

## Writing Assignments

If you would like to rewrite the homework on Dijkstra's algorithm and resubmit it, please do so by Wednesday, November 3. **Attach the previous version to your new one!**

Some things I was looking for, and other comments on this assignment:

- Did you understand the algorithm yourself? In particular were you describing the correct problem and the correct algorithm.
- Could a student who isn't in this class understand the algorithm well enough to implement it?
- Did you describe how to keep track of (or reconstruct) the best path as well as finding out the shortest distance? (In practice we want to know the path!)
- Is the English correct and easy to read, and presented neatly?
- Many papers lacked a good introduction, with a definition of the problem, the terminology used, and some motivation for why we might want to solve it.
- Besides trying to describe the algorithm in words, it is easier to formally describe the general step if some mathematical notation and formulas are used, for example  $\alpha_k(V)$  as the upper bound on the distance to node  $V$  and the formula

$$\alpha_{k+1}(V) = \min(\alpha_k(V), d(A, u_k) + w(u_k, V)).$$

Of course this notation must be introduced and explained. (And also conventions on how  $\infty$  is used for upper bounds and edge weights.) Introducing a table to keep track of things can also help.

- Going through a specific example is useful, perhaps explaining how the table is built up step-by-step for the first few steps along with presenting the general formulas.
- There are other valid ways to present the algorithm rather than the notation and tables introduced in class. Using a different approach is fine but must also be clearly explained. (My notation is adapted from F. S. Roberts, *Applied Combinatorics*, which is on reserve.)

### Homework due Friday, October 29:

Choose a paper to read from one of the following two journals:

- *The UMAP Journal*, in Odegaard Library,
- *Interfaces*, in Foster Business Library.

The paper should concern some form of discrete mathematical modeling. Read the paper and write a 1–2 page summary of the paper. This summary should briefly convey the main point of the paper, what problem is being solved, and something about the method(s) used to solve the problem. (Similar to an abstract, but more detail please.)

**Please make a Xerox copy of the paper and turn it in along with your summary!**

It's fine if you don't understand everything in the paper, and feel free to talk about what you did and didn't understand.

The objectives of this assignment are:

- To encourage you to look through these journals and get a feel for what sorts of problems are discussed. This may help you in identifying an interesting project, both in terms of possible topics and also ways to approach a modeling problem. I recommend going to library and sitting down with a stack of the bound journals from previous years and look through several articles before choosing one. (I also recommend looking through both journals just to get a feel for what's there.)
- To read a paper in some detail, paying attention not only to what it is about but also how it is laid out and how well this works. You may learn something about how to structure your own project report.
- To practice summarizing the contents of a paper. What are the most important things to mention? Trying to extract this from a paper can also help you appreciate whether it is written well, and determine what aspects of the paper you might want to emulate in your report.

A hint on reading a mathematics paper: don't try to start at the beginning and read to the end. First read the abstract, introduction, conclusions, and glance through to see what sorts of results are presented. Get a feel for where the paper is going first. Then start reading but skip over parts that don't make sense at first and iterate in order to fill in the gaps.

Some other notes:

- The assignment isn't due until after your Project Proposals, but it would be a good idea to start on this now since it may help in choosing a problem and/or formulating your proposal.
- I am also distributing some sample problems from the Undergraduate Mathematical Contest in Modeling. These may give you some more ideas on what sort of course project could be done. Winning solutions are presented in the UMAP Journal, and it's fine to do this assignment on one of those papers (or even compare two different solutions to the same problem if you want).