

Exercise 5, Section 3.11

A small toy store, Toyco projects the monthly cash flows (in thousands of dollars) in the table below during the year 2011:

Month	Cash Flow	Month	Cash Flow	Month	Cash Flow
Jan	-12	Feb	-10	Mar	-8
Apr	-10	May	-4	Jun	5
Jul	-7	Aug	-2	Sep	15
Oct	12	Nov	-7	Dec	45

A negative cash flow means that cash outflows exceed cash inflows to the business. To pay its bills, Toyco will need to borrow money early in the year. Money can be borrowed two ways:

- Take out a long-term, year-long loan in January. Interest of 1% charged each month, loan must be paid back at the end of December.
- Each month money can be borrowed from a short-term bank line of credit. Here, a monthly 1.5% is charged. All short-term loans must be paid off at the end of December (that is, zero balance at end of Dec).

At the end of each month, excess cash earns 0.4% interest.

We assume the following order of events (each month):

- Short term loan and interest on short and long term loans are paid. We assume first interest payments on the January short-term and long term loans are made at the beginning of February.
- New short-term loan (or long term loan) is received.
- Month's cash flow is accounted for.
- Interest on balance is received.

Formulate an LP whose solution will help Toyco maximize its cash position at the beginning of January.

Setting up the Homework Problem, 3.11

Exercise 8, Section 3.11

You are a chartered financial analyst. Madonna has come to you because she needs help paying off her credit card bills. She owes the amounts shown in Table 43. Madonna is willing to allocate up to \$5000.00 per month to pay off these cards. All cards must be paid within 36 months.

Madonna's goal is to minimize the total of all her payments. Help Madonna solve her problems!

Card	Balance	Month Interest (%)
Saks Fifth Ave	20,000	0.5
Bloomingdales	50,000	1
Macy's	40,000	1.5

Let's set up the decision variables:

Section 3.12, Multiperiod Work Scheduling

Example (Exercise 3, Section 3.12)

The IRS has determined that during each of the next 12 months, it will need the number of supercomputers given below.

- | | | |
|---------|---------|---------|
| 1. 800 | 5. 1200 | 9. 400 |
| 2. 1000 | 6. 400 | 10. 500 |
| 3. 600 | 7. 800 | 11. 800 |
| 4. 500 | 8. 600 | 12. 600 |

To meet these requirements, the IRS rents out supercomputers for a period of 1, 2 or 3 months. It costs \$100.00 to rent one computer for one month, \$180 for 2, and \$250 for 3 months rent.

At the beginning of month 1, the IRS has no supercomputers. Determine the rental plan that meets the next 12 months' requirements at minimum cost.

NOTE: We may assume that fractional rentals are OK, so if the solution says to rent 140.6 computers for one month, we can round up or down without having much effect on the overall cost. To begin with, let's assume that the we're not rolling computer rentals over for the next year.