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

ECE 220: Computer Systems & Programming

More Recursion Examples

Ready to Play a Game?

Let's play Nim!

In Nim, there are three piles of sticks…

On their turn, each player
◦ takes as many sticks as they want
◦ from one of the piles.

The last player to take sticks wins.

Is Nim a Forced Win or a Forced Loss

Nim starts with 3, 5, and 7 sticks in the piles.

There is no way to tie.

A **forced win** means that,
◦ if a player plays correctly,
◦ they are **guaranteed to win**.

Is Nim
◦ **a forced win** (for the first player),
◦ **or a forced loss?**

Let's Use Recursion to Evaluate Nim

There's a fairly easy and intuitive mathematical solution to Nim.

But … maybe you don't know it?

Fortunately, now you know recursion.

So **let's**
◦ **write a recursive function**
◦ to answer the question!