Recursion in C

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Introduction to Computer Programming (ICP)

Recursion

- In C, it is possible for the functions to call themselves.

- A function is called 'recursive' if a statement within the body of a function calls the same function.

- Sometimes called 'circular definition', recursion is thus the process of defining something in terms of itself.

Simple recursive call program

```c
#include<stdio.h>
#include<conio.h>
int main()
{
    recurse(); /* Sets off the recursion */
    return 0;
}

void recurse()
{
    recurse(); /* Function calls itself */
}
```

Note:

This program will not continue forever, however. The computer keeps function calls on a stack and once too many are called without ending, the program will crash.

Example 1

```c
#include<stdio.h>
#include<conio.h>
void count_to_ten(int);
main()
{
  count_to_ten ( 0 );
  getche();
}

void count_to_ten ( int count )
{
        if ( count < 10 )
        {
          printf("%d   ", count);
           count_to_ten( count + 1 );
        }
}
```

Output!!!

0 1 2 3 4 5 6 7 8 9

Factorial using recursion

```c
#include<stdio.h>
#include<conio.h>
int rec(int);
main( )
{
 int a, fact ;
 printf( "\nEnter any number " ) ;
 scanf( "%d", &a ) ;
 fact = rec( a ) ;
 printf( "Factorial value = %d", fact ) ;
 getche();
}
int rec( int x )
{
 int f ;
 if ( x = = 1 )
 return( 1 ) ;
 else
 f = x * rec( x - 1 ) ;
 return( f ) ;
}
```

rec (5) returns (5 times rec (4),
    which returns (4 times rec (3),
        which returns (3 times rec (2),
            which returns (2 times rec (1),
                which returns (1)))))