1. A farm with 30000 acres of farmland intends to plant corn, soybeans, and wheat. Various crops require 0.12, 0.20, and 0.15 tons of chemical fertilizer per acre. It is expected that 500 kilograms of corn can be harvested per acre in autumn, with a selling price of 0.24 yuan/kilogram; Soybeans can be harvested at a yield of 200 kilograms per acre, with a selling price of 1.20 yuan per kilogram; Wheat can be harvested by 300 kilograms per acre, with a selling price of 0.70 yuan per kilogram. When planning the farm at the beginning of the year, the following aspects need to be considered:
   P1: Maximum year-end income;
   P2: The total production shall not be less than 12500 tons;
   P3: The optimal wheat yield is 5000 tons;
   P4: Soybean production shall not be less than 2000 tons;
   P5: Corn yield does not exceed 6000 tons;
   P6: The farm can now provide 5000 tons of fertilizer
   Try to establish a mathematical model for the production plan of this farm (without requiring a solution).

2. A certain factory produces three types of products, A, B, and C, and the resources consumed per unit of product are as follows.

	Time for Technology(hour)	Time for process(hour)	Materia(kg)
A	1	10	3
B	2	4	2
C	1.5	6	1

The total preparation time for available technology is 100 hours, the total processing time is 700 hours, and the total amount of materials is 400 kilograms. Considering the impact of sales on sales volume, the profit quota is determined as shown in the table below.

A		B		C	
Sales volume	Unit profit	Sales volume	Unit profit	Sales volume	Unit profit
0-40	10	0-50	6	0-100	5
40-100	9	50-100	3	more than 100	4
more than 100	8	more than 100	4		

Try to determine the product variety scheme with the highest profit and model it without solving.

3.Convert the following LP problem into the standard form:

$$minZ = -2x_1 + x_2 + 3x_3$$

Subject to:

$$\begin{cases} 5x_1 + x_2 + x_3 \leq 7 \\ x_1 - x_2 - 4x_3 \geq 2 \\ -3x_1 + x_2 + 2x_3 = -5 \\ x_1, x_2 \geq 0, x_3 \; is \; free. \end{cases}$$

4.Use the simplex method to solve the following LP problem:

$$minZ = -7x_1 - 5x_2$$

Subject to:

$$\begin{cases} 3x_1 + 2x_2 \leq 90 \\ 4x_1 + 6x_2 \leq 200 \\ 7x_2 \leq 210 \\ x_j \geq 0, j = 1, \ldots, 5 \end{cases}$$