(a) Determine the maximum return on the portfolio. What is the optimal number of shares to buy for each of the stocks? What is the corresponding dollar amount invested in each stock?

(b) Compare the solution in which there is no integer restriction on the number of shares invested. By how much (in percentage terms) do the integer restrictions alter the value of the optimal objective function? By how much (in percentage terms) do they alter the optimal investment quantities?

6.4 Selecting New Products: A video game company has an R&D group with 30 programmers. The group has been given a budget of $1 million for this year to develop and test new game designs for introduction next year. The new games have been outlined, each with the ancillary expenses that will be incurred and the number of programmers that will be needed. A panel of marketing specialists has estimated the potential revenues from each game. The problem for the R&D group is to generate the maximum level of potential revenues from its limited expense budget and its available programmers. What is the maximum level?

Game	1	2	3	4	5	6	7	8
Revenue	325	275	320	220	190	265	360	285
Expense	200	130	240	120	115	135	105	280
Programmers	6	5	8	4	5	5	7	6

6.5 Choosing R&D Projects: Texas Electronics Company (TEC) is contemplating a research and development program encompassing eight major projects. The company is constrained from embarking on all of the projects by the number of available scientists (40) and the budget available for projects ($300,000). In the following are the resource requirements and the estimated profit for each project.

Project	Expense ($000)	Scientists Required	Profit ($000)
1	60	7	36
2	110	9	82
3	53	8	29
4	47	4	16
5	92	7	56
6	85	6	61
7	73	8	48
8	65	5	41

(a) What is the maximum profit, and which projects should be selected?

(b) Suppose that projects 2 and 5 are mutually exclusive. That is, TEC should not undertake both. As a result, what is the revised project portfolio and the revised maximum profit?

(c) In addition, suppose that projects 5–8 involve consumer products and that management decides to undertake at least two of those. As a result, what is the revised project portfolio and the revised maximum profit?

6.6 Stocking Warehouses: Nicklaus Razor Blade (NRB) Company plans to test market a new blade next month. The blades will be stocked in their three warehouses in the following quantities.

Warehouse	A	B	C
Stock (cartons)	50	50	50

The carton quantities required by the distributors in the four test markets are as follows.

Distributor	D	E	F	G
Requirement	45	15	25	20

The unit costs (in dollars per carton) of shipping the blades from warehouses to distributors are given in the table below.

	D	E	F	G
A	8	10	6	3
B	9	15	8	6
C	5	12	5	7

(a) If the NRB Company wishes to meet the distributor's requirements at the minimum total transportation cost, what is the optimal distribution plan and its cost?

(b) Suppose that the policy at the NRB Company is that each distributor must be serviced by a single warehouse. What is the optimal distribution plan under this policy?

(c) By how much (in percentage terms) does the single-warehouse policy inflate distribution cost?

6.7 Reservation Scheduling: Roth Auto Rentals, a car rental company specializing is SUVs, is making up a schedule for the next weekend's demands. The peak demand period occurs on the weekend, when Roth may not have enough SUVs to meet demand. The customer demands that have been logged in are listed below.

Days	Customers
Friday–Monday	1
Friday–Saturday	4
Friday–Sunday	5
Saturday–Sunday	4
Saturday–Monday	3
Sunday–Sunday	2