

Shortest Path/Recursion

4/6/2009

Opening Discussion

- Do you have any questions about the quiz?
- Minute Essay comments
 - Can we make a robot that does quantum mechanics?
 - Can we include plotting in a spreadsheet?

Problem

- We have two versions of minimum path.
 - You are driving on a long trip and want to find the the route from where you are to where you want to go where you will drive the fewest miles.
 - You are at a train station in one city and you want to get to another city. Each leg of the trip has a different cost and you want to find the cheapest route.

How to solve it?

- Let's break up into groups again for 10 minutes. I want you to discuss how you would solve this.
- To help you out, I'll draw a picture on the board of a set of train stops and the connecting routes with costs on the routes.
- You should figure out the cheapest route and tell me how you found it.
- I'm going to add a little code to the Graph scenario to help us.

Recursion

- The method we are going to introduce to solve these problems (they are really the same problem), is recursion.
- A recursive method is a method that calls itself.
- Solve a problem by assuming you can solve the problem for other instances.
- You have to have a base case.

Simple Example

- Each time you call a method, it gets its own little copy of local variables and parameters.
- To help you understand recursion we can write two little methods that use recursion to give us the same behavior as loops.
- What we will do to solve the problem would be hard to do with loops.

Trying All Possibilities

- The computer can solve this problem by trying every single route and keeping track of which one is cheapest.
- With a little extra information stored at the stops, we can make it more like what a human does.
- Let's write both of these.

Minute Essay

- Do you have any questions about what we talked about? What should be clarified on Wednesday for this topic?