

# Model 26: Investment Planning

Winston-Salem Development Management (WSDM) is trying to complete its investment plans for the next three years. Currently, WSDM has 2 million dollars available for investment. At six month intervals over the next three years, WSDM expects the following income stream from previous investments: \$500,000 (6 months from now), \$400,000; \$380,000; \$360,000; \$340,000; and \$300,000 (at the end of third year). There are three development projects in which WSDM is considering participating. The Foster City Development would, if WSDM participated fully, have the following cash flow stream (projected) at six month intervals over the next three years (negative numbers represent investments, positive numbers represent income): -\$3,000,000; -\$1,000,000; -\$1,800,000; \$400,000; \$1,800,000; \$1,800,000; \$5,500,000. The last figure is its estimated value at the end of three years. A second project involves taking over the operation of some old lower-middle income housing on the condition that certain initial repairs to it be made and that it be demolished at the end of three years. The cash flow stream for this project if participated in fully would be: -\$2,000,000; -\$500,000; \$1,500,000; \$1,500,000; \$1,500,000; \$200,000; -\$1,000,000.

The third project, The Disney-Universe Hotel, would have the following cash flow stream (six-month intervals) if WSDM participated fully. Again the last figure is the estimated value at the end of the three years: -\$2,000,000; -\$2,000,000; -\$1,800,000; \$1,000,000; \$1,000,000; \$1,000,000; \$6,000,000. WSDM can borrow money for half-year intervals at 3.5 percent interest per half year. At most, 2 million dollars can be borrowed at one time, i.e., the total outstanding principal can never exceed 2 million. WSDM can invest surplus funds at 3 percent per half-year.

Formulate the problem of maximizing WSDM's net worth at the end of three years as a linear program. If WSDM participates in a project at less than 100 percent, all the cash flows of that project are reduced appropriately.