Problems and Exercises

TEST1
SECTION A
1. Data rich data is expensive to collect—T or F?
2. What type of model is a site map that is associated with a website?
3. The x-axis of a risk profile is associated with potential outcomes—T of F?
4. Deterministic is to probabilistic as point estimate is to range—T or F?
5. What is a single annual payment for the PMT() function for the following data: 6.75% annual interest rate; 360 months term; and $100,000 principal?
6. Draw a Process Flow Map of your preparation to leave your house, dormitory, or apartment in the morning. Use a rectangle to represent process steps like, brush teeth, and diamonds to represent decisions, like wear warm weather clothes (?).
7. Create a diagram of a complex decision or process of your choice by using the structure of an influence diagram.

SECTION B
8. An investor has 3 product choices in a year long investment with forecasted outcomes—bank deposit (2.1% guaranteed); a bond mutual fund (0.35 probability of a 4.5% return; 0.65 probability of 7%), and a growth mutual fund (0.25 probability of –3.5% return, 50% probability of 4.5%, and remaining probability of 10.0%).
a. Draw the decision tree and calculate the expected value of the three investment choices. You decide that the maximum expected value is how you will choose an investment. What is your investment choice?

b. What will the guaranteed return for the bank deposit have to be to change your decision in favor of the bank deposit?

c. Create a spreadsheet that permits you to perform the following sensitivity analysis: What must the value of the largest return (currently 7%) for the bond fund be for the expected value of the bond fund to be equal to the expected value of the growth fund?

9. For Fr. Efia's OLPS problem perform the following changes:
a. Introduce a 4th weather condition, Absolutely Miserable, where the number of alumni attending is a point estimate of only 750.
b. Perform all the financial calculations in a separate area below the others.
c. Add the scroll bar (range of 500–900) and the option button associated with the new weather condition, such that the look of the spreadsheet is consistent.
d. What will the entry fee for the new weather condition have to be in order for the profit to equal that in Exhibit 7.7?

e. Find a different combination of Player odds that leads to the same Profit ($125,000) in Exhibit 7.10.
f. Create a two-variable Data Table for cloudy weather, where the variables are Bet Value ($10 to $100 in $10 increments) and OTSD player odds (10–80% in 10% increments).

10. Create a set of 4 buttons that when a specific button is depressed (X) it provides the following message in a cell: Button X is Selected (X can take on values 1–4). Also, add conditional formatting for the cell that changes the color of the cell for each button that is depressed.

11. Create a calculator that asks a person their current weight and permits them to chose, by way of a scroll bar, only one of 5 percentage reductions 5, 10, 15, 20, and 25%. The calculator should take the value of the percentage reduction and calculate their desired weight.

12. For the same calculator in 11, create a one-variable Data Table that permits the calculation of the desired weight for weight reduction from 1 to 25% in 1% increments.

13. Advanced Problem—Income statements are excellent mechanisms for modeling the financial feasibility of projects. Modelers often choose a level of revenue, a percent of the revenue as COGS (Cost of Goods Sold), and a percent of revenue as variable costs.
a. Create a deterministic model of a simple income statement for the data elements shown below (d-i)–(d-iv). The model should permit selection of various data elements through the use of option buttons and scroll bars, as needed.
b. Produce a risk profile of the numerous combinations of data elements assuming that all data element combinations are of equal probability. (Recall the vertical axis of a risk profile is the probability of occurrence of the outcomes on the horizontal axis, and in this case, all probabilities are equal).
c. Also, provide summary data for all the profit combinations for the problem–average, max, min, and standard deviation.
d. Data elements for the problem:
i. Revenue $100 k and $190 k (Option Button)
ii. COGS % of Revenue with outcomes of 24 and 47% (Option Button)
iii. Variable costs % of Revenue with outcome 35 and 45% (Option Button)
iv. Fixed costs $20 k to $30 k in increments of $5 k (Scroll bar)
e. Create a Data Table that will permit you to change (with a scroll bar) the fixed cost in increments of $1 k that will result in instantaneous changes in the graph of the risk profile. Hint: combine (d-ii) and (d-iii) as a single variable and as a single dimension of a two variable Data Table, while using revenue as the second dimension. Fixed cost will act as a third dimension in

the sensitivity analysis, but will not appear on the borders of the two variable Data Table.