Exploration 16A: Setting up Optimization Problems

Break down each of the problems described below so that you know (1) what the objective function is, (2) whether it is to be maximized or minimized, (3) the input variables, (4) the explicit constraints, and (5) the implicit constraints. For most of these situations, the problem is very vaguely stated, and you will need to also describe (6) what further information you will need in order to completely set up the problem.

**Situation A.** How should a fast food chain allocate its advertising budget among different advertising formats?

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| --- | --- |
| Objective function | (max or min?) |
| Input variables |  |
| Explicit constraints |  |
| Implicit constraints |  |
| Further information needed |  |

**Situation B.** Where should a small town locate its only school?

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| --- | --- |
| Objective function | (max or min?) |
| Input variables |  |
| Explicit constraints |  |
| Implicit constraints |  |
| Further information needed |  |

**Situation C.** A large drug company has \$5 billion available to acquire small, start-up biotechnology companies. Which companies should it acquire?

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| Objective function | (max or min?) |
| Input variables |  |
| Explicit constraints |  |
| Implicit constraints |  |
| Further information needed |  |

**Situation D.** Your company has a list of 15 different strategic initiatives that it would like to undertake. Each will tie up some of your skilled labor pool for the next 4 years, and you do not have the resources to take on all 15 projects. Which projects should you select?

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| --- | --- |
| Objective function | (max or min?) |
| Input variables |  |
| Explicit constraints |  |
| Implicit constraints |  |
| Further information needed |  |