

GAMS 0

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Due Tue. October 11 at the beginning of class

1. You are in charge of a somewhat complex construction project, that can be divided into small tasks. Each task has a required length of time to complete, and a list of predecessor tasks that must be completed before the task can begin. The list of tasks is summarized in the following table:

Name	ID	DaysRequired	Predecessors
Foundation	FD	8	
ConcreteSlabs	CS	5	FD
FirstBearingWalls	B1	3	CS
FirstInternalWalls	I1	4	CS
FirstFinishing	F1	12	B1,I1,FL2
SecondFloor	FL2	3	B1
SecondBearingWalls	B2	4	FL2
SecondInternalWalls	I2	5	FL2
SecondFinishing	F2	10	B2,I2,RF
Roof	RF	2	B2

For the following questions, first, formulate a shortest path problem. Then, construct a GAMS program and feed it your graph data to answer the question.

- (a) What is the shortest completion time for the project? What is a sequence of project tasks that stop us from completing the project faster? This sequence of tasks is called the “critical path.”
 - i. Describe how you construct the graph from the problem data to answer the question. What are the nodes in the graph you used as a start and stop node?
 - ii. Turn in a hard-copy of the GAMS code you used, and underline or highlight any lines of code you had to edit. Some of those lines should be the lines that output the critical path. Also provide a printout of the output file of your GAMS program.
- (b) Can the project be completed within 35 days? If the project can be completed in 35 days, for each task, what is the latest start time for the task that would not delay the project completion? If the project cannot be completed within 35 days, what is a sequence of tasks that make us unable to complete it that quickly?
 - i. Describe how you construct the graph from the problem data to answer the question. What shortest path problems did you solve on that graph?
 - ii. Turn in a hard-copy of the GAMS code you used, and underline or highlight any lines of code you had to edit. Some of those lines should check if the project can be completed within 35 days. Other lines should compute the latest start time for each task.

A number of GAMS tutorials, user guides, and presentations are available online. Use them, to help yourself remember or learn the syntax you need to complete the project.