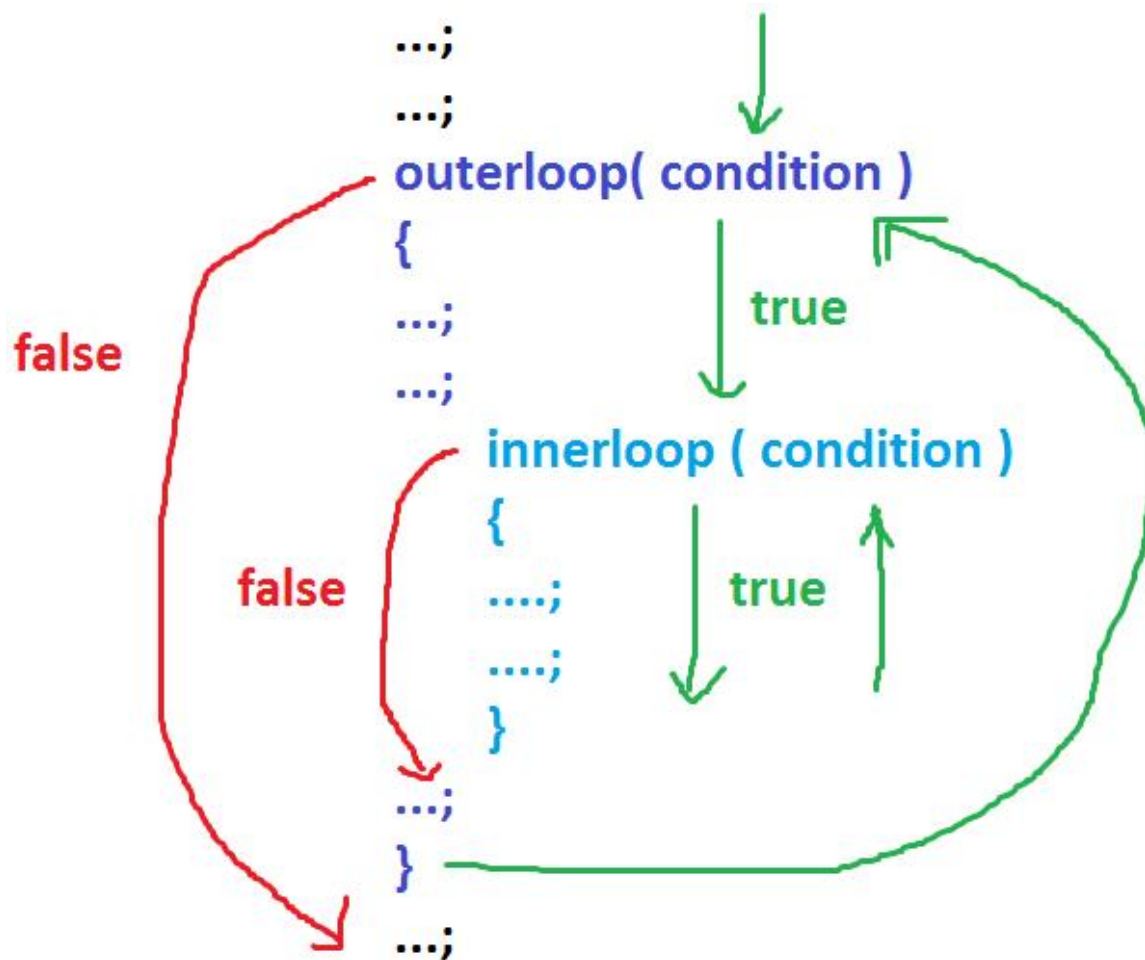


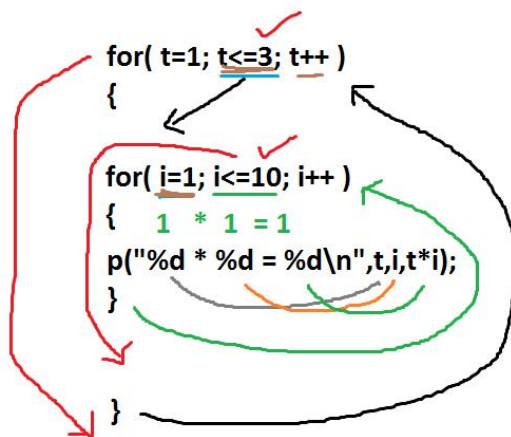
## NESTED LOOPS

Loop within loop is called nested loop.

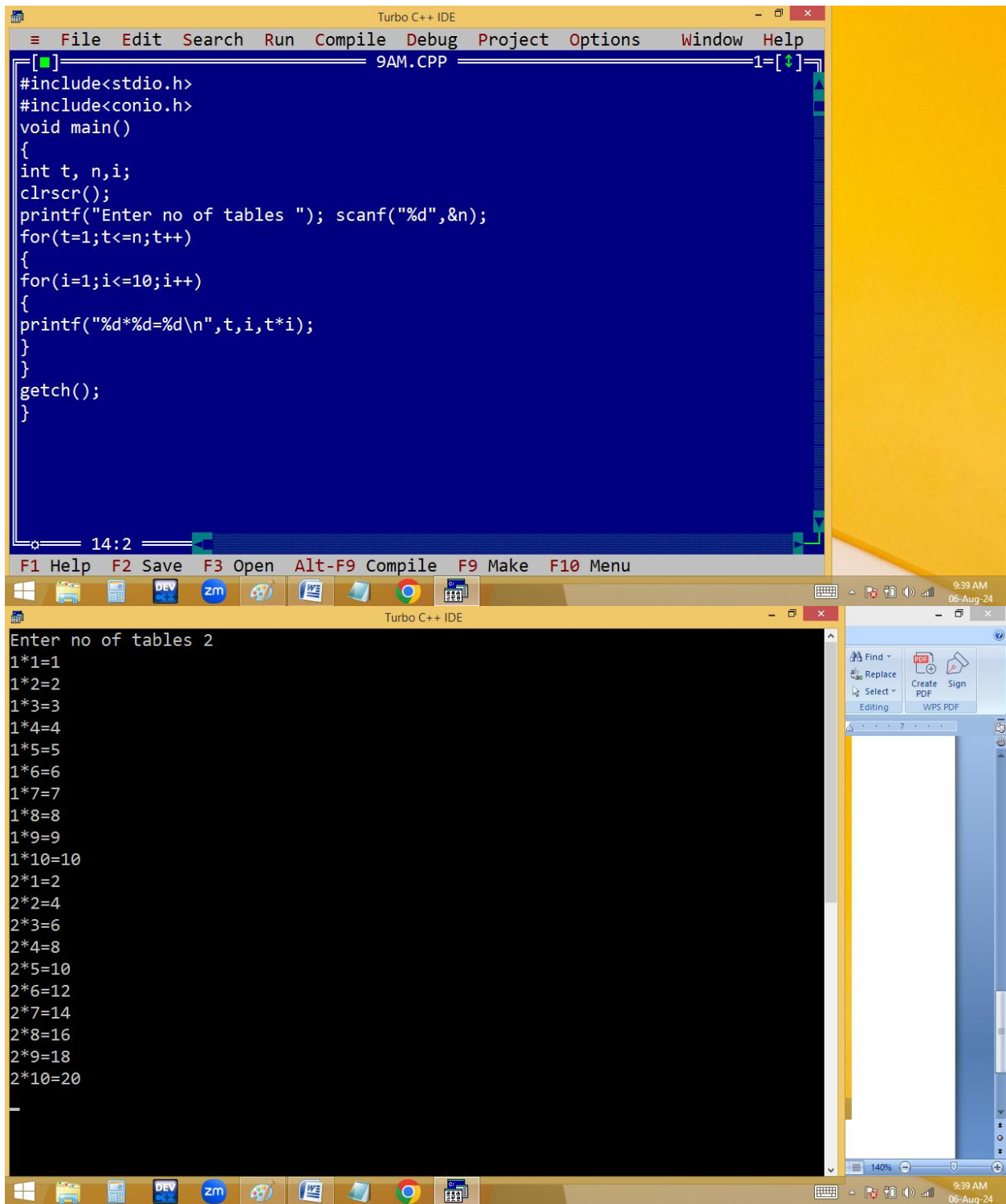


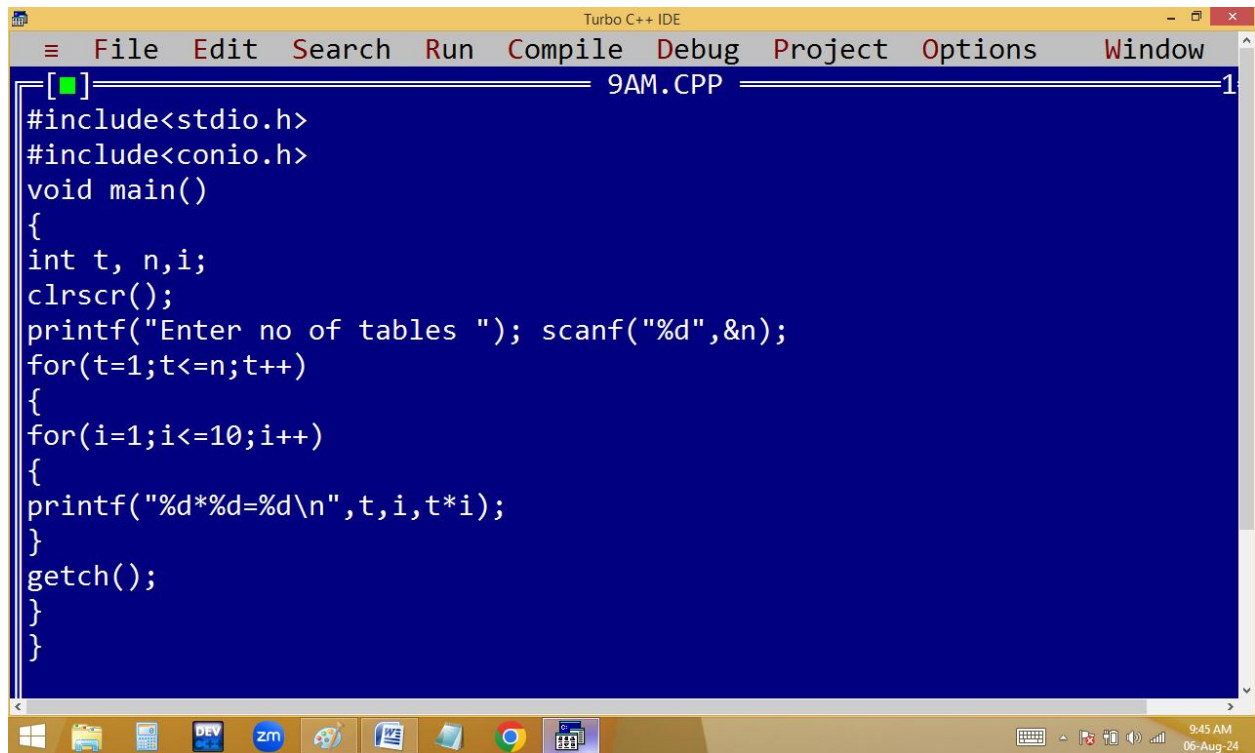
**Printing 1..n tables:**

N=3 → 1 to 3 tables



$t \leq 3$	$i \leq 10$
1	1 2 3 - - 10 11
2	x 1 2 - - 10 11
3	x 1 2 - - 10 11
4	





The image shows a screenshot of the Turbo C++ IDE. The title bar at the top reads "Turbo C++ IDE". The menu bar includes "File", "Edit", "Search", "Run", "Compile", "Debug", "Project", "Options", and "Window". The main window displays a C++ program in a file named "9AM.CPP". The code is as follows:

```
#include<stdio.h>
#include<conio.h>
void main()
{
    int t, n,i;
    clrscr();
    printf("Enter no of tables "); scanf("%d",&n);
    for(t=1;t<=n;t++)
    {
        for(i=1;i<=10;i++)
        {
            printf("%d*%d=%d\n",t,i,t*i);
        }
        getch();
    }
}
```

The Windows taskbar is visible at the bottom, showing icons for the Start menu, File Explorer, DEV C++, ZOOM, and other applications. The system clock in the bottom right corner indicates the time is 9:45 AM on 06-Aug-24.

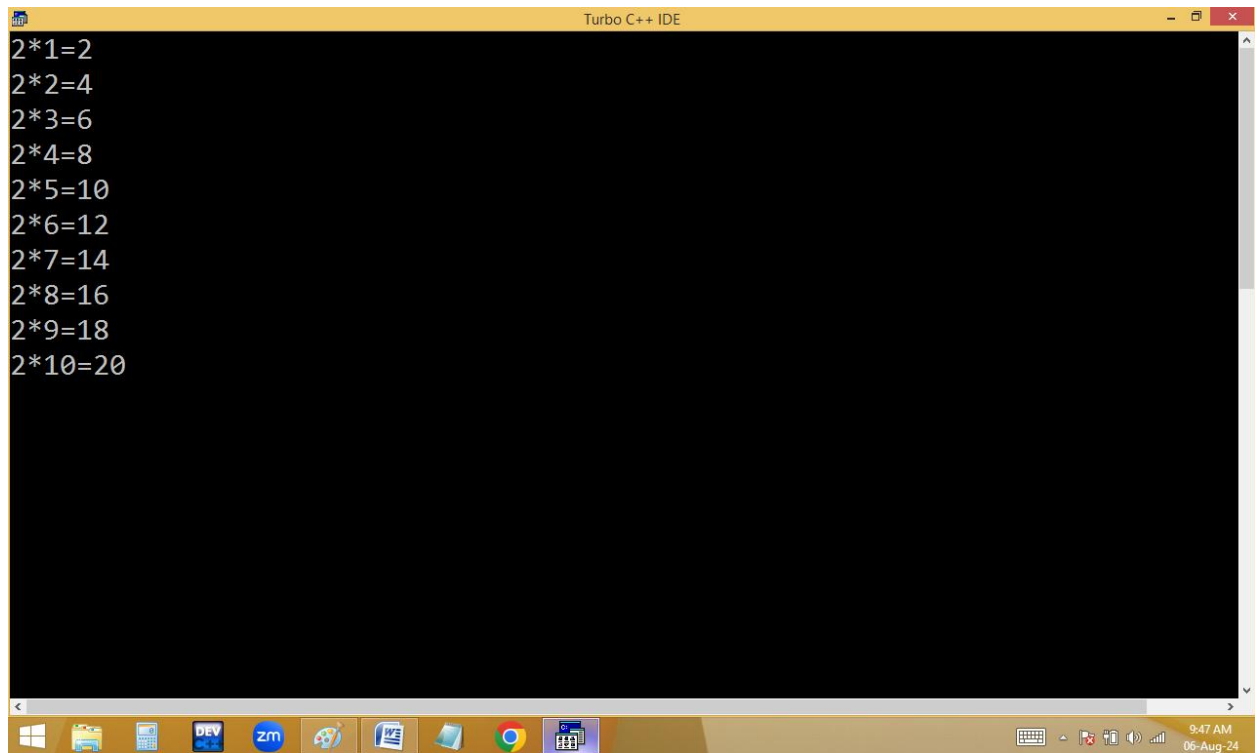
```
Turbo C++ IDE
Enter no of tables 2
1*1=1
1*2=2
1*3=3
1*4=4
1*5=5
1*6=6
1*7=7
1*8=8
1*9=9
1*10=10

Turbo C++ IDE
1*3=3
1*4=4
1*5=5
1*6=6
1*7=7
1*8=8
1*9=9
1*10=10
2*1=2
2*2=4
2*3=6
2*4=8
2*5=10
2*6=12
2*7=14
2*8=16
2*9=18
2*10=20

Turbo C++ IDE
```

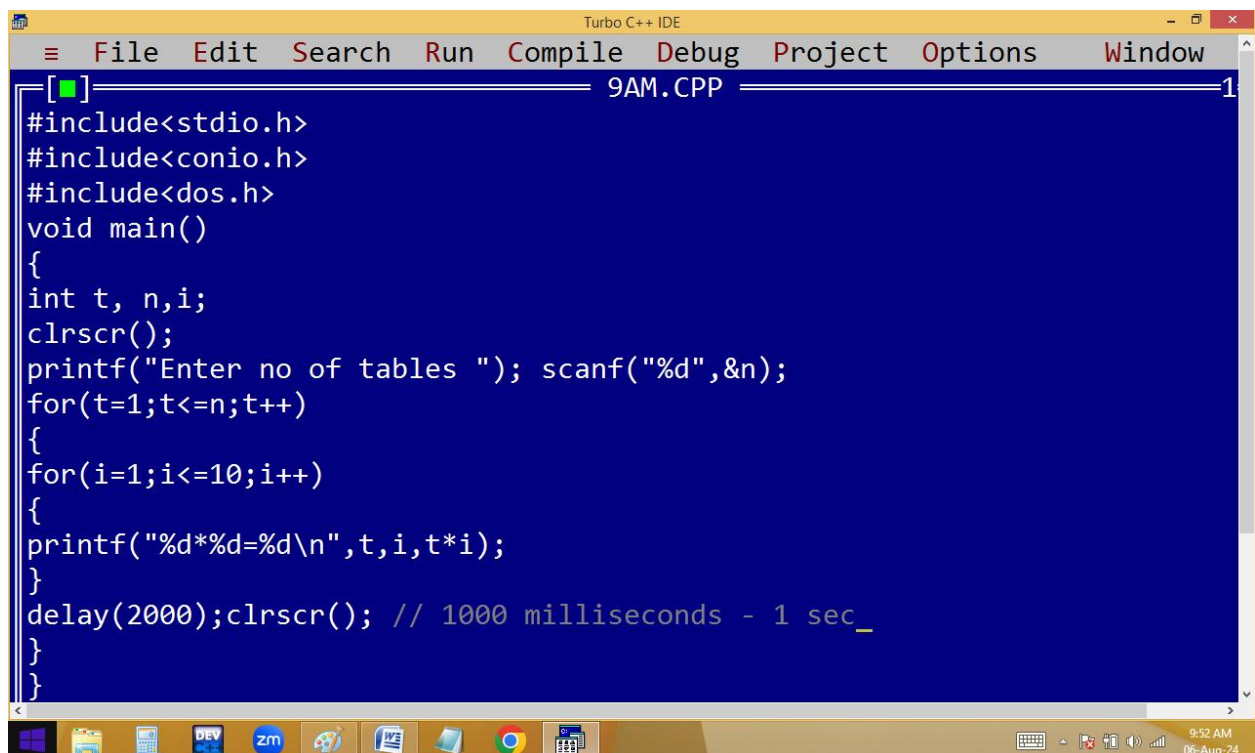
```
Turbo C++ IDE
File Edit Search Run Compile Debug Project Options Window
9AM.CPP
#include<stdio.h>
#include<conio.h>
void main()
{
int t, n,i;
clrscr();
printf("Enter no of tables "); scanf("%d",&n);
for(t=1;t<=n;t++)
{
for(i=1;i<=10;i++)
{
printf("%d*%d=%d\n",t,i,t*i);
}
getch();clrscr();
}
}
```

```
Turbo C++ IDE
Enter no of tables 2
1*1=1
1*2=2
1*3=3
1*4=4
1*5=5
1*6=6
1*7=7
1*8=8
1*9=9
1*10=10
```



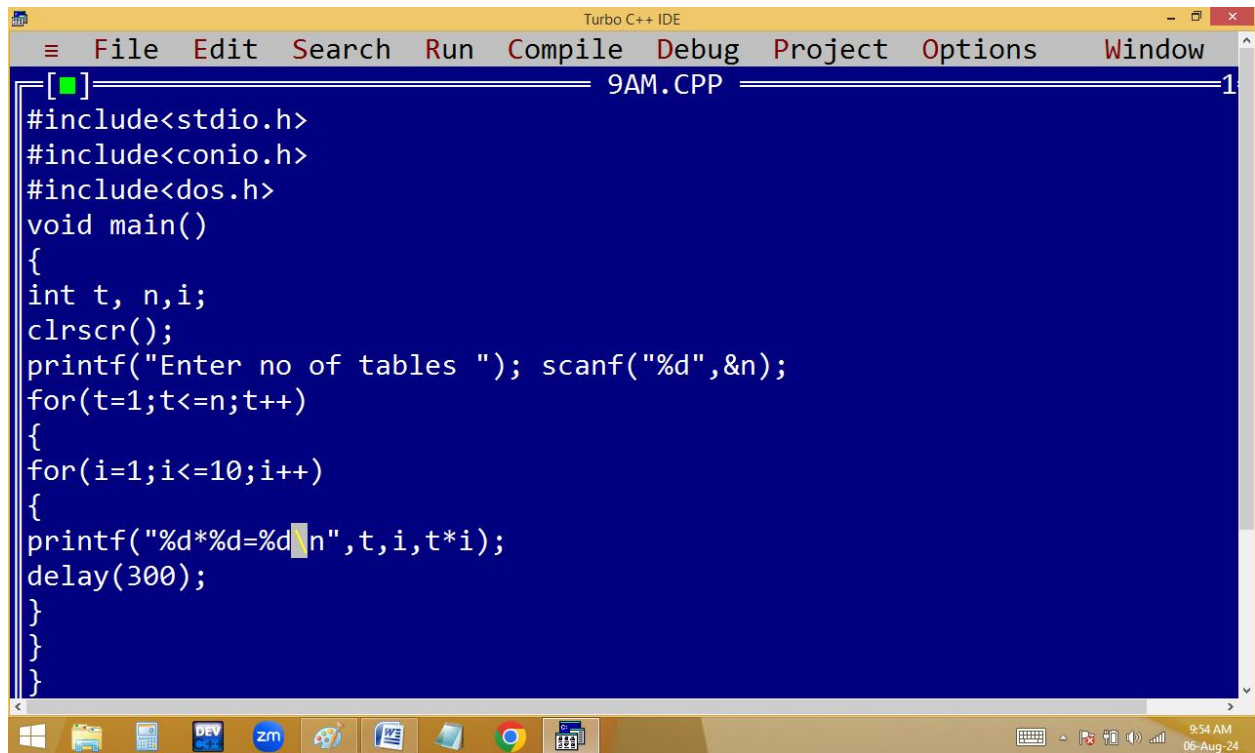
A screenshot of the Turbo C++ IDE window. The title bar reads "Turbo C++ IDE". The main text area is black with white text displaying multiplication tables for the number 2, from 2\*1 to 2\*10. The Windows taskbar is visible at the bottom with various icons and a system clock showing 9:47 AM on 06-Aug-24.

```
2*1=2
2*2=4
2*3=6
2*4=8
2*5=10
2*6=12
2*7=14
2*8=16
2*9=18
2*10=20
```



A screenshot of the Turbo C++ IDE window showing the source code for a file named "9AM.CPP". The menu bar includes File, Edit, Search, Run, Compile, Debug, Project, Options, and Window. The code is written in C and uses `clrscr()` and `delay()` functions. The Windows taskbar at the bottom shows the system clock as 9:52 AM on 06-Aug-24.

```
#include<stdio.h>
#include<conio.h>
#include<dos.h>
void main()
{
    int t, n,i;
    clrscr();
    printf("Enter no of tables "); scanf("%d",&n);
    for(t=1;t<=n;t++)
    {
        for(i=1;i<=10;i++)
        {
            printf("%d*%d=%d\n",t,i,t*i);
        }
        delay(2000);clrscr(); // 1000 milliseconds - 1 sec_
    }
}
```



The image shows a screenshot of the Turbo C++ IDE. The window title is "Turbo C++ IDE". The menu bar includes File, Edit, Search, Run, Compile, Debug, Project, Options, and Window. The file name is "9AM.CPP". The code is as follows:

```
#include<stdio.h>
#include<conio.h>
#include<dos.h>
void main()
{
    int t, n,i;
    clrscr();
    printf("Enter no of tables "); scanf("%d",&n);
    for(t=1;t<=n;t++)
    {
        for(i=1;i<=10;i++)
        {
            printf("%d*%d=%d\t",t,i,t*i);
            delay(300);
        }
    }
}
```

The taskbar at the bottom shows various icons including Windows, File Explorer, DEV, zm, a game controller, a document, a folder, Google Chrome, and a calendar. The system clock shows 9:54 AM on 06-Aug-24.

**Tables side by side:**



```
Turbo C++ IDE
File Edit Search Run Compile Debug Project Options Window
9AM.CPP
#include<stdio.h>
#include<conio.h>
void main()
{
int t, n,i;
clrscr();
printf("Enter no of tables "); scanf("%d",&n);
for(i=1;i<=10;i++)
{
for(t=1;t<=n;t++)
{
printf("%d*%d=%d\t",t,i,t*i);
}
printf("\n");
}
getch();_
}

Enter no of tables 5
1*1=1 2*1=2 3*1=3 4*1=4 5*1=5
1*2=2 2*2=4 3*2=6 4*2=8 5*2=10
1*3=3 2*3=6 3*3=9 4*3=12 5*3=15
1*4=4 2*4=8 3*4=12 4*4=16 5*4=20
1*5=5 2*5=10 3*5=15 4*5=20 5*5=25
1*6=6 2*6=12 3*6=18 4*6=24 5*6=30
1*7=7 2*7=14 3*7=21 4*7=28 5*7=35
1*8=8 2*8=16 3*8=24 4*8=32 5*8=40
1*9=9 2*9=18 3*9=27 4*9=36 5*9=45
1*10=10 2*10=20 3*10=30 4*10=40 5*10=50

Turbo C++ IDE
9:56 AM
06-Aug-24
```

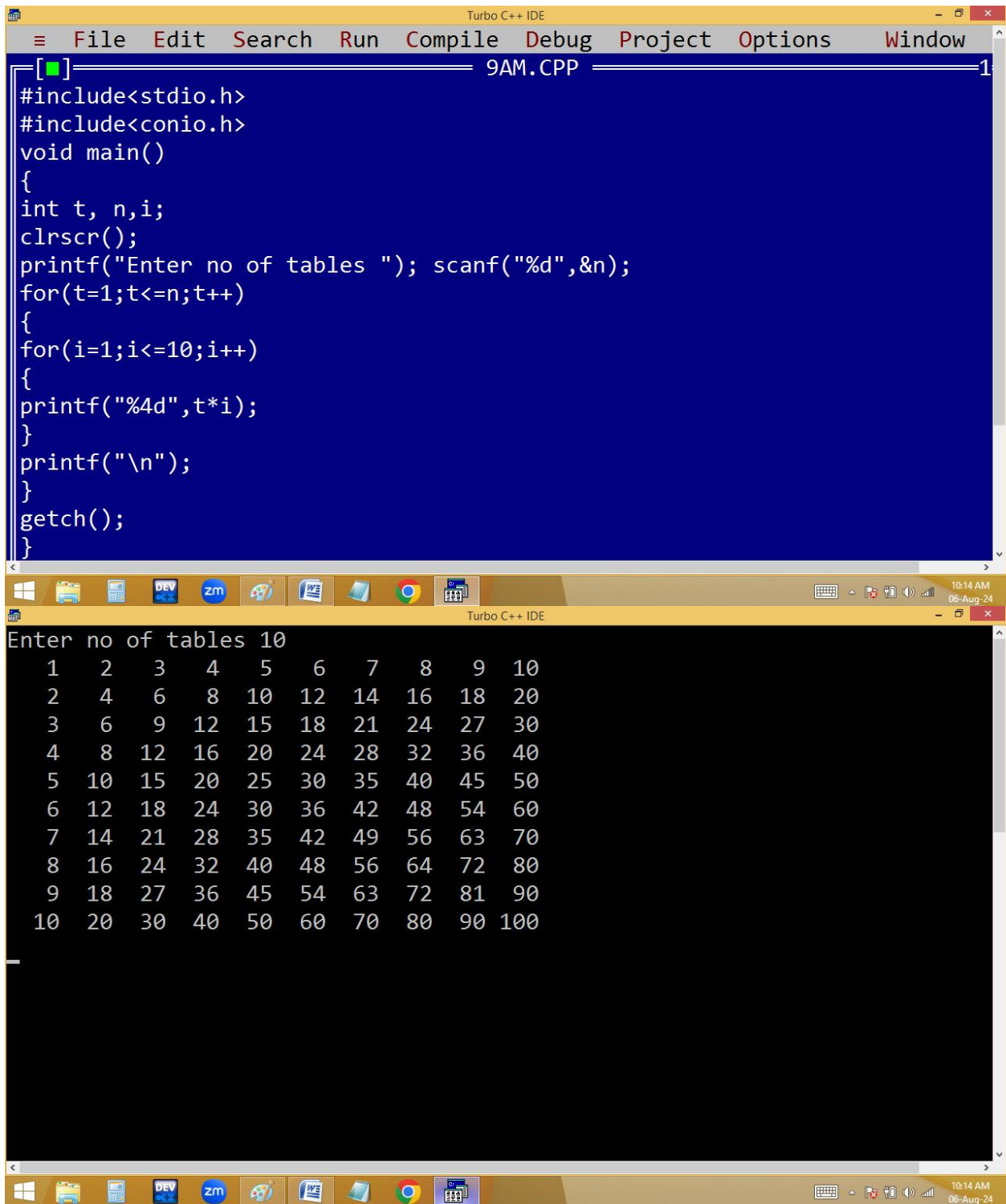
```
Turbo C++ IDE
Enter no of tables 9
1*1=1  2*1=2  3*1=3  4*1=4  5*1=5  6*1=6  7*1=7  8*1=8  9*1=9
1*2=2  2*2=4  3*2=6  4*2=8  5*2=10 6*2=12 7*2=14 8*2=16 9*2=18
1*3=3  2*3=6  3*3=9  4*3=12 5*3=15 6*3=18 7*3=21 8*3=24 9*3=27
1*4=4  2*4=8  3*4=12 4*4=16 5*4=20 6*4=24 7*4=28 8*4=32 9*4=36
1*5=5  2*5=10 3*5=15 4*5=20 5*5=25 6*5=30 7*5=35 8*5=40 9*5=45
1*6=6  2*6=12 3*6=18 4*6=24 5*6=30 6*6=36 7*6=42 8*6=48 9*6=54
1*7=7  2*7=14 3*7=21 4*7=28 5*7=35 6*7=42 7*7=49 8*7=56 9*7=63
1*8=8  2*8=16 3*8=24 4*8=32 5*8=40 6*8=48 7*8=56 8*8=64 9*8=72
1*9=9  2*9=18 3*9=27 4*9=36 5*9=45 6*9=54 7*9=63 8*9=72 9*9=81
1*10=10 2*10=20 3*10=30 4*10=40 5*10=50 6*10=60 7*10=70 8*10=80 9*10=90
```

```
for( i=1; i<=10; i++ )
{
    for( t=1; t<=3; t++ )
    {
        p("t*i\t");
    }
    p("\n");
}

getch();
}
```

$\frac{t}{1 \ 2 \ 3}$   $\times \frac{i}{1}$   
 $1 \ 2 \ 3$   $\times \ 2$   
 $3$   
 $-$   
 $10$   
 $||$

1x1=1 — 2x1=2 — 3x1=3  
1x2=2 — 2x2=4 — 3x2=6  
—  
1x10=10



The image shows a screenshot of the Turbo C++ IDE. The top window, titled "9AM.CPP", contains the following C code:

```
#include<stdio.h>
#include<conio.h>
void main()
{
    int t, n,i;
    clrscr();
    printf("Enter no of tables "); scanf("%d",&n);
    for(t=1;t<=n;t++)
    {
        for(i=1;i<=10;i++)
        {
            printf("%4d",t*i);
        }
        printf("\n");
    }
    getch();
}
```

The bottom window shows the program's output. It prompts "Enter no of tables 10" and then displays a 10x10 grid of multiplication results. The first row is the header, and the subsequent rows show the products of the table number (1-10) with numbers 1 through 10.

	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

## Finding strong no:

Digits factorial sum is equal to given no

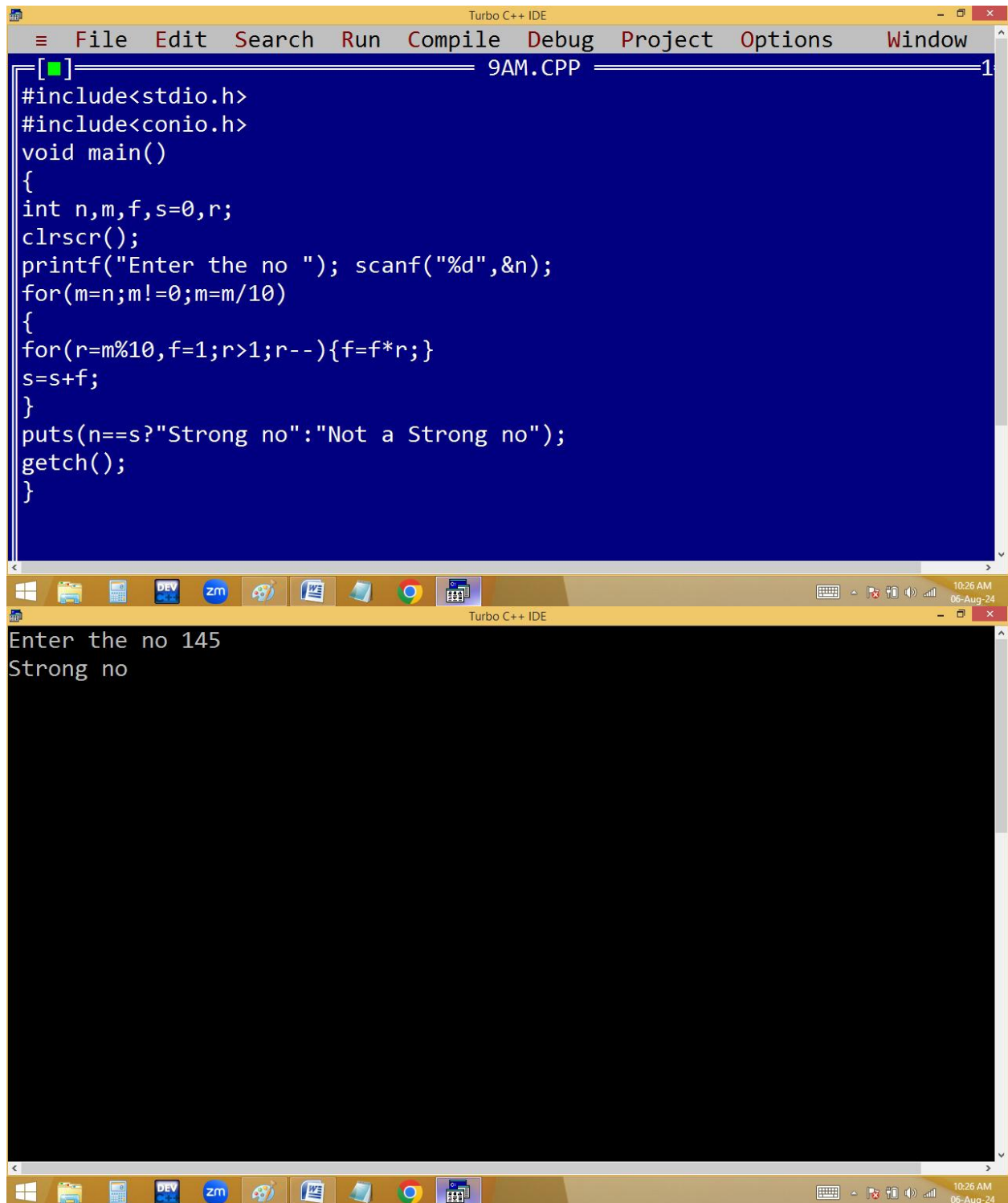
1 factorial is 1

2 factorial is 2

3 factorial 6 ← not a strong no

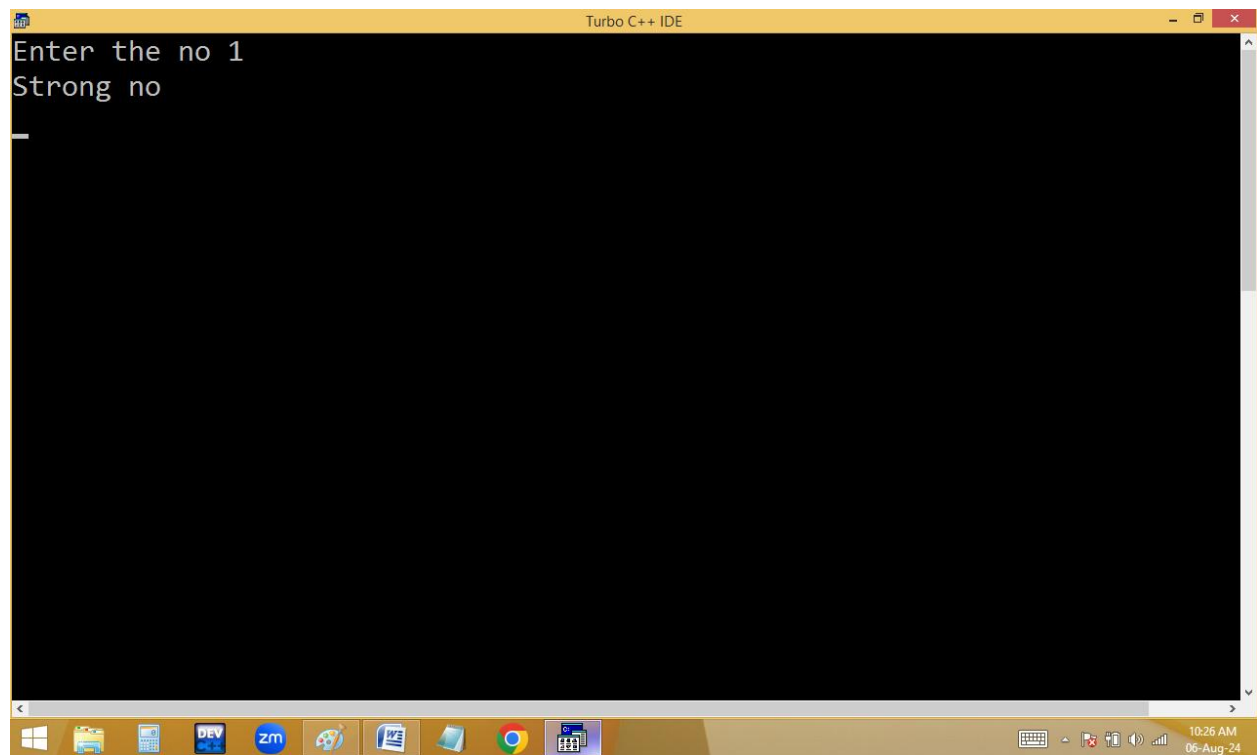
145 →  $1! + 4! + 5! \rightarrow 1 + 24 + 120 \rightarrow 145$

$$\begin{array}{r} \frac{7}{145} \\ \frac{7}{145} \div 10 = \frac{7}{5}! = 120 + \frac{5}{0} \\ 14 \div 10 = 4! = 24 + 120 \\ 1 \div 10 = 1! = 1 + 144 \\ \hline 145 \end{array}$$



```
File Edit Search Run Compile Debug Project Options Window
9AM.CPP
#include<stdio.h>
#include<conio.h>
void main()
{
int n,m,f,s=0,r;
clrscr();
printf("Enter the no "); scanf("%d",&n);
for(m=n;m!=0;m=m/10)
{
for(r=m%10,f=1;r>1;r--){f=f*r;}
s=s+f;
}
puts(n==s?"Strong no":"Not a Strong no");
getch();
}
```

Enter the no 145  
Strong no



```
Turbo C++ IDE
Enter the no 2
Strong no
```

```
Turbo C++ IDE
Enter the no 3
Not a Strong no
```

```

for( m=n; m!=0; m/=10 )
{
    r=m%10 ✓
    for( r=m%10, f=1; r>1; r-- )
    {
        f=f*r;
    }
    s=s+f; ✓
}
puts(n==s?"Strong":"Not");

```

$$\frac{11}{145}$$

$$\frac{11}{145}$$

$$\frac{1}{5}$$

$$\frac{1}{1}$$

$$\frac{5}{10}$$

$$145 \div 10 = 54321$$

$$1 \times 5 \times 4 \times 3 \times 2 = 120$$

$$14 \div 10 = 432$$

$$1 \times 4 \times 3 \times 2 \times 1 = 24$$

$$1 \div 10 = 1$$

$$\frac{1}{145}$$

$$123 = 1 + 2 + 6 = 9$$

**Finding generic root of given no.**

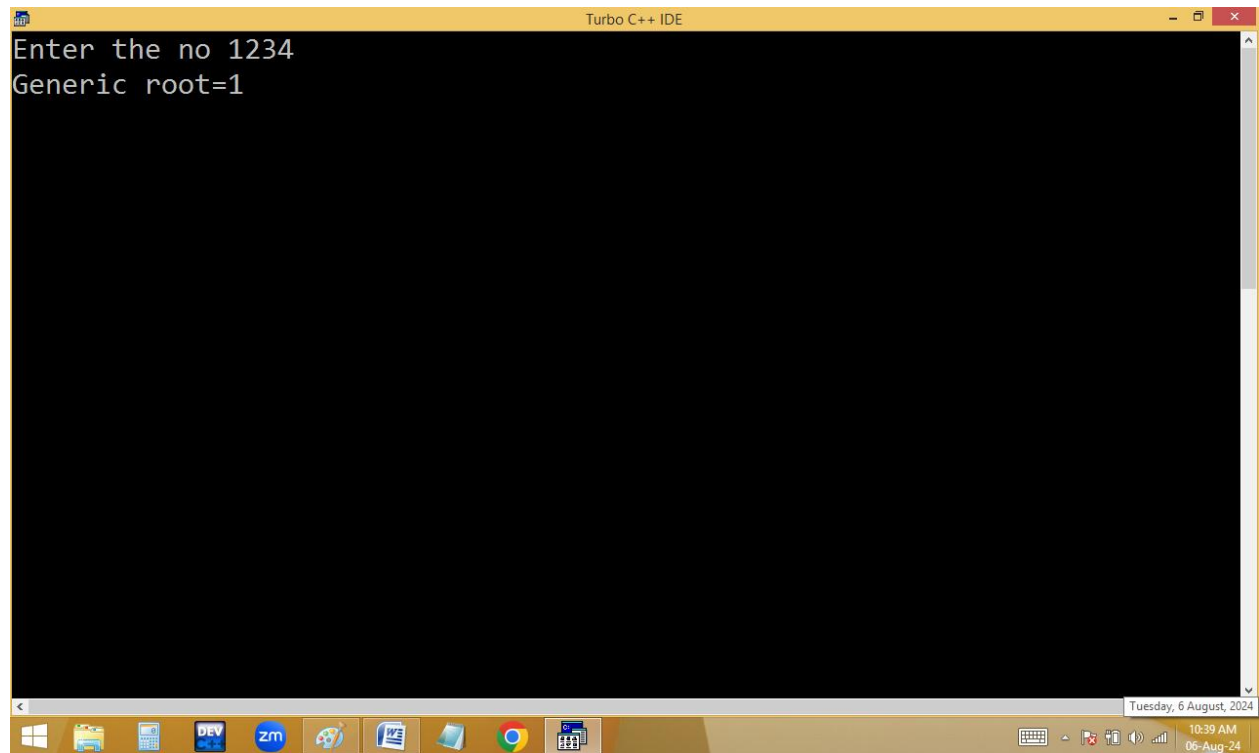
Ap 27 ab 5677  $\rightarrow 5+6+7+7=25 \rightarrow 2+5=7$



The image shows a screenshot of the Turbo C++ IDE. The top window, titled "9AM.CPP", contains the following C++ code:

```
#include<stdio.h>
#include<conio.h>
void main()
{
    long int n,s=0;
    clrscr();
    printf("Enter the no "); scanf("%ld",&n);
    while(n>9||n<-9)
    {
        for(s=0; n!=0; n=n/10){s=s+n%10;}
        n=s;
    }
    printf("Generic root=%ld",n);
    getch();
}
```

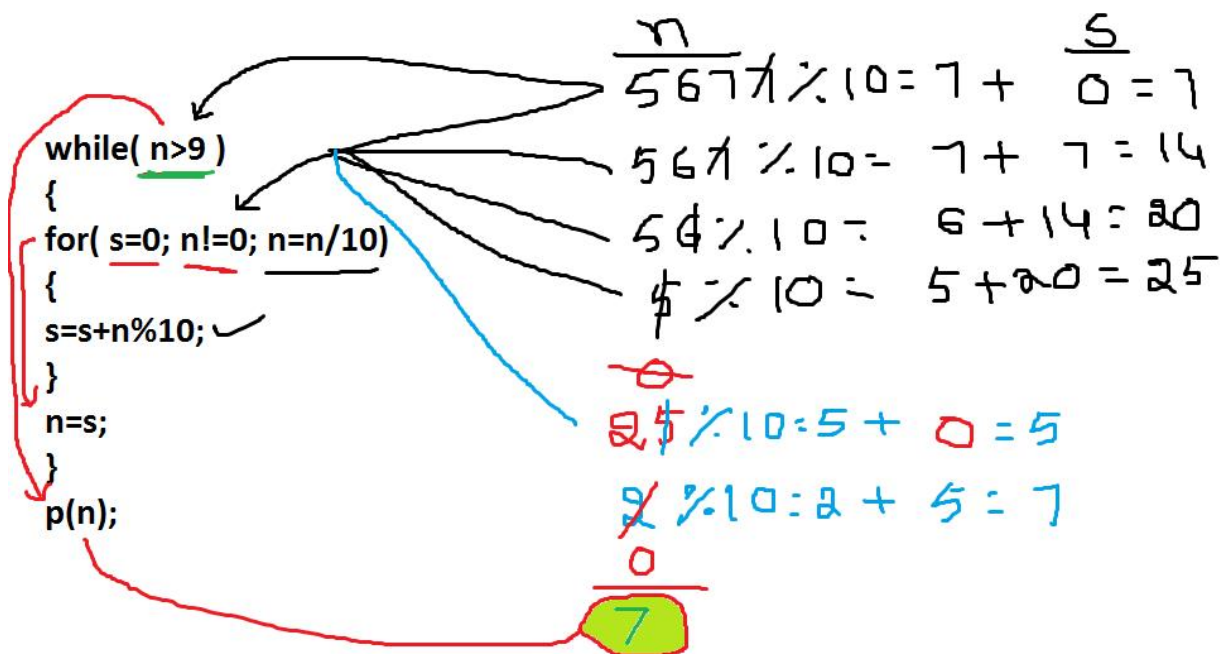
The bottom window shows the program's execution. It prompts "Enter the no -1234" and displays the output "Generic root=-1\_". The Windows taskbar at the bottom shows the time as 10:39 AM on 06-Aug-24.



```

Turbo C++ IDE
Enter the no 5677
Generic root=7

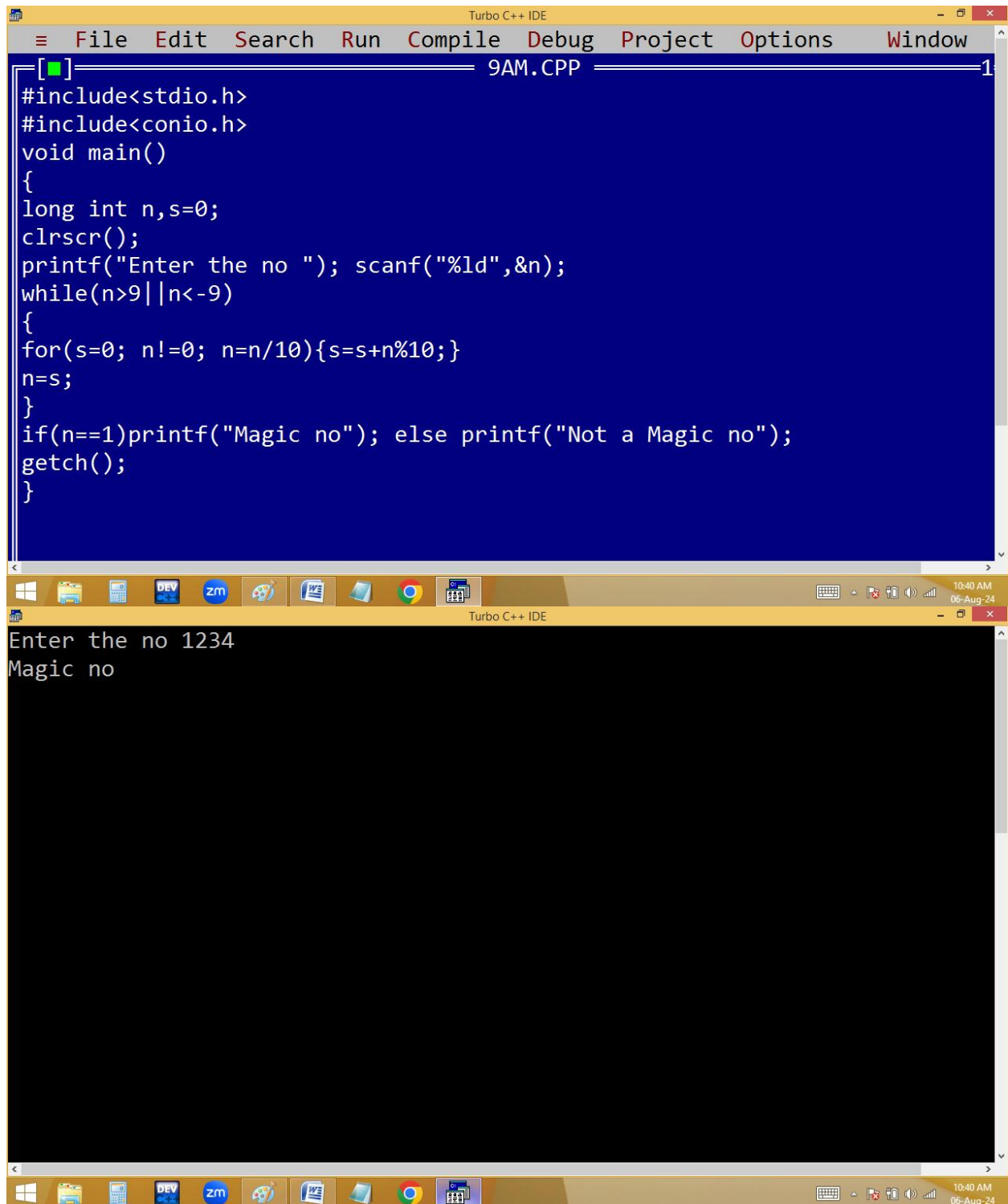
```



Finding magic no:

If generic root is 1 it is a magic no

1234 → 10 → 1+0 = 1



The image shows a screenshot of the Turbo C++ IDE. The top window displays the source code for a C program named 9AM.CPP. The code is as follows:

```
#include<stdio.h>
#include<conio.h>
void main()
{
    long int n,s=0;
    clrscr();
    printf("Enter the no "); scanf("%ld",&n);
    while(n>9||n<-9)
    {
        for(s=0; n!=0; n=n/10){s=s+n%10;}
        n=s;
    }
    if(n==1)printf("Magic no"); else printf("Not a Magic no");
    getch();
}
```

The bottom window shows the program's execution. It prompts the user to "Enter the no" and the input "1234" is provided. The program then outputs "Magic no". The Windows taskbar at the bottom indicates the time is 10:40 AM on 06-Aug-24.

```
Turbo C++ IDE
Enter the no 235
Magic no
```

```
Turbo C++ IDE
Enter the no 9999
Not a Magic no
```