

GAMS 0

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1. You own a machining company and you would like to expand your operations. It is currently year zero and you own zero machines. You want to purchase more machines over time. For each of the following six years, you would like to have a minimum number of machines as follows.

Year	1	2	3	4	5	6
Minimum number of machines required	1	2	4	6	7	8

But, the cost of purchasing new machines changes over time. The cost for a single new machine varies from year to year as follows:

Year	1	2	3	4	5	6
Cost of a single new machine	\$4	\$6	\$8	\$7	\$5	\$2

In addition, you can buy no more than three machines per year.

Formulate the problem of finding the minimum cost expansion plan as a shortest path problem. Be sure to describe what are the nodes in your graph, what are the edges, how you compute the edge costs, and what are the start and end nodes for your shortest path problem. In addition, obtain a solution for this problem using any programming language (e.g. Python) to read-in the data, construct the graph, output csv files for GAMS, and then use GAMS to solve the problem.

For this assignment, turn in the following things:

- (a) A print out of the program you used to construct the GAMS csv files.
- (b) A print out of the GAMS code you used to solve the problem. Remember that you can use the solution for the GAMS Prep homework as a starting point. Please highlight or underline the lines of code you had to edit. Also, please provide a printout of the output your GAMS program produces that tells you the solution of the problem.