BADM 5143
HOMEWORK 1

PART A

1. Spreadsheet models are referred to as what-if models because they

a. are mathematical and logic-based models.

b. allow easy instantaneous recalculation for a change in model inputs.

c. come preloaded on computers.

d. have specialized functions to perform detailed analysis.

2. Which of the following is *not* one of the "intermediate" features of Excel that the authors expect you to be able to use?

a. SUMPRODUCT

b. VLOOKUP

c. IF

d. NPV

e. DIFFERENCEPRODUCT

3. Which of the following Excel® functions can be used for finding a particular value based on a comparison?

a. IF

b. SUMPRODUCT

c. VLOOKUP

d. NPV

4. Which of the following statements is false?

a. A two-way table allows you to see how a single output cell varies as you vary two input cells.

b. The SUMPRODUCT function takes two range arguments, which must be exactly the same size and shape, and it sums the products of the corresponding values in these two ranges.

c. The purpose of the Auditing Toolbar is to solve one equation in with one unknown.

d. The NPV function takes two arguments, the discount rate and a stream of cash flows.

5. A one-way data table summarizes

a. a single input's impact on the output of interest.

b. multiple inputs' impact on a single output of interest.

c. values of the input cells that will cause the single output value to equal zero.

d. values of cells when not all of the model is observable on the screen.

6. With reference to a spreadsheet model, an uncontrollable model input is known as a(n)

a. decision variable.

b. dummy variable.

c. parameter. d. statistic.

7. The arguments supplied to the IF function, in order, are the condition for execution,

a. the result if condition is true, and the result if condition is false.
b. and the range of cells to test.
c. the array1 of data cells to test, and the array2 of data cells to output.
d. the result if condition is false, and the result if condition is true.

8. A _____ decision is one in which companies have to decide whether they should manufacture a product or outsource production to another firm.

a. goal seek b. two-way
c. voting-based d. make-versus-buy

9. A company receives a discount of 10% per unit for all units ordered over a quantity of 50. Suppose cell B1 of an Excel sheet contains the quantity of units ordered and that cell B2 contains the unit price. Write an Excel formula that can be used to calculate the cost of the order.**(3 POINTS) =IF(B1>50,50*B2(B1-50)*(0.9*B2),B1*B2**

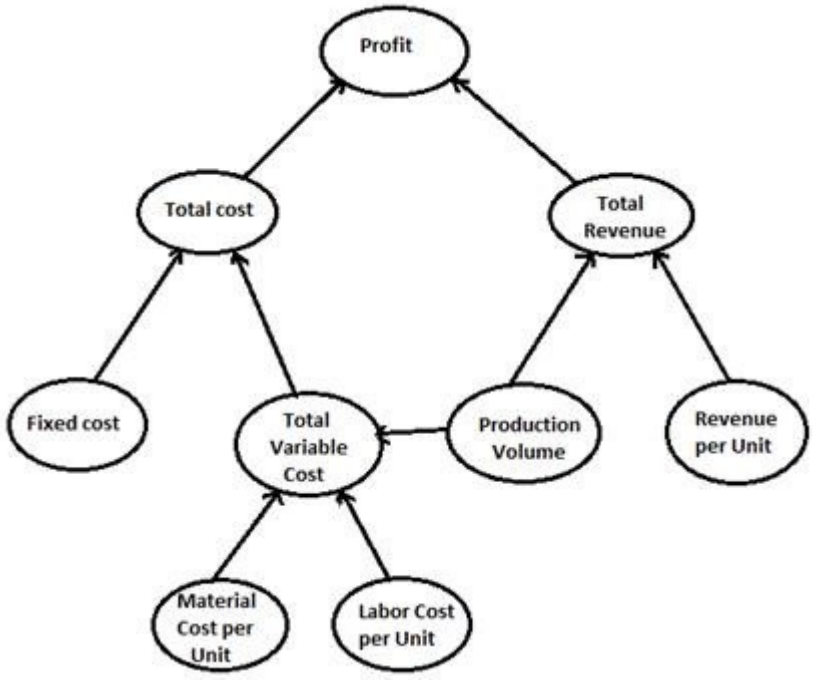
10. The modeling process begins with the framing of a _____ model that shows the relationships between the various parts of the problem being modeled.

a. mathematical b. conceptual
c. circular d. correlation

11. The influence in an influence diagram is visually depicted by

a. a circular symbol. b. an arrow.
c. a straight line. d. the height of the influence diagram.

12. Using the diagram below, which of the following would be a likely mathematical expression for Total Cost?



a. Total Cost = Total Variable Cost × Fixed Cost

b. Total Cost = Fixed Cost + Total Variable Cost

c. Total Cost = Total Variable Cost + Total Revenue × Production Volume

d. Total Cost = Fixed Cost + Total Variable Cost + Production Volume

13. Although it is relatively easy to collect data, it can be more challenging to understand what the data mean.**(True/ False)**

14. What is *not* one of the important themes of your *Business Analytics: Data Analysis & Decision Making* text?

a. Data analysis

b. Dealing with uncertainty

c. Decision making

d. Data mining

15. The decision-making process includes

a. optimization techniques for problems with no uncertainty.

b. decision analysis for problems with uncertainty.

c. sensitivity analysis.

d. all of these choices.

16. Picks and Axes Inc. is an Internet-based retail seller of hiking boots and mountaineering gear. The company decides to open retail stores across the major areas of the city to help complement its Internet-based strategy. This activity would be categorized as a(n)

a. tactical decision.
b. operational decision.
c. strategic decision.
d. financial decision.

17. Data-driven decision making tends to decrease a firm's

a. market value.
b. productivity.
c. risk.
d. profit.

18. Which one of the following is used in predictive analytics?

a. Data dashboard
b. Linear regression
c. Data visualization
d. Optimization model

19. Which of the following analytical techniques helps us arrive at the best decision?

a. Predictive analytics
b. Data mining
c. Prescriptive analytics
d. Descriptive analytics

20. Which of the following best exemplifies big data?

a. Five hundred Facebook users upload one thousand pictures per day.
b. Cellphone owners around the world generate vast amounts of data by calling, texting, tweeting, and browsing the Web on a daily basis.
c. A local grocery store collects data from those that scan their loyalty card.
d. A pharmacy keeps track of customer purchases to send its customers coupons.

27. Which of the following is true?

a. When entering an expression of text into an excel function, it must be enclosed in double quotes.
b. A spreadsheet model should always include input numbers, rather than cell references, in formulas.
c. If we enter A1:A5 as part of an Excel function, this refers to cells A2, A3, and A4…the cells that are between A1 and A5, exclusive.
d. All of these statements are true.

Part B: Spreadsheet Modeling

Instructions: You need to submit one Excel file with 5 sheets, with each sheet containing a solution to the appropriate problem. Use the principles of good spreadsheet modeling we discussed in class. This part has to be submitted individually.

1. The Gatson manufacturing company has estimated the following components for a new product.
Fixed cost = $50,000
Material cost per unit = $2.15

Labor cost per unit = $2.00
Revenue per unit = $7.50

a. Construct a **spreadsheet model** and then construct a **one-way data table** with production volume as the column input and profit as the output. Breakeven occurs when profit is zero. Vary **production volume** from 0 to 100,000 in increments of 10,000. In which interval of production volume does breakeven occur?

b. Starting from the mathematical definition of profit (Total Revenue-Total Costs), derive an expression for the breaking even quantity. Plug in the parameters above to calculate the break-even analysis for Gatson.Then, verify your answer for the breakeven quantity using the **appropriate Excel tool**.

c. Use**a two-way data table** to show how the profit changes as a function of different production volumes and different values of material cost per unit. Vary the production volume from 0 to 100,000 in increments of 10,000. The five different material costs are $1.50, $1.95, $2.15, $2.85, and $3.25.

2. A company asked one of its analysis teams to analyze and create models that help decide whether it should manufacture a particular product or outsource its production. The different components are given below.
Fixed Cost, FC = $25,000
Material Cost per Unit, MC = $2.15
Labor Cost per Unit, LC = $2.00
Outsourcing Cost per Unit, O = $4.50

a. Build an influence diagram that illustrates how to calculate the difference in cost of manufacturing and outsourcing.
b. Using mathematical notation, construct a mathematical model for calculating the difference in cost of manufacturing and outsourcing.
c. Implement your model from part (b) in an Excel spreadsheet model using the principles of good spreadsheet design.
d. Using the spreadsheet model, what will be the resulting savings due to outsourcing if the company wants to make 30,000 units of a particular product?

3. Starsystems is a small information systems company that employs 50 workers. The employee details for a particular month are given below.**(Copy and paste the data into Excel for analysis).**

Name	Age (in years)	Gender	Work experience	Income (in 1000 $)	Number of leaves taken

			(in years)		in a month
John	47	M	22	53	0
Olivia	26	F	3	22	3
Gabriel	38	M	16	29	1
Logan	37	M	12	32	4
James	44	M	22	32	0
Ava	55	F	30	45	5
Isabella	44	F	23	50	0
Sophia	30	F	5	22	4
Joshua	63	M	35	56	2
Abigail	34	F	8	23	3
Anthony	52	M	26	29	2
Matthew	55	M	25	34	0
Jayden	52	M	28	45	1
Emily	63	F	29	23	1
Alexis	51	F	30	32	0
Angel	41	M	18	21	4
Ryan	37	M	14	43	0
Michael	46	M	23	23	3
Grace	30	F	6	18	0
Julia	48	F	25	34	5
Ella	50	F	22	21	0
Noah	56	M	31	24	1
Madison	35	F	9	23	1
Tyler	39	M	13	29	2
Jose	48	M	22	34	2
Samantha	51	F	21	39	3
Lily	27	F	3	26	1
Elizabeth	57	F	32	49	0
Anna	33	F	12	39	4
Luis	58	M	33	32	3
Jackson	46	M	21	45	1
Aiden	32	M	6	23	4
Madison	56	F	28	45	0
Lillian	35	F	12	28	0
Natalie	47	F	23	38	1
Christopher	50	M	23	32	3
Taylor	57	F	25	32	1
Wyatt	38	M	15	25	2
Chloe	52	F	24	22	3
Jack	56	M	31	19	3
Sarah	47	F	24	34	2
Mason	54	M	31	45	1
Mason	25	M	2	21	4
Alanis	40	F	16	34	5
Brooklyn	61	F	30	49	0
Jessica	29	F	6	34	4
Chase	52	M	25	39	0

Aiden	56	M	31	54	1
David	61	M	33	43	0
Andrew	26	M	4	23	2

a. The administrative manager of the company wants to know the total number of employees who were on leave for 4 days and 5 days in this month. Display your use of the COUNTIF function and provide the desired information.
b. Now, the manager wants the details of employees, Ava, Julia, and Alanis who are working in the company. Display your use of the VLOOKUP function and provide the employees' details.

4. Given below is a sample list of 20 products in a grocery store with the product code, the price, and the associated discount rates.**(Copy and paste the data into Excel for analysis).**

Product code	Price ($)	Discount (%)
A003	4.00	5
A345	2.70	0
B985	4.50	5
C765	1.50	0
F302	3.00	5
B453	6.80	10
A109	9.50	10
F432	4.80	5
D234	5.40	10
B432	2.60	0
D765	6.90	10
A406	2.60	5
D203	5.40	10
F405	3.60	0
C432	5.20	5
C106	3.20	5
D324	1.30	0
F456	5.20	10
A156	2.50	5
B654	1.10	0

a) Display your use of the **VLOOKUP** function and find the price of the products A109, F432, B985, D203, C432, B654, and A345.

b. Display your use of the **COUNTIF** function and determine the number of products associated with each discount rate: 0%, 5%, and 10%, from the provided list.

5). A company has to decide on whether to invest on a project that requires an initial investment of $15,000 today., and will yield the following stream of cash flows at the end of each of the next four years.

year	income

1	$6,000
2	$5,000
3	$4,000
4	$3,000

The current opportunity cost of funds is *r =10.00%*.

a) Use an appropriate Excel tool to determine whether the company should proceed with the project or not.
b) Use an appropriate excel tool to determine the discount rate, r, at which the company would be indifferent with regard to whether to proceed with the project or not.