

University of Illinois at Urbana-Champaign
Dept. of Electrical and Computer Engineering

ECE 220: Computer Systems & Programming

Recursion Examples

Writing the Fibonacci Sequence

First, let's go back to Fibonacci.

We had: $F(0) = 1$
 $F(1) = 1$
 $F(N) = F(N - 2) + F(N - 1)$

Let's write Fibonacci as a C function:

```
int32_t fib (int32_t N);
```

Fibonacci as a Recursive Function

```
int32_t fib (int32_t N)
{
    if (0 == N || 1 == N) {
        return 1;
    }
    return (fib (N - 1) +
            fib (N - 2));
}
```

stopping
conditions

handle
children

handle
one node

Pitfall: Recursion May Not Be the Answer

Being able to write a function recursively does not imply that doing so is a good idea.

Consider calling `fib (5)`, for example.

How many times is `fib` called as a result?