Case Summary:

- A family owns and operates an 800-acre farm.
- The entire family can produce a total of:
  - 3750 person-hours' worth of labor during the winter and spring months,
  - 4680 person-hours during the summer and fall.
- If any of these person-hours are not needed, the family will use them to work on neighboring farms for:
  - $4.5/hour during the winter and spring months,
  - $5/hour during the summer and fall.
- The farm supports two types of livestock:
  - dairy cows
  - chickens,
- As well as three crops:
  - sugar beet,
  - barley,
  - wheat.
- All three are cash crops, but:
  - wheat also is feed crop for the cows,
  - barley also is used for chicken feed.
- The family has an investment fund of $25000, that can be used to purchase more livestock. (Other money is available for ongoing expenses, including the next planting of the crops.)
- The family currently has:
  - 25 cows valued at $32000,
  - 2000 chickens valued at $6000.
- They wish to keep all livestock and perhaps purchase more.
- Cost of each new
  - cow would be $1400,
  - chicken would be $4.
- Due to aging, the value decrease of:
  - A herd of cows will be about 5 percent
  - A flock of chickens will be about 25 percent.
- Each cow will require
  - 2 acres of land for grazing
  - 12 person hours of work per season
    (e.g. 24 person hours of work for winter + spring)
  - while producing a net annual cash income of $800
- Each chicken will require
  - no significant acreage,
  - 0.05 person hours per season,
  - and an annual net cash income of $5.5.
- The chicken house can accommodate a maximum of 5000 chickens.
- The size of the barn limits the herd to a maximum of 42 cows.

- For each acre planted:

	sugar beet	barley	wheat
winter and spring (total) (person-hours)	0.6	1	0.9
summer and fall (total) (person-hours)	0.7	1.2	1
net value ($/year)	80	70	50

- They want to plant
  - at least one acre of wheat for each cow in the coming year's herd
  - at least 0.05 acre of barley for each chicken in the coming year's flock.

- Objective: maximize the family's monetary worth at the end of the coming year:
  - The sum of the net income from the livestock for the coming year
  - The net value of the crops for the coming year
  - What remains from the investment fund
  - The value of the livestock at the end of the coming year
  - Income from the working on a neighboring farm
  - Minus living expenses of $40000 for the year

- How much acreage should be planted in each of the crops?
- How many cows and chicken to have for the coming year?