();
}
```

Output: dialing 101 service…

Eg: 3

```
#include<stdio.h>
#include<conio.h>
enum  colors {black, blue, green, cyan, red};
void main()
```

```
{
clrscr();
enum   colors  color=green;
textcolor(color);
textbackground(1);
cprintf(“Naresh   It”);
getch();
}
```