

For Monday

- Read Weiss, chapter 10, section 3
- Homework:
 - Chapter 10, exercise 10

Program 5

Research Paper

- Any questions?

Greedy Algorithms

- With the greedy method, at each step of the algorithm we make the decision that appears best at that time.
- We must always define a **greedy criterion** that determines the best decision.
- Decisions are never changed.
- Each decision must take feasibility of the final solution into account.

Examples

- Making Change
- Shortest Path
- Topological Sort
- Minimum Spanning Tree
- Bin Packing
- Job Scheduling
- Huffman Code

Bin Packing

- What's the problem?

On-Line Strategies

- Next Fit
- First Fit
- Best Fit

Off-Line Strategies

- First Fit Decreasing
- Best Fit Decreasing

Job Scheduling

- What's the problem?
- What is an optimal solution?
- Can we achieve an optimal solution using a greedy algorithm?

Greedy Heuristic

- Assume we want to minimize average completion time: how can we do that?
- Assume we want to minimize final completion time. How would we do that?

Huffman Codes

- File compression technique
- Greedy algorithm is optimal

Divide and Conquer

- Basic Concept
 - Break a problem into pieces
 - Solve the problem for each piece
 - Combine the solutions to create the solution for the entire problem
- Recursion
 - The divide and conquer concept is recursive
 - Implementations of divide and conquer algorithms may or may not be recursive

Finding a Counterfeit Coin

Familiar Divide and Conquer Algorithms

- What algorithms have we looked at that fit this type?

Familiar Divide and Conquer Algorithms

- Quicksort
- Mergesort
- Binary Search
- Permutations
- Towers of Hanoi Solution

Divide and Conquer Examples

- Finding max-min
- Closest two points
- Selection