Assignment 4a, Due Feb 21

- 4.22 (2 points) Read this problem, and write down your ideas and questions about how to turn it into a graph path problem, such that our shortest path algorithms can be modified to solve it.
- (5 points) Implement the binary heap from Figure 4.16 of the text book. Test it for correctness. Bring a printed copy of your code for this submission.

Assignment 4b, Due Feb 23

- 4.1(a) (2 points) Run Dijkstra, tracking the problem data in a table.
- 4.12 (2 points) Your algorithm should be $O(|V|^2)$ or better.
- (5 points) Create a runtime measuring program for the binary heap. Include the ability to measure performance of individual methods as a function of the number of items in the heap. Use powers of 2 for the sizes. Bring a printed copy of your code for this submission.

Assignment 4c, Due Feb 26

- 4.1(b) (2 points) Run Dijkstra, show shortest-path tree.
- 4.14 (2 points) By efficient, we mean no worse than Dijkstra’s algorithm.
- (5 points) Measure the runtime of the `makeheap()`, `deletemin()`, `insert()` and `decreasekey()` methods. For powers of 2 from $2^4$ to at least $2^{28}$. Record the results in a spreadsheet. Bring a printed copy of your table for this submission.

Assignment 4d, Due Feb 28

- 4.2(a) (2 points) Run Bellman-Ford, tracking the problem data in a table as we did in class. Each iteration is a new array, based on the previous array. Start from node S.
- 4.2(b) (2 points) Draw the shortest-path tree, using your table data.
- (5 points) Add theoretical functions to your spreadsheet of results, include at least log n, n, n log n and $n^2$. Produce a table of these values normalized the `deletemin()` column at size $2^{20}$. Chart this table. Bring a printed copy of your table and your chart for this submission.

Assignment 4e, Due Mar 2

- 4.8 (2 points) Prove = proof, disprove = counter-example
- 4.5 (2 points)

Assignment 4f, Due Mar 5

- 4.11 (2 points) How can you find cycles using path algorithms in this chapter?
- 4.15 (2 points)
- 4.19 (2 points) Look for a modified version of Dijkstra that meets the criteria.

Assignment 4z, Due Never (optional)

- Other problems from the chapter

Submission

- For the written work, at the beginning of class, on the due dates, submit paper copies of your solutions.
- For the experimental determination, at the beginning of class on the due date, submit paper copies of the graphs.