

CASE: PROJECT PICKINGS

Tazer, a pharmaceutical manufacturing company, entered the pharmaceutical market 12 years ago with the introduction of six new drugs. Five of the six drugs were simply permutations of existing drugs and therefore did not sell very heavily. The sixth drug, however, addressed hypertension and was a huge success. Since Tazer had a patent on the hypertension drug, it experienced no competition, and profits from the hypertension drug alone kept Tazer in business.

During the past 12 years, Tazer continued a moderate amount of research and development, but it never stumbled upon a drug as successful as the hypertension drug. One reason is that the company never had the motivation to invest heavily in innovative research and development. The company was riding the profit wave generated by its hypertension drug and did not feel the need to commit significant resources to finding new drug breakthroughs.

Now Tazer is beginning to fear the pressure of competition. The patent for the hypertension drug expires in 5 years,¹ and Tazer knows that once the patent expires, generic drug manufacturing companies will swarm into the market like vultures. Historical trends show that generic drugs decreased sales of branded drugs by 75 percent.

Tazer is therefore looking to invest significant amounts of money in research and development this year to begin the search for a new breakthrough drug that will offer the company the same success as the hypertension drug. Tazer believes that if the company begins extensive research and development now, the probability of finding a successful drug shortly after the expiration of the hypertension patent will be high.

As head of research and development at Tazer, you are responsible for choosing potential projects and assigning project directors to lead each of the projects. After researching the needs of the market, analyzing the shortcomings of current drugs, and interviewing numerous scientists concerning the promising areas of medical research, you have decided that your department will pursue five separate projects, which are listed below:

Project Up	Develop an antidepressant that does not cause serious mood swings.
Project Stable	Develop a drug that addresses manic-depression.
Project Choice	Develop a less intrusive birth control method for women.
Project Hope	Develop a vaccine to prevent HIV infection.
Project Release	Develop a more effective drug to lower blood pressure.

For each of the five projects, you are only able to specify the medical ailment the research should address, since you do not know what compounds will exist and be effective without research.

You also have five senior scientists to lead the five pro-

jects. You know that scientists are very temperamental people and will work well only if they are challenged and motivated by the project. To ensure that the senior scientists are assigned to projects they find motivating, you have established a bidding system for the projects. You have given each of the five scientists 1000 bid points. They assign bids to each project, giving a higher number of bid points to projects they most prefer to lead. The following table provides the bids from the five individual senior scientists for the five individual projects:

Project	Dr. Kvaal	Dr. Zuner	Dr. Tsai	Dr. Mickey	Dr. Rollin
Project Up	100	0	100	267	100
Project Stable	400	200	100	153	33
Project Choice	200	800	100	99	33
Project Hope	200	0	100	451	34
Project Release	100	0	600	30	800

You decide to evaluate a variety of scenarios you think are likely.

- Given the bids, you need to assign one senior scientist to each of the five projects to maximize the preferences of the scientists. What are the assignments?
- Dr. Rollins is being courted by Harvard Medical School to accept a teaching position. You are fighting desperately to keep her at Tazer, but the prestige of Harvard may lure her away. If this were to happen, the company would give up the project with the least enthusiasm. Which project would not be done?
- You do not want to sacrifice any project, since researching only four projects decreases the probability of finding a breakthrough new drug. You decide that either Dr. Zuner or Dr. Mickey could lead two projects. Under these new conditions with just four senior scientists, which scientists will lead which projects to maximize preferences?
- After Dr. Zuner was informed that she and Dr. Mickey are being considered for two projects, she decided to change her bids. The following table shows Dr. Zuner's new bids for each of the projects:

Project Up	20
Project Stable	450
Project Choice	451
Project Hope	39
Project Release	40

Under these new conditions with just four scientists, which scientists will lead which projects to maximize preferences?

- Do you support the assignment found in part (d)? Why or why not?
- Now you again consider all five scientists. You decide, however, that several scientists cannot lead certain projects. In particular, Dr. Mickey does not have experience with research on the immune system, so he cannot lead Project Hope. His family also has a history of manic-depression, and you feel that he would be too personally involved in Project Stable to serve as an effective project leader. Dr. Mickey therefore cannot lead Project Stable. Dr. Kvaal also does not have experience with research on the immune systems and cannot lead Project Hope. In addition, Dr. Kvaal cannot lead Project Release because he does not have experience with research on the

¹ In general, patents protect inventions for 17 years. In 1995, GATT legislation extending the protection given by new pharmaceutical patents to 20 years became effective. The patent for Tazer's hypertension drug was issued prior to the GATT legislation, however. Thus, the patent only protects the drug for 17 years.

cardiovascular system. Finally, Dr. Rollins cannot lead Project Up because her family has a history of depression and you feel she would be too personally involved in the project to serve as an effective leader. Because Dr. Mickey and Dr. Kvaal cannot

lead two of the five projects, they each have only 600 bid points. Dr. Rollins has only 800 bid points because she cannot lead one of the five projects. The following table provides the new bids of Dr. Mickey, Dr. Kvaal, and Dr. Rollins:

Project	Dr. Mickey	Dr. Kvaal	Dr. Rollins.
Project Up	300	86	Can't lead
Project Stable	Can't lead	343	50
Project Choice	125	171	50
Project Hope	Can't lead	Can't lead	100
Project Release	175	Can't lead	600

Which scientists should lead which projects to maximize preferences?

- (g) You decide that Project Hope and Project Release are too complex to be led by only one scientist. Therefore, each of these projects will be assigned two scientists as project leaders. You

decide to hire two more scientists in order to staff all projects: Dr. Arriaga and Dr. Santos. Because of religious reasons, the two doctors both do not want to lead Project Choice. The following table lists all projects, scientists, and their bids.

	Kvaal	Zuner	Tsai	Mickey	Rollins	Arriaga	Santos
Up	86	0	100	300	Can't lead	250	111
Stable	343	200	100	Can't lead	50	250	1
Choice	171	800	100	125	50	Can't lead	Can't lead
Hope	Can't lead	0	100	Can't lead	100	250	333
Release	Can't lead	0	600	175	600	250	555

Which scientists should lead which projects to maximize preferences?

- (h) Do you think it is wise to base your decision in part (g) only on an optimal solution for an assignment problem?