1. Acme Manufacturing Company has a contract to deliver 100, 250, 190, 140, 220, and 110 home windows over the next 6 months. Production cost (labour, material, and utilities) per window varies by period and is estimated to be $50, $45, $55, $48, $52, and $50 over the next 6 months. To take advantage of the fluctuations in manufacturing cost, Acme can produce more windows than needed in a given month and hold the extra units for delivery in later months. This will incur a storage cost at the rate of $8 per window per month, assessed on end-of-month inventory. Develop a linear program to determine the optimum production schedule.

2. A company produces two products, *A* and *B*. The sales volume for *A* is at least 80% of the total sales of both *A* and *B*. However, the company cannot sell more than 110 units of *A* per day. Both products use one raw material, of which the maximum daily availability is 300 lb. The usage rates of the raw material are 2 lb per unit of *A*, and 4 lb per unit of *B*. The profit units for *A* and *B* are $40 and $90, respectively. Determine the optimal product mix for the company.

3. In preparation for the winter season, a clothing company is manufacturing parka and goose overcoats, insulated pants, and gloves. All products are manufactured in four different departments: cutting, insulating, sewing, and packaging. The company has received firm orders for its products. The contract stipulates a penalty for undelivered items. Devise an optimal production plan for the company based on the following data:

	Time per unit(hr)				
Department	Parka	Goose	Pants	Gloves	Capacity(hr)
Cutting	0.30	0.30	0.25	0.15	1000
Insulating	0.25	0.35	0.30	0.10	1000
Sewing	0.45	0.50	0.40	0.22	1000
Packaging	0.15	0.15	0.1	0.05	1000
Demand	800	750	600	500	
Unit profit	$30	$40	$20	$10	
Unit penalty	$15	$20	$10	$8	

4. Bank One is in the process of devising a loan policy that involves a maximum of $12 million. The following table provides the pertinent data about available loans.

Type of loan	Interest rate	Bad-debt ratio
Personal	0.140	0.10
Car	0.130	0.07
Home	0.120	0.03
Farm	0.125	0.05
Commercial	0.100	0.02

Bad debts are unrecoverable and produce no interest revenue. Competition with other financial institutions dictates the allocation of at least 40% of the funds to farm and commercial loans. To assist the housing industry in the region, home loans must equal at least 50% of the personal, car, and home loans. The bank limits the overall ratio of bad debts on all loans to at most 4%.