CPIN239
Systems Analysis and Design
Final Team Project

Overview

It is the team's responsibility to <u>analyze the contents of the case for relevant information and develop a system to address the business needs</u>. The due date for project updates and for the final project and presentation can be found in the course syllabus. Proper spelling and good grammar are mandatory in all writing assignments. There are four sample project reports posted. Notice where is no one format for the report, it is up to you and your group to use a professional format for the final report. Of course, a professional theme should also be used for the presentation. Design materials are to be included in the appendix of your proposal in the order they appear in the sample.

Your team has been assigned the task of developing the system to facilitate the reengineering of purchase order generation and invoice processing.

The Business

You and your group should decide on a business or industry type. You and your group should also select a type of system to replace, or upgrade. Remember the primary purpose of a systems analysis and then a new design.

The type of business is inconsequential for your purposes. You select the type of business based on your own preferences. Various business types of organization and processes including your own are being evaluated for reengineering to streamline the business, better serve your customers, and reduce costs. This is a critical requirement to keep in mind when you are selecting your company and system to replace.

Company Demographics

Your company or organization has multiple locations and they must be included in the new system upgrade. The type of industry/company you have selected will help you determine the types of security, physical placement of requirement, and network/communications requirements. You are to determine the number of employees in each location based on the purpose of the location, and, of course, the type of business.

Technology

Current systems are on a mainframe to which the primary interface devices are dumb terminals. The new system, which you are to develop, will be a client/server-based model in order to take advantage of new technologies and begin moving the company toward new computer technologies. Interfacing with systems on the mainframe is not a consideration for your system at this time.

The system itself comprises of a complete enterprise resource planning (ERP) system, only mainframe based. For the purpose of this project, you are to concentrate on the moving to a client/server-based system, at some point. The initial hardware specifications, acquisitions, and placement in production will be to satisfy the complete ERP, at some point. The only application software portion to concentrate on is the payroll system. The hardware should include any computing devices for the end-users, network file servers, networking equipment, and communications equipment. You will also want to consider a network operating system. The

application software will be an ERP system, but a canned product that can be purchased from some software vendor. Remember, while the entire ERP software will be purchased, you and your group will only concentrate on the conversation of the payroll software from the old mainframe system to the client/server system.

Upper levels of management mandated that any databases for these systems will reside on the new client/server system, and backups shall be the responsibility of the database administrator. The database administrator will interact with your team as a consultant in the database design.

A reengineering project that will impact your systems design is also in process. Contracts are being negotiated with all approved vendors. These contracts include agreements on delivery time for ordered material. This information is used by the purchasing department to develop order points and quantities that will minimize your inventory levels and assure your production department of an adequate supply of raw materials.

A consultant has suggested automatic payroll deposit generation with a manual interface for special circumstances to generate a physical check or a deposit.

As an integral part of the system, the new company-wide network that will support your project as well as the new ERP system and currently unknown future projects that might be designed. Demographics for the company have been provided to enable you to determine the network requirements and construction. Technology is also to be described in terms of software, hardware, and communication technology. For purposes of the proposal, it is not necessary to address great detail. You are concerned with gross dollar figures. Communications may use Windows 2008/2012, Linux, or other appropriate technology. Programming language/s to be used in the system and why they were chosen should be identified, but the physical design scope of the system will not include programs.

Database Requirements
Your team will develop a database to support the application. Objectives for the database are:

1. **Identify and describe data entities** about which the new system must store data and document the relationships that exist between those data entities.
2. For each data entity, determine an **identifier** (one or more attributes) **that uniquely identifies** one and only one occurrence of that entity.
3. **Each data attribute will initially be mapped to one data entity. Foreign keys will subsequently map to additional entities.**
4. An Entity-Relationship diagram (ERD) is required. This requires that the entities be normalized. Normalize to 3rd NF.

The textbook does provide some examples of each of the requirements to be included in your system design report. However, you are always encouraged to search your other resources for additional examples.

Database development includes normalizing the entities of your ERD. Each entity should be normalized to 3rd normal form. Normalization will result in the creation of additional entities. Such changes should be reflected in the ERD.

Suggestions for your database entries are:

- Data entities should be named using singular nouns.

- Data relationship names should describe the association between data entities and must be provided in both directions; e.g., an order contains order items, and order items appear in an order. In this example, order and order item are entities while "contains" and "appear in" are associations.

- Attach whatever documentation is necessary to make your ERD understandable.

- No repeating attributes or groups of attributes are allowed; e.g., month 1, month 2, etc. are not permissible. This is 1st normal form.

- Adopt the following rule for normalizing to 3rd normal form: Every non-key attribute relates to the key, the whole key, and nothing but the key.
  For example, a social security number can be used as a key attribute to uniquely identify an individual. The city the individual lives in is not key since millions of people may live in the city.

Process Modeling

They include a system structure chart (or decomposition diagram), a context diagram, and three Data Flow diagrams. You can use your textbook or search for other examples.

The purpose of process modeling is to identify the relationships between processes within this system and to other systems, when necessary. Your system will not only contain relationships within the system but will also interface or relate to the payroll system. It will be necessary to write a brief description of your DFDs to help make them more understandable.

General Expectations in Process Modeling

Programs are needed to create and maintain base employee information. These programs will interface with the human resource (HR) data. HR enters the base employee information when an employee is hired. Another interface that is needed is for the employee to log time worked if hourly, and time off for hourly and salaried people. Supervisor's must have a method to approve requested time off in the system and then approve the pay periods hours/pay data before the actual pay is processed.

Transactions should also be available for generating employee pay manually. Circumstances pay require some pay must be initiated manually, but the information must be stored in the database to enable the employee pay.

Network Modeling

Objectives:

- Identify and document locations to which people, activities, and data must be distributed.
- Create location connectivity diagrams that document business locations and the connections required between them.
- Write a brief description of your location connectivity diagrams.

Requirements

- Develop a location decomposition diagram for the system.
- Develop a location connectivity diagram for the system.
- Develop a legend and description to teach users how to read the diagrams.

- Documentation for the proposed network configuration
  Who will use what, where?
  Why was the particular configuration selected?
  What are the gross costs associated the network? How do the benefits justify the cost?
- Identify any LAN requirements. Identify WAN connectivity requirements; i.e., T1, partial T1, T3, POTS, etc.
- These are high-level diagrams. Only major connections need be represented. The costs you report are gross numbers-not researched. For convenience sake, PCs cost $700 each with any operating system, Servers cost $3,000 each, Storage Area Network Servers (SANs) cost $15,000 each, and T-1 lines cost $1,000 monthly. You can come up with other hardware costs, both one-time and continuing. Include server operating systems and the licensing as a one-time or initial cost (do not be concerned with the number of Microsoft Client Access Licenses (CALs) available with your chosen server package). Other initial IT considerations involve the hosting of intranet, extranet, and internet material.

Project Schedule

A Gantt chart is required and should reflect the processes that are to be completed during the semester on a realistic timetable. Those elements of the system that will not be completed during the semester should be projected for their estimated completion dates and resources required. **The team will be required to provide all materials to the instructor at several points during the semester.** Targeted material **MUST** be available.

Supporting documentation will be included with the Project Schedule.

System Proposal

A sample system design report can be found within the final project assignment link in session two in Blackboard. You should use these to generate ideas within your group to create your own report.

Part of the project grade will be based on professionalism and grammar. Informal notes are not allowed. Be consistent in form usage; for example, "I will be reading and grading . . ." as opposed to "I will be reading and have graded . . ."

Presentation

You presentation will be the process of presenting your system proposal to management. Remember that you are trying to sell your system to a company. They are not interested in the process you followed in coming to conclusions. They are interested in conclusions. The manager will want to know the bottom-line dollar benefit to the company—how much the company will realize in dollars-per-year.

Each team member will present part of the proposal, focusing on her or his primary area(s) of contribution. Individuals' contributions to the project will be partially evaluated on subject knowledge, preparation, etc. PowerPoint usage is required.

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Beware of:

- ❖ Scope creep: Developers have a tendency to create something beyond what has been asked for. If something is not clearly within the scope of the system, leave it out. If you are not sure, ask the instructor.
- ❖ Your job includes designing the database—not populating it. You do not have to gather information about elements that will exist in the database; for example, you do not need to know that the database will contain widget with a particular unit of measure, price of $3, or from whom it is purchased. You have to design a database that will support the information that needs to be stored in it.

Suggestions:

Analyze this paper for system requirements. You may wish to use different colored highlighters to designate the relevance of items. What elements are required? What elements provide information to the system design? What elements provide information supporting the network design? What, if anything, appears to be filler, providing no value to the project?

Use a top-down approach to the system design. Start with a **context** diagram. This diagram will consist of a single square representing the system and multiple external entities that will interface with the system. These may be one-way or two-way interfaces. There are two key areas of the project, two requirements. The context diagram will explode into a diagram with nothing less than these two processes. What other high-level processes are necessary to satisfy the requirements of this system? Explode this diagram into the next level diagram. Two diagrams are required at this level.

The **structure chart** or decomposition diagram helps keep the DFDs aligned mentally. The top level of the decomposition diagram is the equivalent of the context diagram. The next level shows the next level breakdown—at least the two key areas of the project. It is unlikely that you will be able to design this system without at least one additional process at this level.

In designing the database, ask what data elements or records are required to implement this system. Part of this system deals with employee information, the obvious, but you must also consider taxes. You will need to research and account for the types of other deductions from pay if working in the United States.