1. (8) Assume you have the following spreadsheet that performs a purchase/lease cash flow analysis for a hypothetical asset.

	A	B	C	D	E	F
1	**Common Parameters**					
2	Increase in Revenues		$124,500			
3	First Yr Increase in Op Expenses		$35,000			
4	Estimated Op Expense Increase		6.50%			
5	Tax Rate		32.00%			
7	**Purchase Option**			**Lease Option**		
8	Purchase Price		$235,000	Annual Payments		$70,000
9	Useful Life		8	NPV Discount Rate		18.00%
10	Aftertax Resale Value		$20,000			
11	Depreciation		$29,375			
12	NPV Discount Rate		15.00%			
14	**Cash Flows**					
15	Year	Revenues	Op Expenses	Purchase Cash Flow	Lease Cash Flow	
16	1	$124,500	$35,000	$70,260	$13,260	
17	2	$124,500	$37,275	$68,713	$11,713	
18	3	$124,500	$39,698	$67,065	$10,065	
19	4	$124,500	$42,278	$65,311	$8,311	
20	5	$124,500	$45,026	$63,442	$6,442	
21	6	$124,500	$47,953	$61,452	$4,452	
22	7	$124,500	$51,070	$59,332	$2,332	
23	8	$124,500	$54,390	$77,075	$75	
24			**NPV**	**$65,101**	**$35,279**	

Assuming that you have the appropriate software, use the model above to describe how you would perform a risk analysis. Your description should demonstrate an understanding of the risk analysis modeling approach.

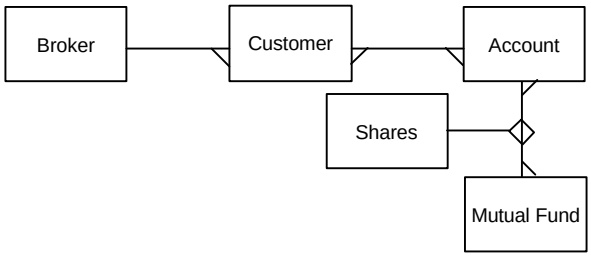
2. (8) Construct an ERD from the following description. A construction firm has a number of projects that it is working on at any one time. Each of these projects is identified with a unique project code and includes other information. Each project can have several managers. Information stored about managers includes a unique employee number and other data. A manager will only manage one project at any one time.

   Projects use equipment such as trucks, compressors, etc. Each piece of equipment is identified with a unique identifier code. Other information includes a description, date purchased, etc. Any one project can use many pieces of equipment and a piece of equipment may be used by several projects at once. For example, a compressor might be used in one project on Monday-Wednesday and used on another project the other two days. The company needs to store this information (when each piece of equipment is being used by each project).

3. (9) Classify each of the following systems as either a TPS, a DSS, an IRS, or an EIS. Choose only one system. No justification is necessary.

   a. A system used by an accounting firm that uses weekly cost data and reports on the profitability of each of its consulting projects.
   b. A system used by a general contractor that helps in responding to RFPs. The system helps the contractor estimate costs associated with a project taking into account the likely future cost of materials and labor over the life of the construction project.
   c. A system used by a radio station to record listener comments and suggestions. The system records the date, time, and content of each comment or suggestion phoned into the station.

4. (8) You are given the following ERD that describes the data needed in a brokerage firm:



   In addition, you are given the following information on the size (in bytes) and number of entities:

Entity	Size of Key	Size of Other	Total Size*	Number of Entities
Broker	10	70	80	25
Customer	8	92	100	2000
Account	12	58	70	3000
Mutual Fund	18	42	60	600

*Sizes do not include foreign keys

   In addition to this information, you know that each customer has on average 3 accounts and each account has on average 5 mutual funds. The shares entity includes a numeric field representing the number of shares of a specific mutual fund held by an account. This field requires 4 bytes of storage.

   Given this information, compute the size of each table in a relational database. Do not include any storage for expansion or overhead (such as indexes).

5. (8) Using the STAR registration system, describe one physical requirement of the current system and one logical requirement of the current system. Be sure to phrase your answer so that it clearly demonstrates an understanding of the concepts but *do not* write down just definitions.

6. (9) For each of the following situations, indicate the type of feasibility that is being described. No justification is needed.

   a. A small company is considering using the world-wide web to accept orders for its products. The company is evaluating web security capabilities relating to the transmission of credit card information.
   b. A company is considering using the world-wide web to advertise its products and services. However, the company president is resisting because she thinks that the world-wide web is just a passing fade.
   c. A company is considering using the world-wide web to advertise its products and services. An estimate has been made regarding the cost of the hardware, software, and building and maintaining the web page. However, the company is having a hard time estimating how the web advertising will impact sales.

7. (9) You are given the following unnormalized data that stores information about departments and courses at a university.

   { deptId + deptName + city + state + zipCode +
   { courseId + courseDesc + qtrYr + enrollment } }

   In addition to the implicit assumptions seen in the definition above, make the following additional assumptions:

   - ❑ "zipCode" determines city and state.
   - ❑ "qtrYr" is the quarter/year the course was offered by the department.
   - ❑ the same course can be offered in different quarters and years.
   - ❑ the same "courseId" is offered only once for a specific quarter/year.
   - ❑ courses are only offered by a single department.
   - ❑ "enrollment" is the enrollment for a course in a specific quarter/year.
   - ❑ all fields that end in "Id" are unique.

   Using the definition and assumptions, normalize the data. Show 1NF, 2NF, and 3NF. Clearly show key fields at each stage by underlining them.

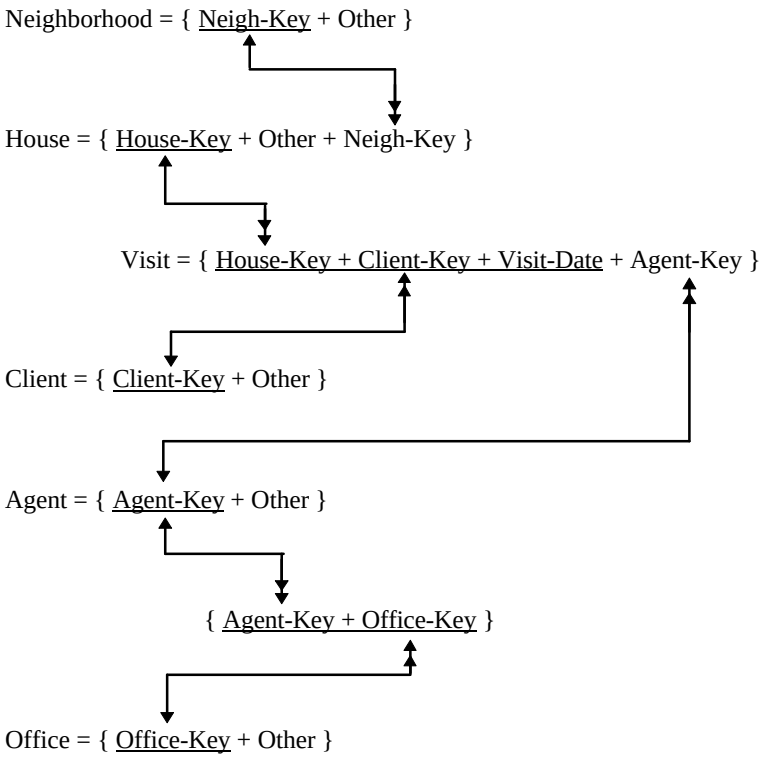
8. (8) Will the use of the traditional SDLC approach be a good strategy if a firm wants to reengineer a process? Briefly explain.

9. (9) For each of the following situations, identify the type of application control that would make the most sense. No justification is needed.

   a. An inventory system uses paper cards called "pull cards" that are used to indicate when items are taken (pulled) from inventory. Each night these cards are processed and the information is entered into the computer system. The control should help reduce the chance that a card is not processed.

b. An accounts payable system generates checks based on invoice amounts from vendors. These invoices are identified by an invoice number and are processed at the end of each week. The first step in processing is to validate the invoice. The control should reduce the likelihood that an invalid invoice is processed later by the system.
c. A company needs to develop a system that generates unique product numbers for products. The control should reduce the chances that a product number could be entered into any of their systems with transcription or transposition errors.

10. (8) You are given the following Bachman Diagram:



Using this Bachman Diagram, construct an entity-relationship diagram.

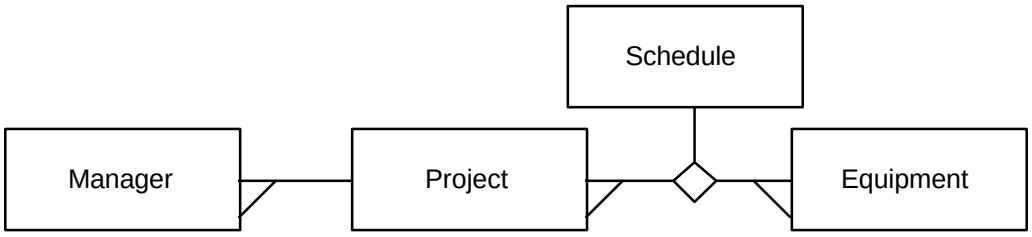
11. (7) Do you think that the primary motivation behind the Ford Motor Company accounts payable reengineering example was to improve efficiency or to improve effectiveness? Briefly explain.

12. (9) Each of the following describe a particular DSS analytical modeling approach. Identify the approach. No justification is necessary.

    a. A model is being built that will attempt to schedule employees with the objective of minimizing labor costs. However, the schedule must satisfy a number of constraints such as union rules on minimum hours per employee, overtime restrictions, and availability of certain skills.
    b. A firm uses a financial model to estimate the profitability of various advertising choices. In this model, they enter estimates such as media costs and market penetration. The model uses these factors to compute an estimated profit. They enter values for various advertising options to see which produces the highest profit.
    c. A very rich person is considering whether he should purchase an NFL team. He has built a financial model that takes into account a number of factors in determining the potential profitability of the investment. He wants to know which of these factors are the most critical so that he can concentrate his activities in these important areas.

1. An example risk analysis would be to define the "Increase in Revenue" parameter as a distribution with a mean of $124,500 and a standard deviation of 10,000. You would then run a series of simulations sampling from the distribution and recording each NPV figure. These NPVs would be summarized and presented as another distribution.

2.



3. a. IRS or EIS (depending upon the user).
   b. DSS.
   c. TPS.

4. Broker: 80 x 25 = **2,000**
   Customer: (100 + 10) x 2,000 = **220,000**
   Cust / Acct: (8 + 12) x 3 x 2,000 = **120,000**
   Account: 70 x 3,000 = **210,000**
   Shares: (12 + 18 + 4) x 5 x 3,000 = **510,000**
   Mut Fund: 60 x 600 = **36,000**

5. An example answer might be as follows:

   A physical requirement of the current system is that it accepts user input via touch-tone telephones.

   A logical requirement of the current system is that it needs to keep track of the current enrollment and the class limit for each course.

6. a. Technical.
   b. Political (Organizational).
   c. Economic.

7. 1NF
   File 1: { deptId + deptName + city + state + zipCode }
   File 2: { deptId + courseId + courseDesc + qtrYr + enrollment }

   2NF
   File 1: *already in 2NF*
   File 2a: { courseId + qtrYr + enrollment }

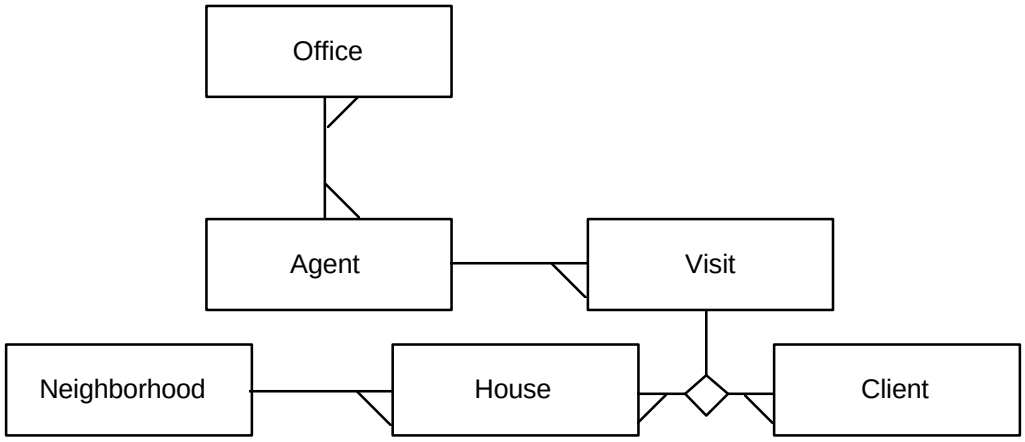
File 2b: { courseId + deptId + courseDesc }

3NF
File 1a: { deptId + deptName + zipCode }
File 1b: { zipCode + city + state }
File 2a: *already in 3NF*
File 2b: *already in 3NF*

8. Using the traditional SDLC will not be a good strategy. Reengineering calls for the radical redesign of a system. The traditional approach, which starts by looking at the physical and logical model of the old system tends to keep people thinking the "old" way which contradicts the reengineering philosophy.

9. a. Batch total (count the transactions).
   b. Hash total (sum the invoice numbers).
   c. Check digits.

10.



11. The primary focus was to improve efficiency. The motivation was to reduce the size of the A/P staff (which they accomplished) without impacting the transaction volume.

12. a. Optimization (linear programming).
    b. What if.
    c. Sensitivity analysis.