**Problem 1**

30+15-20 =25k

30+15-20 =25k

15+30+16.5-16 =45.5k

**Problem 2**

Let be the binary variables that indicate the company buy new photocopier in year i and sell it in year j, where

Objective: minimize

s.t.

**Problem 3**

Let be the number of tons of sewage flow from node i to node j, where

Objective: maximize

s.t.