

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

## ECE 220: Computer Systems & Programming

### Fully Dynamic Allocation

## Summary of Dynamic Resizing Pros and Cons

dynamically resized array

- start with small constant
- multiply size by a constant as necessary

pros

- easy to implement
- array uses contiguous memory

cons (quantified for  $2\times$  multiplier)

- copying cost ( $\leq 2N$  for  $N$  players)
- waste space ( $\sim 38\%$ )

## Player Deletion with Dynamic Resizing

### What about deletion?

If order doesn't matter,

- copy last element over deleted element,
- then reduce count
- (requires **constant time**).

If order matters, deletion can be expensive.

## Allocating Individual Players Requires a Pointer for Each

Can we **use dynamic allocation**

- **to allocate one thing** (a player) at a time
- instead of resizing an array?

**Yes, but** first, we **need to solve a problem:**

- Every call to **malloc** returns a pointer.
- These pointers have no predictable relationship to one another.
- So we **need to store a pointer to each player.**