Project Description

A company plans to schedule production on their 200-hectare factories over the next five years. They currently have a 120 manufacturing machines. These machines consist of 20 type I machines and 100 type II machines. Each type I machine needs 2.3 hectares and each type II machine needs 1 hectare of space. Each type I machine produces an average of 1.1 type I product per year. Half of these type I products are immediately sold for $ 30. The remaining type I products can either be sold immediately for $ 40 or raised to become a type III product at 2 years old. The company plans to sell all type I products at the age of 12 at an average price of $ 120 each. However, there is a 5% annual decrease in type II products and a 2% decrease in type I machines. There are currently 10. The decision to sell some type II products at the present time has already been made and implemented. Products generate annual income of $ 370 for the company. There are currently facilities for manufacturing type I machines on the company. Providing space for each machine above that number costs $ 200 per machine. Also, each type I machine needs 6.0 tons of type I material and 7.0 tons of type II material annually. Both type I and type II material can be manufactured in the factories. Per hectare of land, 5.1 tons of type II material can be produced. Also, only 80 hectares are suitable for type I materials, which can be divided into 4 groups below:

Product (tons per hectare)	Hectares	Group
1.1	20	1
0.9	30	2
0.8	20	3
0.65	10	4

It is obvious that the space required for any action must be considered separately and it is not possible to do two actions in one space. Therefore, it is not possible to overlap the space required for material production, machine production or product production. Type II material can also be bought for $ 90 per ton and sold for $ 75 per ton. Type I material can also be bought for $ 70 per ton and sold for $ 58 per ton. The number of workers required and

other costs are given in the table below. At present, workers are paid $ 4,000 (in total) and provide 5,500 working hours (in total). For each additional 5500 hours, you have to pay $ 2.1.

	Required working time(hours per year)	Other Costs(dollars per year)
Every Type II machine	**10**	**50**
Every Type I machine	**42**	**100**
Every Type I material	**4**	**15**
Every Type II material	**14**	**10**

The company does not want the total number of type II machine to decrease to less than 50% or increase to more than 75% at the end of the 5-year period. Every 5 years, the buying and selling prices are constant and equal to the amounts stated. How should a company act in the next 5 years to maximize his profit?