**CS 451**

**Activity 16-3 - Solutions**

Let xi = 1 if server i is included in the initial set.

xi = 0 otherwise

Then appropriate IP is

max z = 3x1 + 2x2 + 2x3 + x4 + 3x5 + 3x6 + x7

s.t. x1 + x3 + x5 + x7≥4 (service 1)

x3 + x4 + x5 + x6 + x7≥2 (service 2)

x2 + x4 + x6≥1 (service 3)

x1 + x2 + x3 + x4 + x5 + x6 + x7 = 5 (five servers in the initial set)

3x1 + 2x2 + 2x3 + x4 + 3x5 + 3x6 + 3x7≥10 (CPU power)

3x1 + x2 + 3x3 + 3x4 + 3x5 + x6 + 2x7≥10 (Memory)

x1 + 3x2 + 2x3 + 3x4 +3x5 + 2x6 + 2x7≥10 (Number of users)

x6 + x3≤1

‑x4‑x5 + 2≤2y (If x2>0 then x4 + x5≥2)

x2 ≤2(1‑y)

x2 + x3≥1

x1,x2,...x7,y are all 0‑1 variables