

CS Bridge Module 12 Recursions Part 3

1. Recursions - Part 3


1.1 CS Bridge: Recursions




Notes:

1.2 Factorial

Factorial






$$n! = n \cdot (n-1) \cdot (n-2) \dots 2 \cdot 1$$

Write a recursive implementation for the function: $(n-1)!$

```
int factorial(int n);  
n! = n · (n-1)!
```

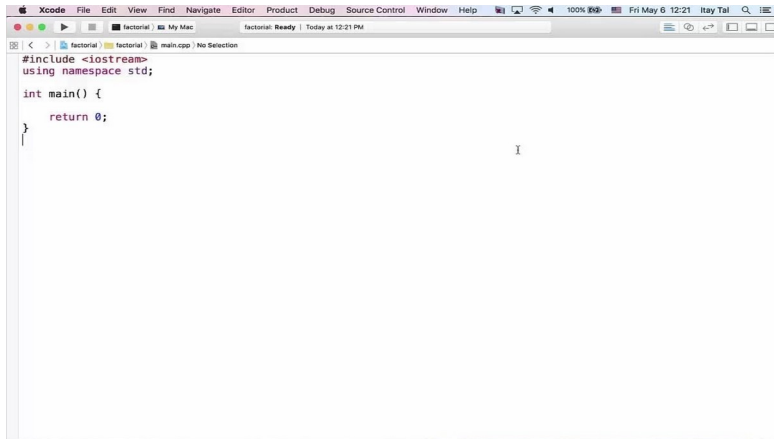
That given a positive integer n , the function returns $n!$

Example

`factorial(4)`  24

Notes:

1.3 Factorial Implementation

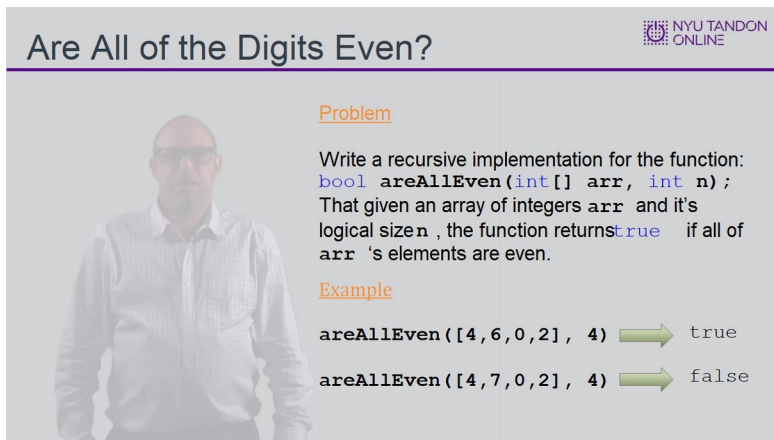


```
#include <iostream>
using namespace std;

int main() {
    return 0;
}
```

Notes:

1.4 Are All of the Digits Even?



Are All of the Digits Even? NYU TANDON ONLINE

Problem

Write a recursive implementation for the function:

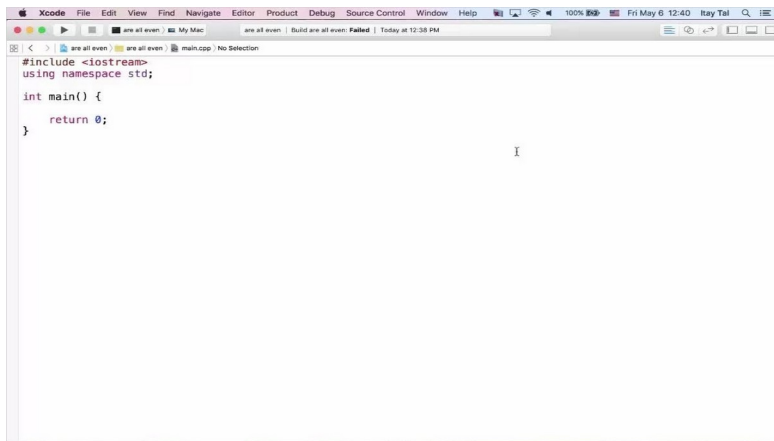
```
bool areAllEven(int[] arr, int n);
```

That given an array of integers `arr` and it's logical size `n`, the function return `true` if all of `arr`'s elements are even.

Example

```
areAllEven([4, 6, 0, 2], 4) ➡ true
areAllEven([4, 7, 0, 2], 4) ➡ false
```

1.5 Are All of the Digits Even? Implementation



```
#include <iostream>
using namespace std;

int main() {
    return 0;
}
```

Notes:

1.6 Knowledge Check

(Multiple Choice, 10 points, 4 attempts permitted)

Knowledge Check

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In the following code snippet, what is the output of this code if $n=3$?

```
void f(int n) {
    if (n > 1) {
        cout << 'a';
        f(n/2);
        cout << 'b';
        f(n/2);
    }
    cout << 'c';
}
```

☐ abccc
☒ acbcc
☐ abcbc
☐ abbcc

Correct	Choice	Feedback
	abccc	Note that the first recursive call will finish before the initial call!
X	acbcc	Correct!

abcbc	Since n=3, the code would not reach the line "cout<<b" more than once!
abbcc	Since n=3, the code would not reach the line "cout<<b" more than once!

Notes:

abccc (Slide Layer)

Knowledge Check

In the following code snippet, what is the output of this code if n=3?

```
void f(int n)
{
    if (n > 0)
    {
        cout << "a";
        f(n-1);
        cout << "b";
        f(n-1);
    }
    cout << "c";
}
```

Incorrect

Note that the first recursive call will finish before the initial call!

Continue

acbcc (Slide Layer)

Knowledge Check

In the following code snippet, what is the output of this code if n=3?

```
void f(int n)
{
    if (n > 0)
    {
        cout << "a";
        f(n-1);
        cout << "b";
        f(n-1);
    }
    cout << "c";
}
```

Correct

Correct!

Continue

abcbc (Slide Layer)

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Knowledge Check

In the following code snippet, what is the output of this code if n=3?

```
void f(int n)
{
    if (n > 1)
    {
        cout << "a";
        f(n/2);
        cout << "b";
        f(n/2);
    }
    cout << "c";
}
```

Incorrect

Since n=3, the code would not reach the line "cout<<b" more than once!

Continue

abbcc (Slide Layer)

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Knowledge Check

In the following code snippet, what is the output of this code if n=3?

```
void f(int n)
{
    if (n > 1)
    {
        cout << "a";
        f(n/2);
        cout << "b";
        f(n/2);
    }
    cout << "c";
}
```

Incorrect

Since n=3, the code would not reach the line "cout<<b" more than once!

Continue

1.7 End of Module

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End of Module

Exit

