Case Summary:

- Main Task: Designing a training program.
- The company has determined 41 skills that are important for its employees; seen in Table 1.
- There are six employees; skills required for each person are given in Table 2. There are 15 programs available for use; Table 3 contains the cost per person and the skills covered for each program. In Table 3, a 1 in the row for program p and the column for skill s implies that program p contains skill s. Table 4 lists the programs that conflict in time with other programs (for example, programs 3 and 5 conflict with program 1). An employee cannot take two conflicting programs simultaneously. It is company policy that each employee is limited to 15 days for training per year.
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Table 1. Skills List

No	Skill
1	New employee orientation
2	Performance appraisals
3	Personal computer apps
4	Leadership
5	Sexual harassment
6	Team building
7	Safety
8	Hiring and selection process
9	New equipment operation
10	Training the trainer
11	Product knowledge
12	Decision making
13	Listening skills
14	Time management
15	Conducting meetings
16	Quality improvements
17	Delegation skills
18	Problem solving
19	Goal setting
20	Managing change
21	Motivation

No	Skill
22	Stress management
23	Computer programming
24	Diversity
25	Data processing/MIS
26	Planning
27	Public speaking and presentation
28	Strategic planning
29	Writing skills
30	Negotiating skills
31	Finance
32	Marketing
33	Substance abuse
34	Ethics
35	Outplacement and retirement
36	Creativity
37	Purchasing
38	Smoking cessation
39	Financial and business literacy
40	Reengineering
41	Foreign language

Table 2. Salary and Skills Required for Each Job Classification

Person	Skills 1-41																																							
Senior Manager	0	1	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	0	1	1	1	1	0	1	1	0	1	0	1	1	0	1	0	1	1	1	0	0	0
Project Manager	0	1	0	0	1	0	0	0	0	0	1	1	1	1	1	0	0	1	0	0	0	1	1	1	0	1	1	1	1	0	1	0	1	0	0	1	1	1	1	0	1
Professional	1	1	0	0	1	1	1	0	1	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	1	1	0	0	0	1	0	0	1	0	1	0	0	1	1	0	1
Sales	1	1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	1	0	0	0	0	1	1	0	0	0	1	0	0	1	0	1	0	0	1	1	1	1
Technician	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Administrative Assistant	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	0

Table 3. Enrollment Cost and Skills of Each Program

Program	Enrollment Cost ($)	Skills 1-41																																								
Program 1	500	1	1	0	1	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Program 2	300	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Program 3	500	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	1	1	0	1	0	1	0	0	0	0	1	0	0	0	0	0
Program 4	575	0	1	0	1	0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1
Program 5	800	0	1	1	1	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0
Program 6	400	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	1	0	0	0	0
Program 7	200	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Program 8	1000	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0	1	1	1	1	0	0	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0
Program 9	200	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Program 10	500	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0
Program 11	700	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	1	0	0	1	1	0	0	0	0	0
Program 12	600	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	1	1	1	0
Program 13	400	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	0	1	1	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Program 14	900	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1
Program 15	700	1	0	1	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1

Table 4. Interfering Programs

Program Number	Days long	Programs that Interfere		
Program 1	2	3	5	
Program 2	2	7	10	
Program 3	4	1	12	
Program 4	3	6	7	14
Program 5	2	1	9	
Program 6	3	4	11	
Program 7	5	2	4	
Program 8	2	13		
Program 9	3	5	15	
Program 10	3	2		
Program 11	2	6	12	
Program 12	4	3	11	
Program 13	3	8	14	
Program 14	4	4	13	
Program 15	3	9		

Table 5. Fixed charges of the programs

Program Number	Fixed cost ($)
Program 1	4500
Program 2	2000
Program 3	4000
Program 4	3000
Program 5	2000
Program 6	3500
Program 7	5000
Program 8	4000
Program 9	2000
Program 10	3000
Program 11	5000
Program 12	4500
Program 13	2500
Program 14	4000
Program 15	5000

Task

a) Your job is to develop a recommendation for the company for addressing its training needs. In particular, you should address the following key questions:

- **i)** Which training programs should we be using? What is the assignment of the personnel to those programs?
- **ii)** Identify three programs having high cost. Use that information to develop an in-house program (develop a program in the company rather than get service from a vendor). How much would you be willing to pay for that development if you could use the program for the next year?
- **iii)** Would your recommendation change if we allowed more(less) days of training per year?

b) Suppose that enrollment cost (cost per person) of a program decreases by $100 per person when more than three people are assigned to it. Modify the model you formulate in part (a) and answer the questions stated in the part a.

c) Suppose that programs 3, 9 and 10 are provided by the same outside vendor. From their previous cooperation, the company thinks that negotiating fixed costs of these programs together is possible. If one employee is assigned to each program, then there will be a 15% discount in fixed costs of the corresponding programs. Similarly, 25% and 35% discounts will be applied if two and three employees are assigned to these programs, respectively. (Remark that, for instance, if one employee is assigned to program 10 and two employees are assigned to programs 3 and 9, then the discount rate will be 15%.)

d) Suppose that dates of programs can be changed to manage conflict. However, it requires extra payment. The payment amount is equal to the 5% of the fixed costs of the programs that have conflict. For instance, if we manage the conflict between program 1 and 3, then we need to pay additional $425((4500+4000) *0.05). By considering this relaxation, modify the model you formulate in part (a) and report the changes.

e) Company asks to assign administrative assistants to training courses alone. Modify the model you formulate in part (a) and report the changes.

f) Suppose that programs consist of skill courses and if an employee is assigned to a program there will be no need to take all courses. That means, employees are assigned to the skill courses. Remark that the restriction about conflicting programs is still valid.

Assume that there are not any enrolment costs rather payments will be based on the number of courses taken. The payment for each course in each program is equal to enrolment costs/total number of courses in the program. (For instance, program 1 has 11 courses and the cost of a course in program 1 is equal to 500/11 = $45.4545). Similarly, the duration of courses is calculated as duration of program/total number of courses in the program.

- **i)** Modify your model in part a and compare the costs. Comment on your results. (Remark that, to assign an employee to a course, a fixed cost has to be paid)
- **ii)** Suppose that each program now can be given at most six times and for each time 10% of the fixed cost has to be paid. At each time, at most two employees can be assigned to a program.