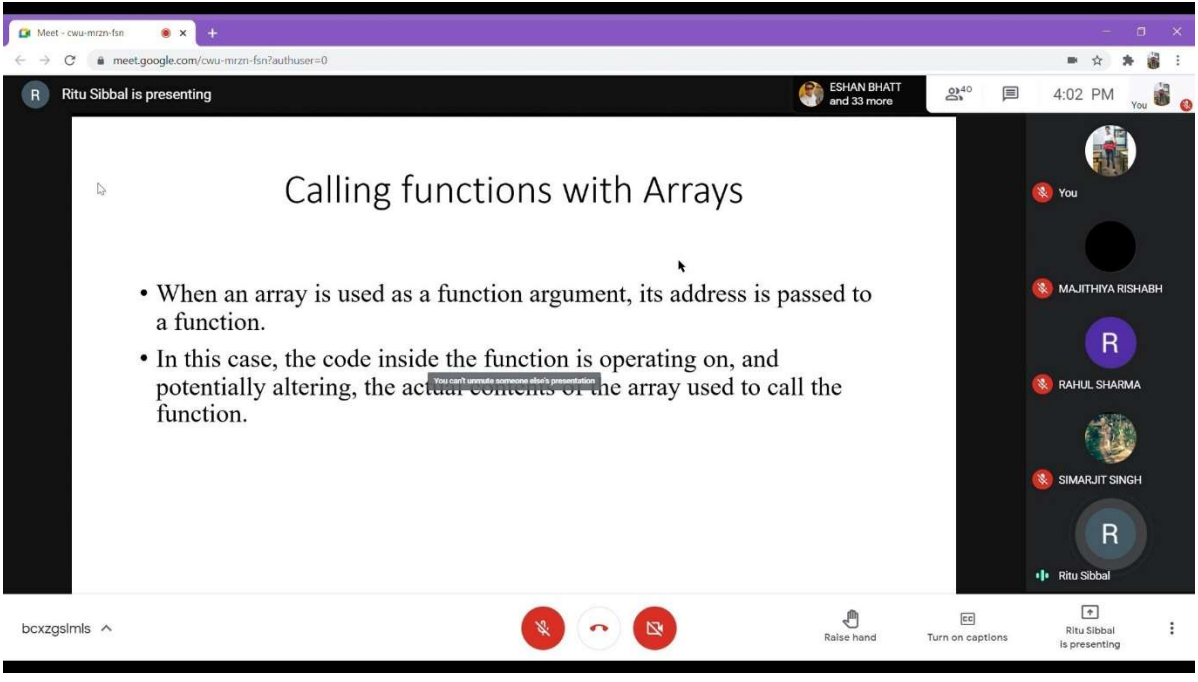
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Calling functions with Arrays
• When an array is used as a function argument, its address is passed to a function.
• In this case, the code inside the function is operating on, and potentially altering, the actual contents of the array used to call the function.
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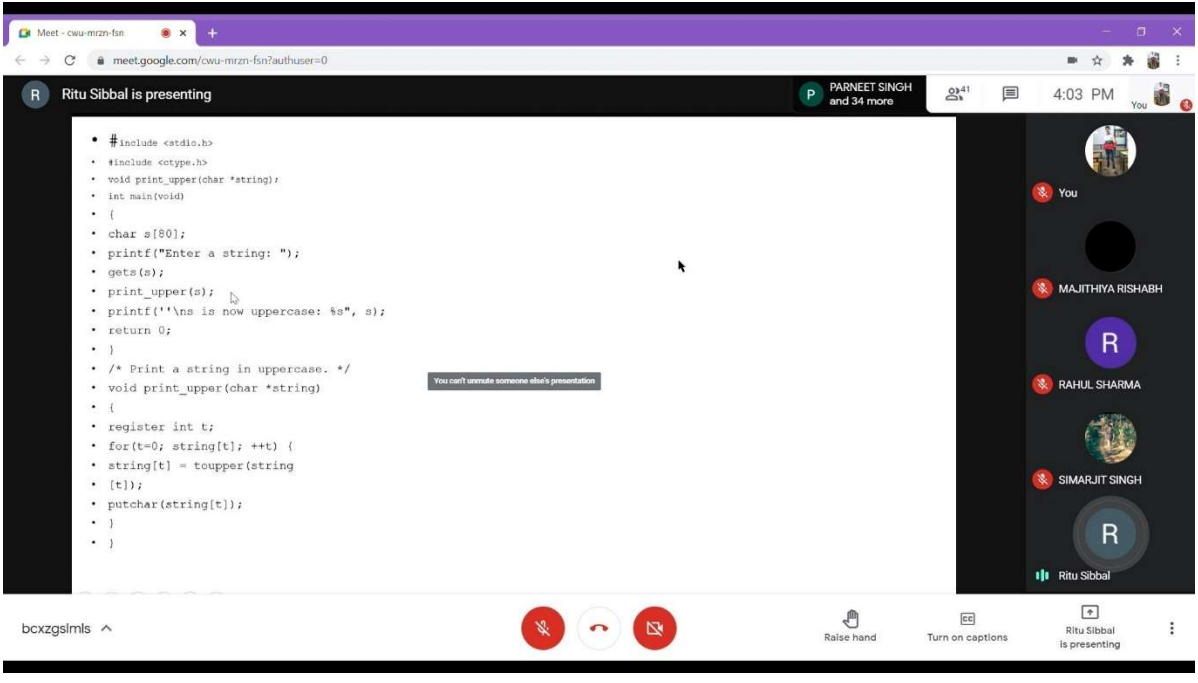
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#include <stdio.h>
#include <ctype.h>
void print_upper(char *string);
int main(void)
{
char s[80];
printf("Enter a string: ");
gets(s);
print_upper(s);
printf("\ns is now uppercase: %s", s);
return 0;
}
/* Print a string in uppercase. */
void print_upper(char *string)
{
register int t;
for(t=0; string[t]; ++t) {
string[t] = toupper(string
[t]);
putchar(string[t]);
}
}
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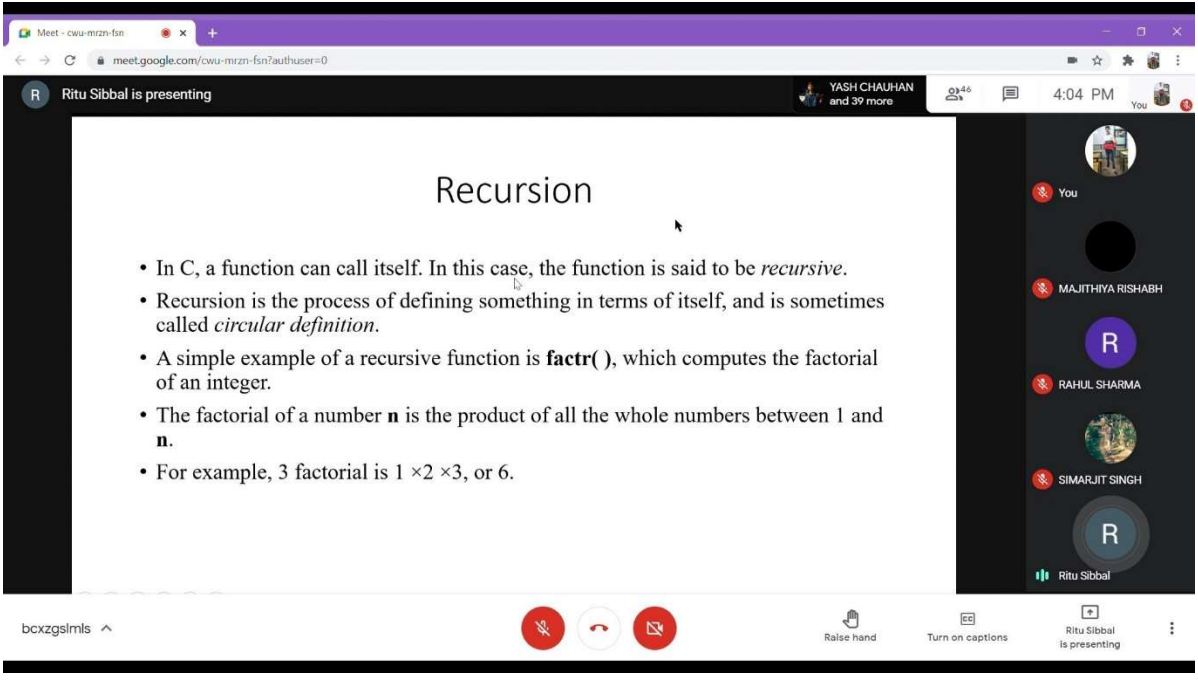
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Recursion
• In C, a function can call itself. In this case, the function is said to be recursive.
• Recursion is the process of defining something in terms of itself, and is sometimes called circular definition.
• A simple example of a recursive function is factr( ), which computes the factorial of an integer.
• The factorial of a number n is the product of all the whole numbers between 1 and n.
• For example, 3 factorial is 1 ×2 ×3, or 6.
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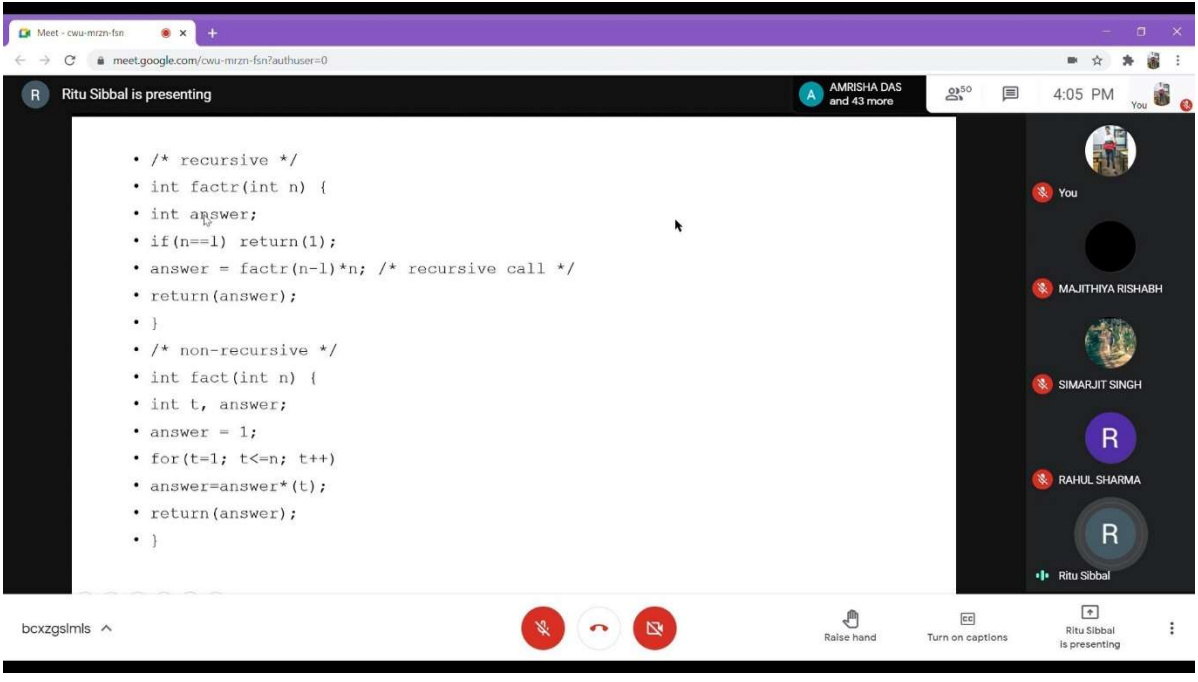
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/* recursive */
int factr(int n) {
int answer;
if(n==1) return(1);
answer = factr(n-1)*n; /* recursive call */
return(answer);
}
/* non-recursive */
int fact(int n) {
int t, answer;
answer = 1;
for(t=1; t<=n; t++)
answer=answer*(t);
return(answer);
}
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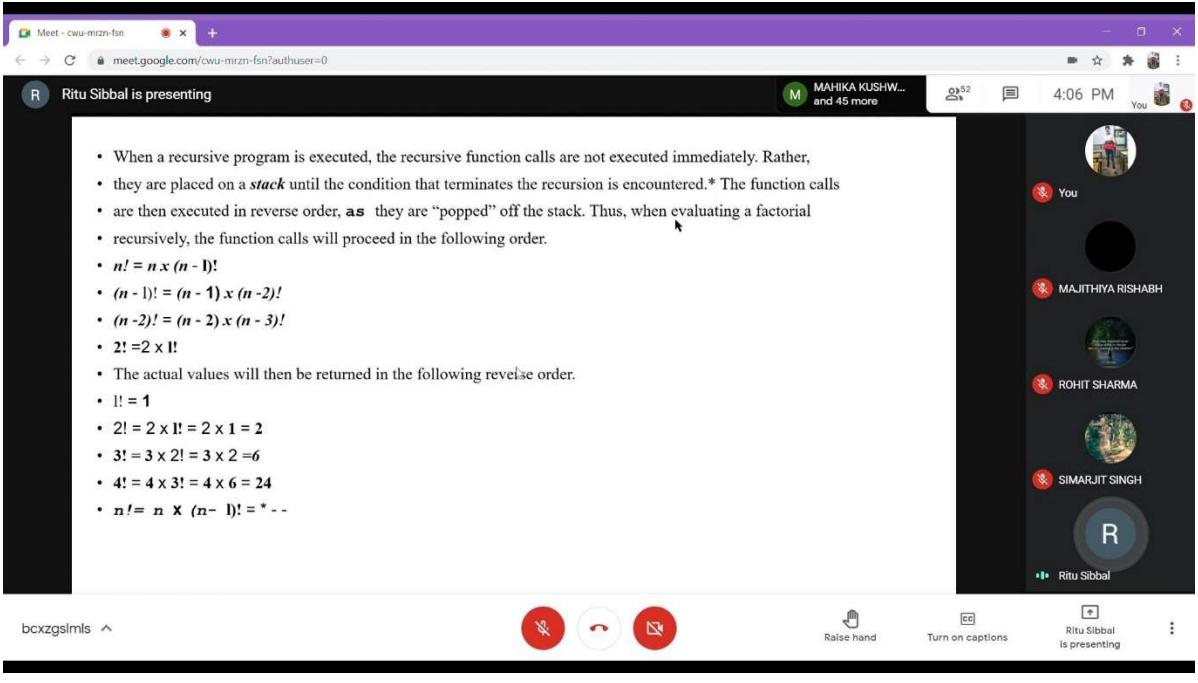
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When a recursive program is executed, the recursive function calls are not executed immediately. Rather,
they are placed on a stack until the condition that terminates the recursion is encountered.* The function calls
are then executed in reverse order, as they are "popped" off the stack. Thus, when evaluating a factorial
recursively, the function calls will proceed in the following order.
n! = n x (n - 1)!
(n - 1)! = (n - 1) x (n -2)!
(n -2)! = (n - 2) x (n - 3)!
2! =2 x 1!
The actual values will then be returned in the following reverse order.
1! = 1
2! = 2 x 1! = 2 x 1 = 2
3! = 3 x 2! = 3 x 2 =6
4! = 4 x 3! = 4 x 6 = 24
n!= n x (n- 1)! = * - -
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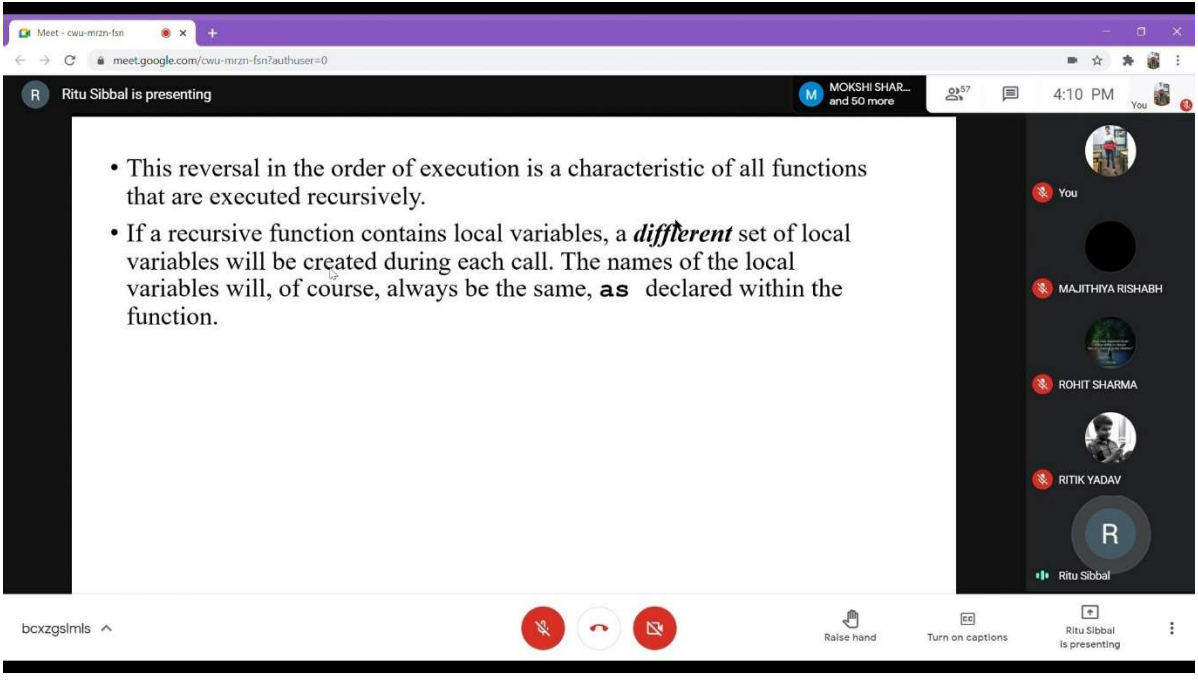
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• This reversal in the order of execution is a characteristic of all functions that are executed recursively.
• If a recursive function contains local variables, a ***different*** set of local variables will be created during each call. The names of the local variables will, of course, always be the same, **as** declared within the function.
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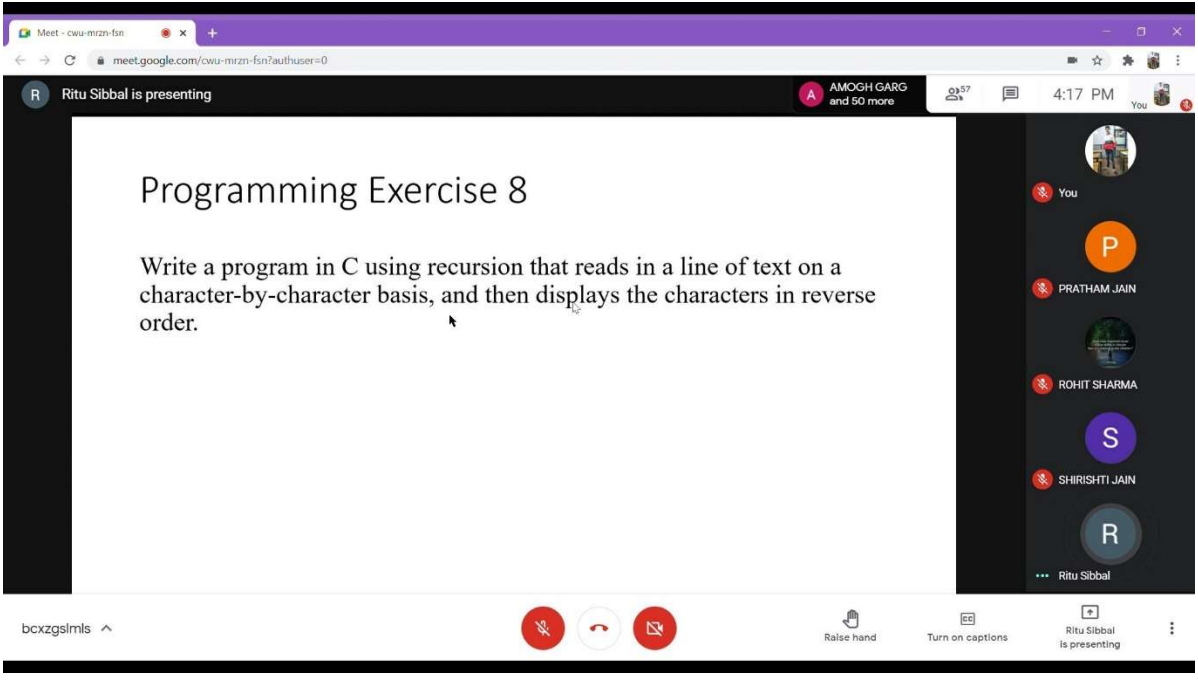
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Programming Exercise 8
Write a program in C using recursion that reads in a line of text on a character-by-character basis, and then displays the characters in reverse order.
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SHIRISHTI JAIN
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