**END501 - HW1 DUE ON 21TH SEP., (You can submit it electronically and bring the hard copy to the class in our next meeting)**

Q1. Consider the cutting stock problem we have covered in the class. Construct the model again where l=11 feet and we are required to produce 20 of pieces with length 3 feet, 10 of pieces with length 6 feet, and 15 pieces with length 4 feet. Describe your decision variables and model briefly. Comment briefly on the four axioms of LP for this problem, do you see any problem with the validity of these axioms?

Q2. Consider the machine placement problem covered in the class. Remodel the problem considering the following modifications; We would like to place two new machines (instead of one) and we again want to minimize the total rectilinear distance from the new machines to the current machines. We have an additional restriction that both the horizontal and the vertical distance between the two new machines are greater than 8 feet. Describe your decision variables and model briefly.

Q3. Consider the static workforce scheduling problem covered in the class and remodel it considering following modifications; a worker should take two days off in a week and these two days can be any of the two week days, not necessarily consecutive. Describe your decision variables and model briefly.

Q4



Q5





Q6





Q7. Solve the following LP using geometric method. Show each step. What would be the optimal solution if the objective was maximization?

Min Z=-3X1 + 12X2

s.t.

3X1 – X2 <= 3

-X1 + 4X2 <=8

X1, X2>=0