

Discrete Optimization

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Name:

1 Project

Due: Thursday Dec. 29

Background:

A mining company is recruiting a person that will be in charge of managing their mines operations. They are soliciting proposals from candidates. This is a very lucrative position and it will be highly competitive. The job will be offered to the candidate who submits the offer judged best by the management.

The project for this class is an AIMMS project. The project should include the following parts:

1. A background description of the project and intended functionality.
2. The linear program interpretation.
3. A printout of the project as implemented in AIMMS.
4. A solution for a test data set.

1.1 Project Description

The VMC mining company operates 15 mines in Vietnam located in 15 different locations: A_1, A_2, \dots, A_{15} . Each mine currently produces every week a known amount of ore. The ore is processed by 10 smelters located in various cities. Each smelter has a limited capacity of ore that it can process. The cost of shipping a ton of ore from each mine to each smelter is known.

Management is asking you to develop the following functionalities:

1. How to distribute all the ore produced by all mines to the smelters so that the total shipping cost be minimized.
2. In case of too much smelter capacity, management would like to decide which smelter can be shut down, the ore re-distributed among the other smelters, again so that the shipping cost will be minimized.
3. Management discovered that it is important for every smelter to process a minimum amount of ore. They also anticipate an increased production by the mines. They anticipate that each mine will be able to increase its production level by 50%. They realize that each smelter has limited growing capacity (given as a percentage of current capacity). The cost of increasing the capacity of each smelter (per ton of processing) is known. In case this happens, management wants your project to be able to re-adjust the shipping to reflect this changes, and minimize the total costs (shipping + increased capacity).
4. Think of an additional functionality that might be useful for the management. Design it, incorporate it in your project.

1.2 Technical details

1. the final project is an individual project.
2. You can build your project on the first two parts of the project that were part of your previous assignments and can be used (even if they were a team effort).
3. The third and fourth part are individual efforts. You will not get credit for copying someone else's project.
4. Judging will be based on correctness, quality (creative implementation) and your narrative.
5. Special weight will be given to part 4, your own additional idea.