DECISION TREE TO PRODUCT DESIGN

1)

DECISION TREE APPLIED TO PRODUCT DESIGN

Silicon, Inc., a semiconductor manufacturer, is investigating the possibility of producing and marketing a microprocessor. Undertaking this project will require either purchasing a sophisticated CAD system or hiring and training several additional engineers. The market for the product could be either favorable or unfavorable. Silicon, Inc., of course, has the option of not developing the new product at all.

With favorable acceptance by the market, sales would be 25,000 processors selling for $100 each. With unfavorable acceptance, sales would be only 8,000 processors selling for $100 each. The cost of CAD equipment is $500,000, but that of hiring and training three new engineers is only $375,000. However, manufacturing costs should drop from $50 each when manufacturing without CAD to $40 each when manufacturing with CAD.

The probability of favorable acceptance of the new microprocessor is .40; the probability of unfavorable acceptance is .60.

APPROACH ► Use of a decision tree seems appropriate as Silicon, Inc., has the basic ingredients: a choice of decisions, probabilities, and payoffs.

2)

Sarah King, president of King Electronics, Inc., has two design options for her new line of high-resolution monitors for CAD workstations. The production run is for 100,000 units.

Design option A has a .90 probability of yielding 60 good monitors per 100 and a .10 probability of yielding 65 good monitors per 100. This design will cost $1,000,000.

Design option B has a .80 probability of yielding 64 good units per 100 and a .20 probability of yielding 59 good units per 100. This design will cost $1,350,000.

Good or bad, each monitor will cost $75. Each good monitor will sell for $150. Bad monitors are destroyed and have no salvage value. We ignore any disposal costs in this problem.