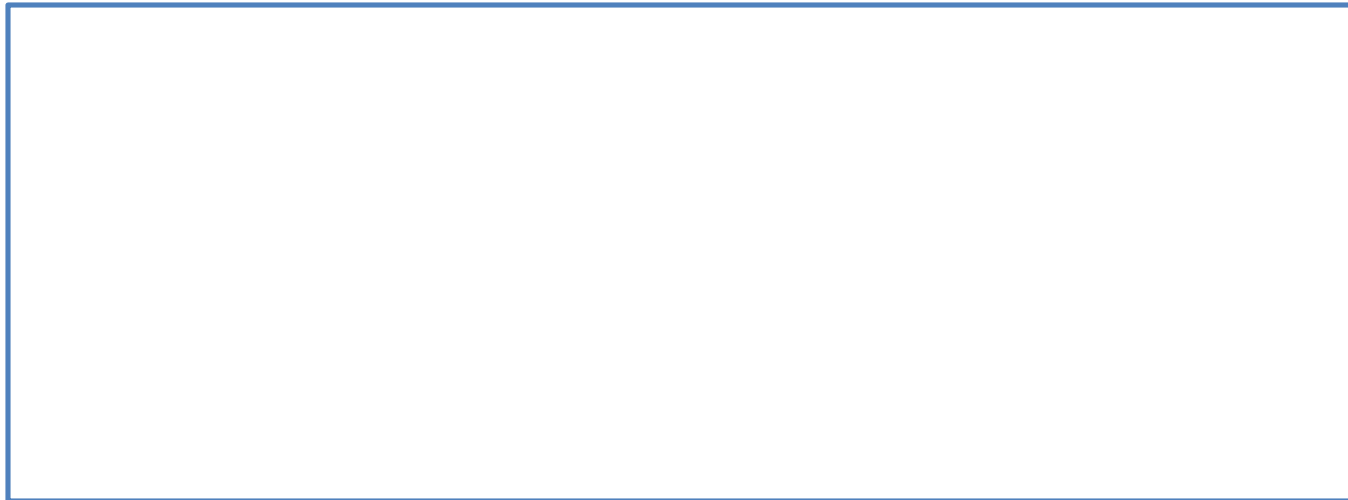


Applications of Stacks



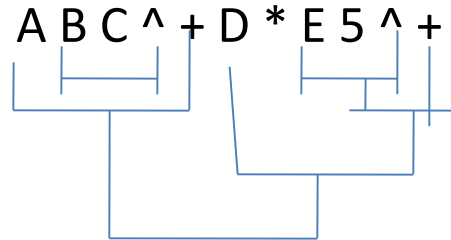
Contents:

- Postfix to Prefix Conversion
- Prefix to Infix Conversion
- Recursion

Postfix to Prefix Conversion

Consider Postfix Expression: $ABC^+D^*E5^+$

Form the groups of tokens from left to right as follows:



Move the operators in each group in front of operands

$$\underline{+A^BC} \quad * D + \underline{^E5}$$

Now solve according to the priority

$$\underline{*+A^BCD} + \underline{^E5}$$

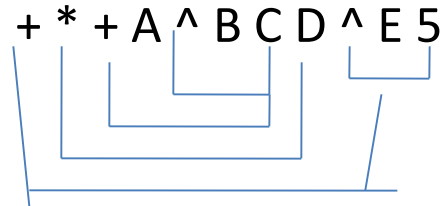
We get the result as follows

$$\mathbf{+*+A^BCD^E5}$$

Prefix to Infix Conversion

Consider Prefix Expression: $+*+A^BCD^E5$

Form the groups of tokens from right to left as follows:



Move the operators in each group in between the operands

And we get the result as follows:

$$(A+B^C)*D+E^5$$

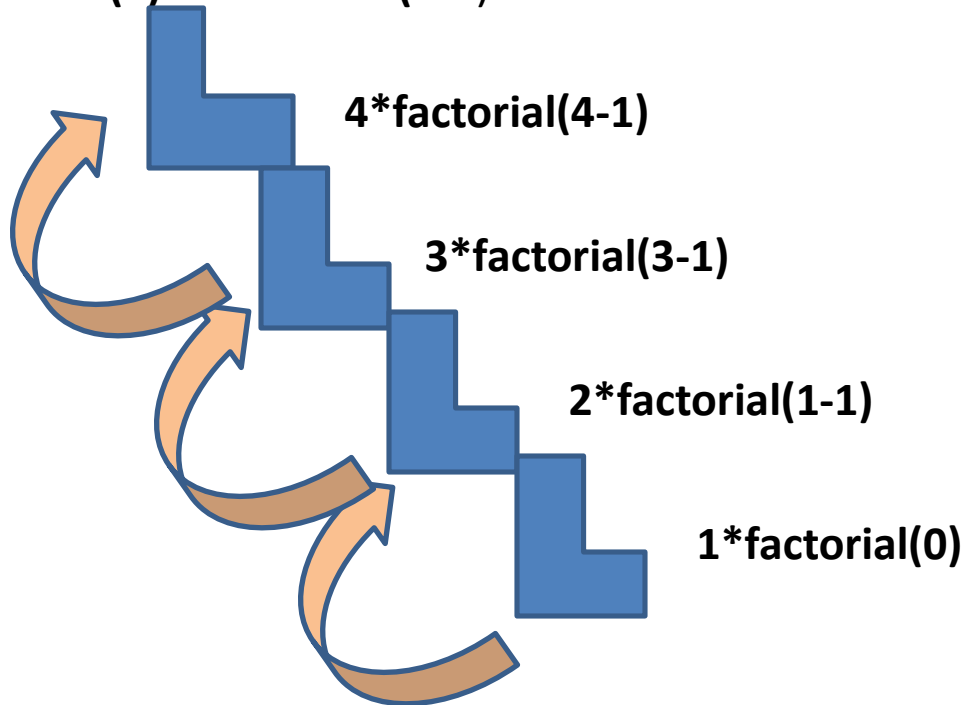
Recursion:

- When a function is defined in terms of itself, then it is called a *recursion*.
- A *function calling itself*
- Its a fundamental concept in Mathematics
- For example, calculation of a factorial involves the recursive method.
- $\text{Factorial}(n) = 1$ if $(n=0)$
 $n * \text{fact}(n-1)$ otherwise

Recursion (Continue)

- Function factorial(n) is defined in terms of itself for $n > 0$
- Value of the function at $n=0$ is 1 and it is called as the base
- Recursion terminates on reaching the base
- This is shown in the following example:-----

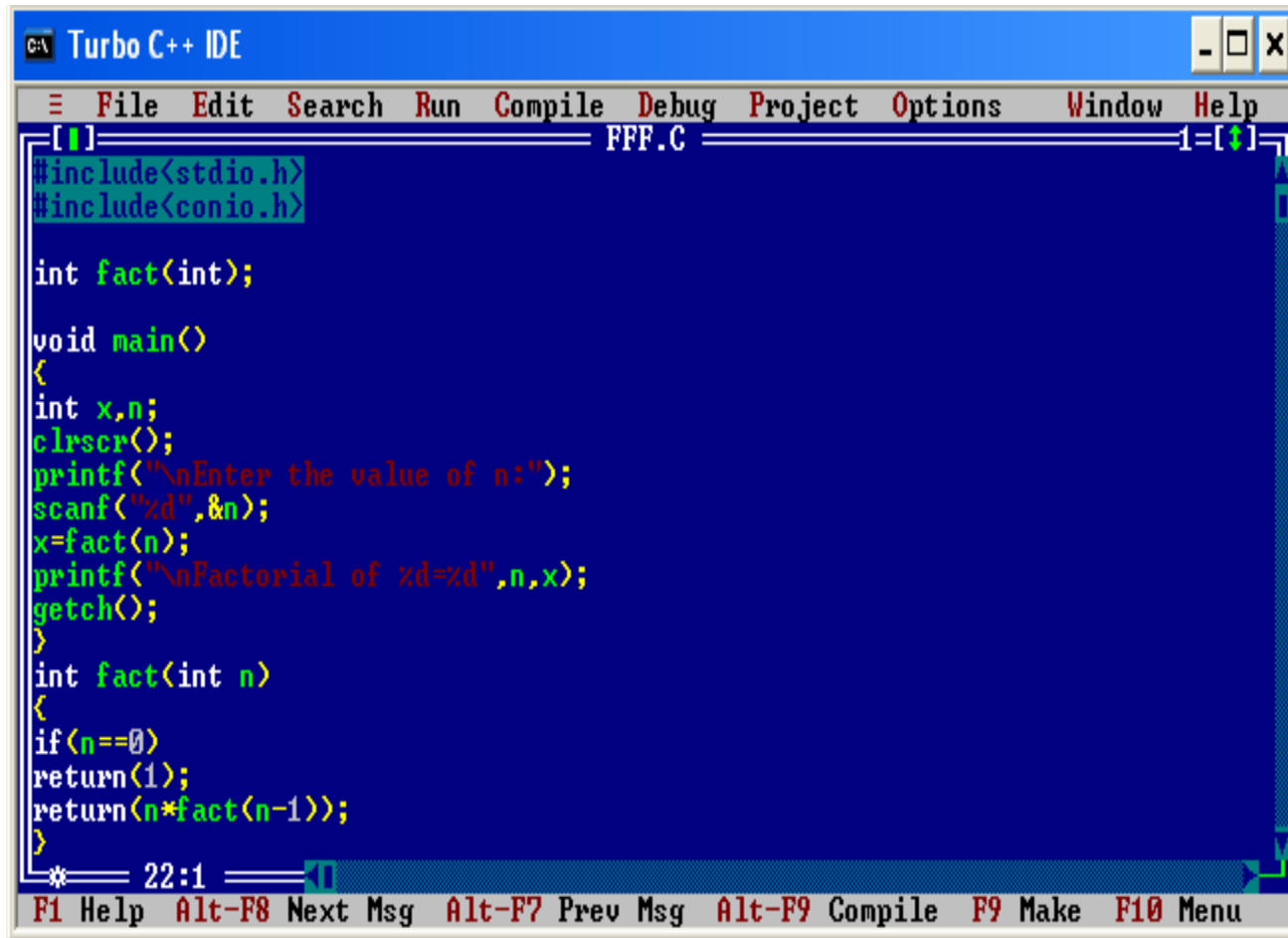
factorial(5)=5*factorial(5-1)



**** Recursion expands when $n > 0$***

**** Its starts winding up on hitting the base***

C program to find the factorial of any number input through the keyboard.



The image shows a screenshot of the Turbo C++ IDE. The window title is "C:\ Turbo C++ IDE". The menu bar includes File, Edit, Search, Run, Compile, Debug, Project, Options, Window, and Help. The editor displays a C program named "FFF.C" with the following code:

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

int fact(int);

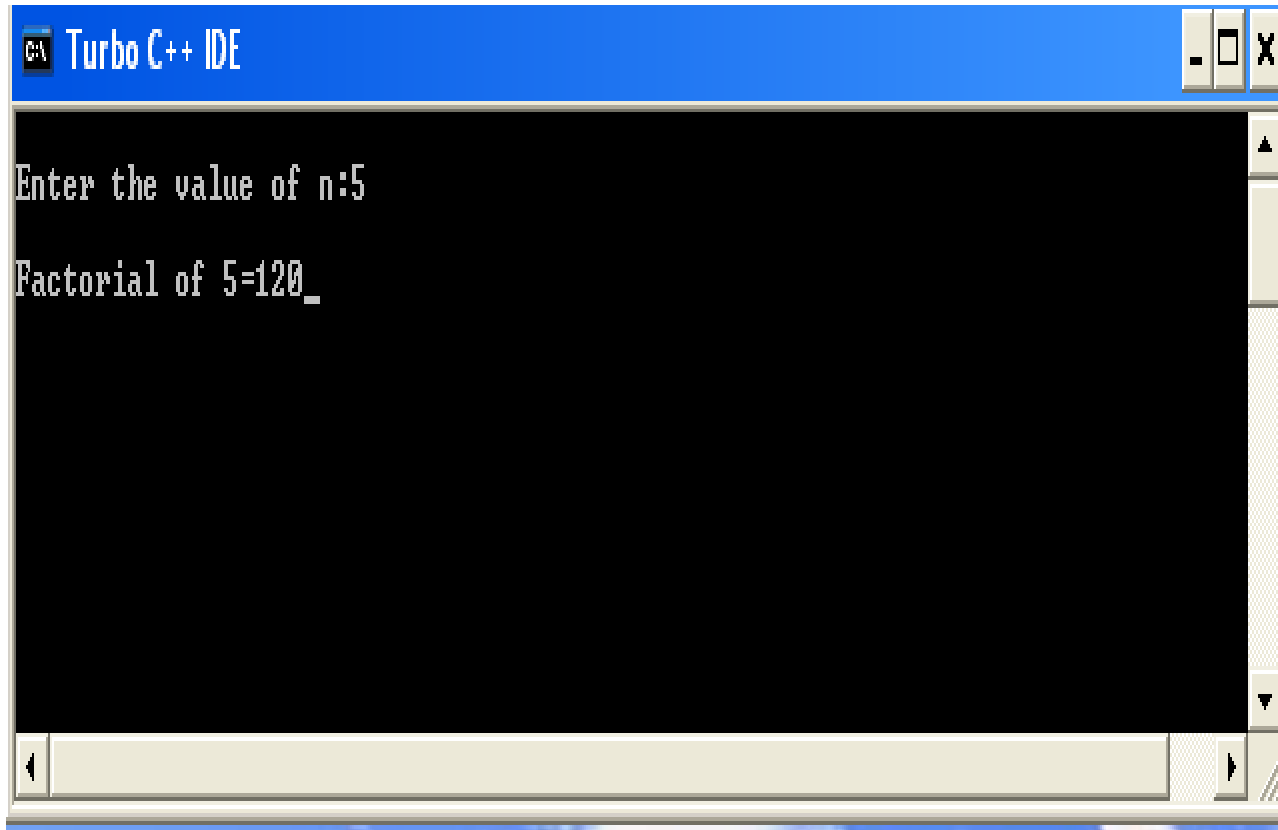
void main()
<
int x,n;
clrscr();
printf("\nEnter the value of n:");
scanf("%d",&n);
x=fact(n);
printf("\nFactorial of %d=%d",n,x);
getch();
}

int fact(int n)
<
if(n==0)
return(1);
return(n*fact(n-1));
}

*==== 22:1
```

The status bar at the bottom shows function key shortcuts: F1 Help, Alt-F8 Next Msg, Alt-F7 Prev Msg, Alt-F9 Compile, F9 Make, and F10 Menu.

*Output Screen for
Factorial program*



The image shows a screenshot of the Turbo C++ IDE's output window. The window title is "Turbo C++ IDE". The output text is as follows:

```
Enter the value of n:5  
Factorial of 5=120_
```

Thank you!