Chapter 1—Introduction to Modeling and Decision Analysis

MULTIPLE CHOICE

1. The essence of decision analysis is:
   a. breaking down complex situations into manageable elements.
   b. choosing the best course of action among alternatives.
   c. finding the root cause of why something has gone wrong.
   d. thinking ahead to avoid negative consequences.

   ANS: B   PTS: 1

2. Why would someone wish to use a spreadsheet model?
   a. To implement a computer model.
   b. Because spreadsheets are convenient.
   c. To analyze decision alternatives.
   d. All of these.

   ANS: D   PTS: 1

3. Which of the following fields of study is defined in Chapter One as the one that "uses computers, statistics, and mathematics to solve business problems"?
   a. Accounting
   b. Information systems
   c. Management science
   d. Scientific management

   ANS: C   PTS: 1

4. In a decision-making problem, anchoring effects occur when
   a. decision makers are tied too closely to previous decisions.
   b. organizations refuse to consider new alternatives.
   c. a seemingly trivial factor serves as a starting point for estimations.
   d. a person in a position of authority exerts his or her opinion very forcefully.

   ANS: C   PTS: 1

5. Virtually everyone who uses a spreadsheet today for model building and decision making
   a. is a practitioner of management science.
   b. possesses an advanced knowledge of mathematics and computer programming languages.
   c. is a CPA.
   d. is in a position to influence decision makers.

   ANS: A   PTS: 1

6. Which of the following statements is true of using models in problem solving and decision analysis?
   a. It is a fairly new idea.
   b. It is required in order to find good solutions.
   c. It is something everyone has done before.
   d. It is tied to the use of computers.

   ANS: C   PTS: 1

7. A road map is an example of

a. a mathematical model.
b. a mental model.
c. a physical model.
d. a visual model.

ANS: D   PTS: 1

8. The textbook figure of the problem-solving process is an example of a
a. mental model.
b. prescriptive model.
c. graphical model.
d. visual model.

ANS: D   PTS: 1

9. Which of the following is most likely to be used when faced with the decision of how to arrange furniture in a room?
a. Mathematical model
b. Mental model
c. Physical model
d. Visual model

ANS: B   PTS: 1

10. To illustrate how a complex system will be built, an engineer will likely use a
a. Mathematical model
b. Mental model
c. Physical model
d. Visual model

ANS: D   PTS: 1

11. Which of the following is the type of model used throughout this textbook?
a. Mathematical model
b. Mental model
c. Physical model
d. Visual model

ANS: A   PTS: 1

12. The best models
a. accurately reflect relevant characteristics of the real-world object or decision.
b. are mathematical models.
c. replicate all aspects of the real-world object or decision.
d. replicate the characteristics of a component in isolation from the rest of the system.

ANS: A   PTS: 1

13. A mathematical model is considered to be "valid" when
a. it accurately represents the relevant characteristics of the object or decision.
b. it has passed a validation test.
c. it replicates all aspects of the object or decision.
d. the left-hand and right-hand sides of expressions are equal.

ANS: A   PTS: 1

14. All of the following are benefits of modeling <u>except</u>:
    a. Modeling delivers needed information on a more timely basis.
    b. Modeling finds the right answers to incorrect or flawed problem statements.
    c. Modeling is helpful in examining things that would be impossible to do in reality.
    d. Modeling is less expensive than implementing several alternative solutions.

    ANS: B   PTS: 1

15. Better decision making due to using a modeling process is achieved due to
    a. the interaction with the spreadsheet.
    b. the visualization of the system being studied.
    c. the insight gained through the process.
    d. the timeliness of the results obtained.

    ANS: C   PTS: 1

16. In this text we use the term "mathematics" to encompass

    i.   familiar elements of math such as algebra.
    ii. logic.

    a. i only
    b. ii only
    c. Both i and ii
    d. Neither i nor ii

    ANS: C   PTS: 1

17. The specification or description of the relationship between the dependent and independent variables is generally called
    a. a constraint.
    b. a declaration.
    c. a function.
    d. a mathematical model.

    ANS: C   PTS: 1

18. Variables are termed independent when they satisfy which of the following?
    a. The function value depends upon their values.
    b. The decision maker has no control over them.
    c. The variables have no relationship to one another.
    d. The variable is described as an output of the spreadsheet model.

    ANS: A   PTS: 1

19. In the following expression, which is (are) the dependent variable(s)?

    PROFIT = REVENUE − EXPENSES

    a. Profit
    b. Revenue
    c. Expenses
    d. (b) and (c)

    ANS: A   PTS: 1

20. In a spreadsheet, input cells correspond conceptually to
    a. dependent variables.
    b. functions.
    c. independent variables.
    d. output cells.

    ANS: C   PTS: 1

21. The categories of modeling techniques presented in this book include all of the following <u>except</u>:
    a. descriptive models.
    b. predictive models.
    c. prescriptive models.
    d. preventive models.

    ANS: D   PTS: 1

22. Consider the spreadsheet model shown in the figure below. This is an example of a

	A	B	C
1			
2			
3	Purchase price	$32,500	
4	less:		
5	Down payment	$6,500	
6	Trade-in	$4,000	
7	Amount financed	$22,000	
8			
9	Term of loan	5 years	
10			
11	Annual interest rate	11.25%	
12			
13	Monthly payment	$481.08	
14			

    a. descriptive model.
    b. predictive model.
    c. prescriptive model.
    d. preventive model.

    ANS: C   PTS: 1

23. Solutions to which of the following categories of modeling techniques indicate a course of action to
    the decision maker?
    a. Descriptive models
    b. Predictive models
    c. Prescriptive models
    d. Preventive models

    ANS: C   PTS: 1

24. In which of the following categories of modeling techniques do the independent variables have
    unknown or uncertain values or coefficients?
    a. Descriptive models
    b. Predictive models

c. Prescriptive models
d. Probabilistic models

ANS: A   PTS: 1

25. In which of the following categories of modeling techniques are the specifications of the relationships between dependent and independent variables unknown or ill-defined?
   a. Descriptive models
   b. Open models
   c. Predictive models
   d. Prescriptive models

ANS: C   PTS: 1

26. Which of the following categories of modeling techniques includes optimization techniques?
   a. Capitalistic models
   b. Descriptive models
   c. Predictive models
   d. Prescriptive models

ANS: D   PTS: 1

27. Which of the following categories of modeling techniques includes simulation?
   a. Descriptive models
   b. Predictive models
   c. Prescriptive models
   d. Scale models

ANS: A   PTS: 1

28. Which of the following categories of modeling techniques includes discriminant analysis?
   a. Biased models.
   b. Descriptive models.
   c. Predictive models.
   d. Prescriptive models.

ANS: C   PTS: 1

29. To be effective, a modeler must
   a. be an effective presenter of results.
   b. collect the proper input data for the model.
   c. understand how modeling fits into the problem-solving process.
   d. apply the correct modeling technique.

ANS: C   PTS: 1

30. Identifying the real problems faced by the decision maker
   a. is not important since the decision maker has already defined the problem.
   b. requires insight, some imagination, time and a good bit of detective work.
   c. first requires a well-defined problem statement.
   d. will lead to developing the best model.

ANS: B   PTS: 1

31. The ultimate goal of the problem identification step of the problem-solving process is
   a. collecting lots of information.

b. helping the decision maker realize there is a problem.
c. identifying the root problem or problems causing the mess.
d. convincing the decision maker the mess is really a problem that can be solved.

ANS: C   PTS: 1

32. Which step of the problem-solving process is considered the most important?
a. Identify problem.
b. Analyze model.
c. Test results.
d. Implement solution.

ANS: A   PTS: 1

33. Which of the following steps in the problem-solving process is most likely to incur resistance from people affected by the proposed solution?
a. Formulate model
b. Use model to analyze problem
c. Test results
d. Implement solution

ANS: D   PTS: 1

34. There are a variety of problems a manager might face. While presenting and defending your approach, how would you complete this thought?

Several different modeling techniques are available to solve managerial decision problems,
a. the wrong choice of modeling technique is a common source of implementation difficulties.
b. students should develop a strong preference and expertise in one technique so when faced with problems as managers they can formulate them as a model that can be solved by their favorite technique.
c. fundamental characteristics of the problem guide the selection of an appropriate modeling technique.
d. most problems faced by managers are fundamentally the same.

ANS: C   PTS: 1

35. In which step of the problem-solving process is the main focus to generate and evaluate alternatives?
a. Identify problem
b. Formulate model
c. Use model to analyze problem
d. Test results

ANS: C   PTS: 1

36. Which of the following is true of "What if?" analysis?
a. A well-designed spreadsheet facilitates "What if?" analysis.
b. It is not very useful when working with non mathematical models.
c. "What if?" analysis is an efficient optimization technique.
d. "What if?" analysis is useful in creating a well-defined problem statement.

ANS: A   PTS: 1

37. Beneficial uses of the testing process include all of the following except:
a. double checking the validity the model.

b. finding that some important assumption has been left out of the model.
c. giving no new insights into the nature of the problem.
d. improving solutions after the implementation step.

ANS: D   PTS: 1

38. Implementing solutions to problems involves people and change. Which of the following is a suggested approach to effectively implement solutions?
a. Decision-making authority centralized to those who have specialized training in decision making.
b. Involve anyone affected by the decision in all steps of the problem-solving process.
c. Making decisions according to majority vote.
d. More skillful communication of management decisions.

ANS: B   PTS: 1

39. Which of the following problem-solving steps is often considered the most difficult?
a. Identify the problem.
b. Analyze the model.
c. Test results.
d. Implement the solution.

ANS: D   PTS: 1

40. If we do not identify the correct problem, the best we can hope for is:
a. wasted time and effort.
b. useful experience in problem definition efforts.
c. a descriptive model.
d. the right answer to the wrong question.

ANS: D   PTS: 1

41. Chapter One discussed all of the following except:
a. how models of decision problems differ in a number of important characteristics.
b. how spreadsheet modeling and analysis fit into the problem-solving process.
c. how spreadsheet models of decision problems can be used to analyze the consequences of possible courses of action.
d. how to implement a problem formulation as a spreadsheet model.

ANS: D   PTS: 1

42. The main point brought forward in the Chapter One "The World of Management Science" case reading is:
a. At a cocktail party, it is more efficient to divide the dip into several bowls and place them around the room.
b. Competitive rivalry between IS and OR/MS groups can be turned to advantage when tackling business process re-engineering projects.
c. Information system analysts trained in management science can help turn ordinary information systems into money-saving decision-support systems.
d. OR/MS professionals lack communication skills and tend to focus on "rigor without relevance".

ANS: C   PTS: 1

43. The Chapter One "The World of Management Science" case reading offers the CEO alternatives to start the OR/MS collaboration process. All the following are alternatives offered EXCEPT:

a. Require the OR/MS group to save their yearly salary in every study.
b. Use OR/MS personnel as consultants.
c. Hire some OR/MS professionals and give them a problem to work.
d. All are recommended alternatives.

ANS: A   PTS: 1

44. Operations Research got its start
a. during World War II.
b. with the first Univac computers in the early 1950's.
c. from roots in Operations Management.
d. from Frederick Taylor's Scientific Management.

ANS: A   PTS: 1

45. The Chapter One "The World of Management Science" case reading discusses the relationship between OR/MS and IS professionals. Which of the following statements is NOT true?
a. OR/MS analysts need IS professionals' data for their models.
b. OR/MS analysts need to take many of the IS customers.
c. The IS professional cannot use OR/MS tools in their applications.
d. The IS tools can start to recommend solutions using OR/MS skills.

ANS: D   PTS: 1

46. The goal of the modeling approach to problem solving is to
a. Help individuals make good decisions.
b. Ensure optimality of decisions.
c. Determine a set of optimal decisions.
d. Determine feasibility of decisions.

ANS: A   PTS: 1

47. A situation when decision quality is good and the resulting outcome quality is good is referred to as
a. Pure luck.
b. Deserved success.
c. Dumb luck.
d. Poetic justice.

ANS: B   PTS: 1

48. A factor that plays a role in determining whether a good or bad outcome occurs is called
a. Luck.
b. Intuition.
c. Certainty.
d. Predictability.

ANS: A   PTS: 1

49. Consistently using a structured, model based process to make decisions
a. Should produce good outcomes more frequently.
b. Is less effective than making decisions in a haphazard manner.
c. Is evidence that luck plays an important role in decision making.
d. Always leads to well-deserved success in managerial decision making.

ANS: A   PTS: 1

50. In a decision-making framework presented in Chapter One, the term "poetic justice" refers to a situation when the following occur:
   a. Good decision quality and good outcome quality.
   b. Good decision quality and bad outcome quality.
   c. Bad decision quality and good outcome quality.
   d. Bad decision quality and bad outcome quality.

   ANS: D   PTS: 1

51. A purely rational decision maker should
   a. Consistently select the same alternative, regardless of how the problem is framed.
   b. Disregard the consequences of his/her choices.
   c. Always select optimal action.
   d. Allow emotions influence the decision.

   ANS: A   PTS: 1

PROJECT

52. **Project 1.1**

   Assignment: Read the assigned case. You are not expected to understand the specifics of the management science technique employed. Read the case to comprehend the overall goals and objectives of the effort, the general use of the techniques employed, and the results obtained. Based on your reading of the assigned article, provide short essay responses to the following questions:

   a. What types of model or models were employed?

   b. What was the objective of the model development and study as presented in the article?

   c. What were the independent and dependent variables in the model?

   d. How were these models used to improve decision making? How might these models be used to improve decision making?

   e. Did the authors employ the problem-solving process as defined in Chapter One of the text and if so, what specific actions were completed within each of the steps of the process? If the problem-solving process differed, or no systematic process was discussed, what is your most reasonable estimate as to the process employed to solve the problem posed?

   f. Discuss the good decision-bad outcome dilemma with respect to the situation described in the article you read.

   g. If the authors discussed data gathering what level of effort was implied in their discussion? Do you think their effort represented a below normal, normal, or above normal level of effort with respect to data gathering and data preparation?

   h. What were the final conclusions with respect to the quantitative management techniques employed?

   ANS:
   Answer not provided.

   PTS: 1

53. **Project 1.2**

Assignment: Conduct a search of internet news sites or trade journals for an instance of a company using a management science technique. Provide a short note summarizing the application, which technique was employed, and any benefits noted.

ANS:
Answer not provided.

PTS: 1