Problems Set

Exercise 1. Solve Integer Programming by Excel Solver

An English manual need to be translated into four languages: Spanish, French, Arabic, and Chinese, denoted as language 1, 2, 3, and 4. We need to assign four people, denoted by person 1, 2, 3, and 4, to finish this task. We know if person i translates language j, it will take time c_{ij} as the following table shows.

Constraints are:

1) One person will exactly translate one language.

2) One language will exactly be translated by one person.

How should we assignment these people to **minimize** the time?

Person	Language			
	1	2	3	4
1	**2**	**15**	**13**	**4**
2	10	**4**	14	15
3	9	14	16	13
4	7	8	11	9

Exercise 2. Simulation for Demand

The demand for some product is shown is the table above.

Demand	Frequency
15	20
20	20
30	60

Simulate the demand for the next 1000 days and calculate the average demand from the 1000 iterations. Calculate the expected demand according to the frequency. Comparing the average and the expectation, what conclusion can you get? Which theorem can be applied to explain this phenomenon?

Exercise 3. Read "Saw Tooth" Diagram

According to this "saw tooth" diagram of mouse' inventory, suppose we know
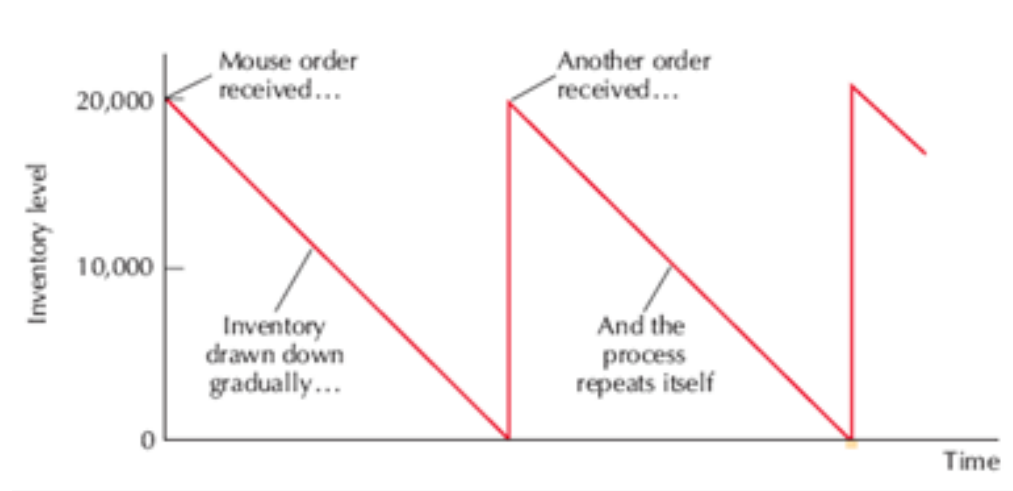
the cost of carrying a mouse is $1 per year. The ordering cost is $80 per order. One year is 250 working days. The lead time is 2 days and the corresponding reorder point is 800 units.

1) Calculate annual demand.

2) Is 20000 the EOQ?

Exercise 4. Newsvendor

A newspaper vendor wants to decide how many newspapers to order per day. The unit cost of one newspaper is $10 and the unit price of one newspaper is $50. If newspapers are not sold out, the rest cannot get a refund. The daily demand is normally distributed such that N(120, 3600). If the vendor wants to maximize his profits, find the optimal quantity to order by Monte Carlo Simulation.