Due: Friday, January 31st (11:59 p.m. PT.)

Writing Resubmissions

If you would like to improve the written parts of your answers to the first assignment based on feedback received, you can do that and resubmit to Crowmark by **Wednesday, January 29th (11:30 p.m. PT)**. Scores will be averaged between the original and revised submissions.

Reading

For Monday, January 27th, Sections 3.5 and 3.6.

For Wednesday, January 29th, Sections 4.1 and 4.2.

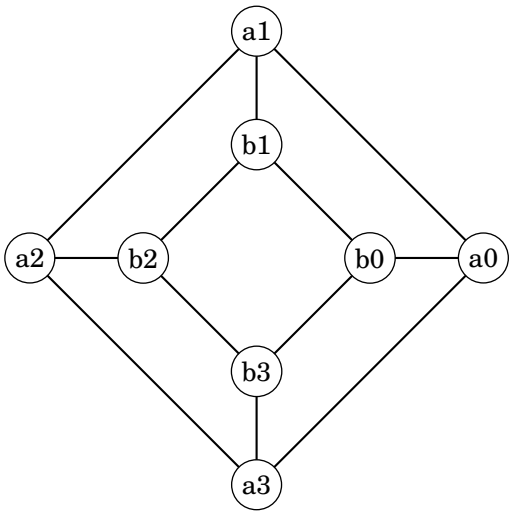
Assignment exercises to hand in

Questions must be solved in a spreadsheet, and must be accompanied by well-written solutions, typeset in LaTeX. You should provide full details of how you solved the problems. We have a new plan for assignment submission: the `.pdf` files will be submitted in Crowdmark (1 file per question), and the spreadsheets to Canvas. Please do **not** submit `.zip` files (archives).

0. Generate 12 numbers (they won't all be distinct) by taking the last 6 digits of your student id number, and then taking the same digits but adding two. So if your student id is 314159265, your 12 numbers are $1, 5, 9, 2, 6, 6, 3, 7, 11, 4, 8, 7$. This is not a graded problem, and is not to be handed in. However, your list of 12 numbers should be clearly stated in your solutions to problems 1. and 2.

1. Exercise 3.3. Do not use the unit cost matrix provided. Instead modify the unit cost matrix by adding the 12 numbers generated in part 0. to the corresponding matrix entries.

2. In class we described how to formulate a shortest path problem as a linear program. Consider the following graph, which has 12 edges:



The graph that we saw in class was a *directed graph*, that is, we could cross the edges only in one direction. Here the edges are *undirected* and we could cross them in both directions. This can be handled by "splitting" the undirected edges into pairs of directed edges, pointing in opposite directions. There are then separate variable for crossing each edge from the pair, for example $x_{a0,a1}$ and $x_{a1,a0}$.

a. For the purposes of finding the shortest path from a2 to b0, you may not need to split all the edges to formulate the problem. Explain which edges need to be split and why.

b. Assign "distances" to the edges by placing your 12 numbers from part 0. on the edges starting from the outside cycle, and ending with the inside cycle. Formulate the problem of finding the shortest path from a2 to b0 as a linear program. Solve the problem in `Excel`.

3. Exercise 3.7. However, replace the final digits of the prices in the wells-to-pumps cost matrix with the corresponding digit in your student id number.

Some other exercises you should try

Additional exercises from Chapters 2 and 3.