

# 15-213

## Dynamic Memory Allocation II

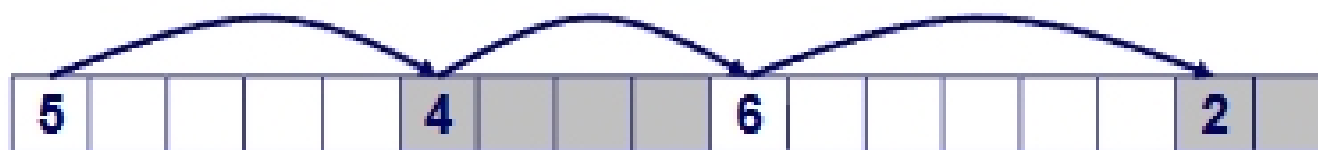
### November 7, 2007

#### Topics

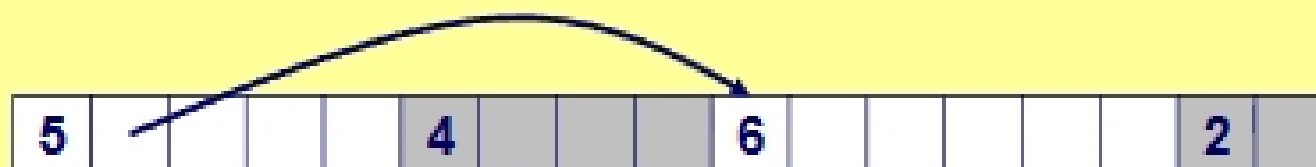
- Explicit doubly-linked free lists
- Segregated free lists
- Garbage collection
- Review of pointers
- Memory-related perils and pitfalls

# Keeping Track of Free Blocks

- Method 1: Implicit list using lengths -- links all blocks



- Method 2: Explicit list among the free blocks using pointers within the free blocks



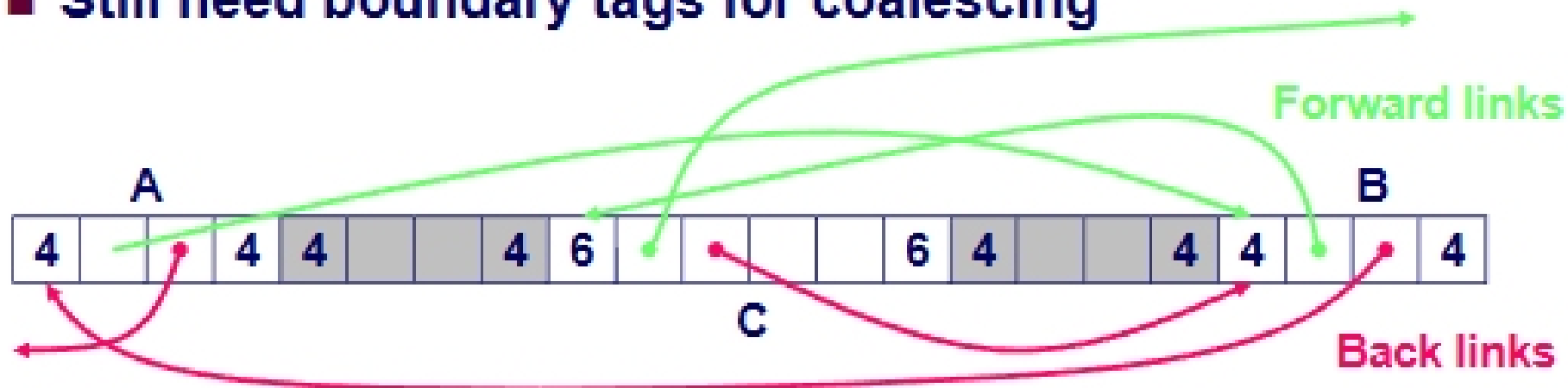
- Method 3: Segregated free lists
  - Different free lists for different size classes
- Method 4: Blocks sorted by size (not discussed)
  - Can use a balanced tree (e.g. Red-Black tree) with pointers within each free block, and the length used as a key

# Explicit Free Lists



## Use data space for link pointers

- Typically doubly linked
- Still need boundary tags for coalescing



- It is important to realize that links are not necessarily in the same order as the blocks