Algo HW 9
Anooj Pai

7.3) If we let m1, m2, and m3 represent the given volumes of the materials given, then the linear program is:

Maximize 1000m1 + 1200m2 + 1200m3
2m1 + m2 + 3m3 <= 100
m1 + m2 + m3 <= 60
m1 <= 40
m2 <= 30
m3 <= 20
m1, m2, m3 >= 0

7.7)

a) This linear program will always be feasible unless you add an additional constraint because at (0,0) it is always feasible
b) If and only if a <= 0 or b <= 0 then it will be unbounded
c) A finite and unique optimal solution only exists when a != b and both a > 0 and b > 0

7.12)

Maximize x1 - 2x3 with bounds
x1 - x2 <= 1
2x2 -x3 <= 1
x1, x2, x3 >= 0

To maximize, x3 would have to have a value of 0 which is its minimum. This means 2x2 <= 1. We maximize x1 so x1 - x2 <= 1, this means x2 must be ½ and x3 must be 3/2. Because all of these values are given in the problem, we have proven that (3/2, ½, 0) is the optimal solution.

7.13)

a) The playoff matrix:

H	-1	1
T	1	-1

b) The value of the game is equal to 0
-yH + yT <= v
yT - yH <= v
yT + yH = 1
yT, yH >= 0

It is optimal at yT = yH = 0.5. Because of this both of the players should play with a probability of 0.5 for both heads and tails. This makes sure that the expected payoff for both players is 0 and there is no way to increase the odds by using another strategy.