CS360 Final Project, Fall 2018
Project Design DUE October 31st, 2018 in Blackboard
Final Project DUE December 7th, 2018 in Blackboard

The term project will be done in groups of 2.
A set of suggested projects is included below and the groups can choose which one they will complete. The projects and presentation times are assigned first-come first-serve basis. Send an email to the instructor with your preferences (at least 1st and 2nd) for projects from the options given below. The selections will be posted in Blackboard.

1 DELIVERABLES FOR THE PROJECT

1.1 PHASE 1 - PROJECT DESIGN DOCUMENT

Teams must submit a well-organized and complete design document. The design document should be complete and clearly describe the project to be undertaken. The project descriptions are stated in this document, the design document should clearly state the scope of the final product. Database applications can grow and get out of hand very quickly therefore your design document should clearly define the scope of the product. You may have to discuss some questions with the instructor to clarify the scope. In the first phase of the project you are modeling the database design that will be used in the second phase to implement the physical database. Therefore, it is important to clearly state the design and scope of the product.

This document should include the following
1) Cover page
    a. Name of the team members
2) Project description
    a. Background and detailed description: introductory section, intended users, etc.
    b. Project Scope
    c. Usefulness of the product
3) The complete database schema (with E-R diagrams). This is not a complete list, there are more concepts that we have learned in class and they should be used appropriately in the model.
    a. Entities
        i. Weak entities
        ii. Strong entities
        iii. Associative entities
    b. Attributes
        i. Key attributes
        ii. Multivalued attributes
        iii. Composite attributes
        iv. Required/non-required
    c. Relationships
        i. Unary
        ii. Binary
        iii. Ternary
    d. All keys should be identified
        i. Primary keys
        ii. All foreign key relationships should be included with appropriate constraints, unless clearly argued and documented for reasons otherwise.
4) The database should be in 3NF.

a. The document does not show the normalization process. Only the final 3NF should be included in the document.
5) Appropriate symbols and notations should be used.
6) The template for the proposal and design document is available in Blackboard.
    a) Use the template to complete the design document. This is a general document, you can add headings based on your specific project.
    b) Make sure to organize appropriately
    c) There are headers/footers added to the document. Do not delete.
    d) Usually there is a signature page at the end of this document to sign it as a contract. We will omit that for the purposes of this class.

1.2 PHASE 2 - PROJECT SCRIPTS
In the second phase of the project the team will be completing a logical and physical design for the database. Submission includes
1) Complete SQL scripts
    a. Tables
    b. Relationships
    c. Constraints
    d. And more.
2) Scripts should be well-documented/commented.

2 STUDENT PEER ASSESSMENT
The document is available in the project folder which is due along with the project submission. NO HARD COPIES.

3 PROJECT PRESENTATION
1. Plan to give a 15-minute PowerPoint presentation at the end of semester out of which 5 minutes are allotted for Q/A. Attendance required for all students. Presentations should be self-contained, and should be clear and precise. The following format is suggested:
2. First Slide – Introduce the topic name and the team members
3. Problem statement/objective/background
4. Any anticipated risk factors that the team encountered during the completion of your project
5. Any complications that the team did not foresee but encountered during the completion of your project
6. Show results of the completed project
7. DEMO
8. References

4 GENERAL GUIDELINES
Grading of written content and presentations will be based upon substantive content, clarity, conciseness and technical correctness, appropriate organization and use of presentation time, and effectiveness of the presentation and the documents. Multiple errors in grammar and spelling are unprofessional and detract from the clarity of the document or presentation and will be graded accordingly.

5 GRADING RUBRIC

The following rubric will be used to grade the final project:

CONCEPTUAL DESIGN (40 TOTAL POINTS)

Full credit:

- The conceptual design implements all features as stated in the problem description and/or as discussed with the instructor.
- All notations are consistent with the design and complete.
- The design is in third normal form.

25 out of 50 total points:

- The design is missing some features.
- Some notations are not consistent.
- The design is in partial third normal form.

No credit:

- The design implements few features as stated in the problem description and/or as discussed with the instructor.
- None of the notations are consistent.
- The design is not in the third normal form.

PHYSICAL DESIGN (40 TOTAL POINTS)

Full credit:

- The scripts implement the complete design.

10 out of 20 total points:

- Partial design is implemented.

No credit:

- Few parts of the design is implemented.

DOCUMENTATION (20 TOTAL POINTS)

Full credit:

- All comments clearly describe the function of the code.
- All notations for the design are correct.
- Clearly stated relationships/Cardinality/degree in the design.

15 out of 30 total points:

- Some of the above mentioned elements are missing.

No credit:

- ALL of the above mentioned elements are missing.

6   PROJECTS

There are 4 projects listed in this section. A project will not be assigned to more than 3 teams.

6.1   PROJECT 1: IMAGES PHOTOGRAPHY STUDIO

6.1.1   General Description

Images Photography Studio is a small business that provides custom photography services to individual and corporate clients. The services include photographing weddings, graduations, awards ceremonies, business conferences, receptions, and other events. The studio also offers sittings for individual, family, or group portraits, which may be taken in the studio or at a location specified by the client. The studio photographs about 200 events and takes about 1000 portraits per year. The staff consists of the manager/owner who is a professional photographer, five additional staff photographers, and an office manager.

6.1.2   Basic Operations

The client usually contacts the studio to make an appointment to meet with the manager or a member of the staff. At the first meeting, the representative shows samples of the studio's work, and answers any questions the client may have. The client provides information including the services desired, location, date, time, and the name of the photographer requested, if any.

Most events require two photographers, a primary one and an assistant, but portraits require only one. In addition to the six regular photographers, the studio maintains a list of freelance photographers whom it can use for events when the staff photographers are booked or unavailable. The representative provides an estimate and makes a tentative booking. After the meeting, a contract is prepared and mailed to the client for a signature. The client returns the signed contract with a deposit, and the booking is finalized.

The photographers cover the event or sitting, the pictures are edited, and proofs are produced. Each proof is assigned a unique identifying number, and a package of proofs is presented to the client. The client selects the pictures desired, and places the final order along with any special instructions such as retouching desired. The pictures or albums are produced and the final package is delivered to the client.

Payments are made for jobs at various times. Usually, a deposit is given at the time of the booking, and additional payments are made on the day of the event or sitting, on presentation of the proofs to the client, and when the final package is delivered. Many package options are available, including combinations of pictures of various sizes, several types of albums, and digital packages. The packages are described in a printed booklet, and are identified by number. The final package may differ from the original request, so the last payment may be adjusted accordingly. In the event the client is not pleased with the proofs, he or she has the option of refusing a final package, but the deposit and payments for the sitting are not refunded.

Clients keep proofs, but the studio owns the copyright for the images and it keeps all digital files for six months, during which time the client may order additional photographs. At the end of six months, the files are discarded unless the client requests additional time.

6.1.3   Information Needs

The company currently keeps records by hand, but its business has grown enough so that a database is needed to help control its operations. The current manual system is unwieldy and inefficient, and the owner wishes to develop a database system that the office manager will be able to maintain. The system will be used to keep information about clients, jobs, and photographers. It will not include information about supplies, equipment, office expenses, or payroll.

6.1.4   The following forms are used to provide information to be saved into the database

Inquiry Form: This document is filled in when the client meets with the manager. It lists such items as contact information, services requested, and package chosen. During the interview, the manager checks to see what photographer(s) are available at the requested time, and chooses one to put on the form. Entries are considered tentative and subject to change before a contract is drawn up.

Contract: The contract contains data from the inquiry form, as well as the name of the photographer(s) actually assigned to the job, planned payment data and any additional requests from the client. Each contract form has a unique number, and it contains some pre-printed matter, such as the studio's name and address, and notices concerning cancellation, liability, and Notice of Copyright.

Package order form: The package order form is filled out when the client has selected the proofs and decided on the final package. If the client orders additional pictures or albums during the six-month period following the final order, an additional order form is filled out. Each order form has a unique number.

6.1.5   The following reports will be generated from the database

Photographer Schedule: A schedule is printed for any period desired, typically a week or a month, for each photographer. It provides basic information about the scheduled events or sittings, and refers to the contract number, which can be used by the photographer to get complete information about each event or sitting scheduled.

Weekly Schedule: The weekly schedule summarizes the scheduled activities for each day of the week, for all photographers. For each day, it lists the activities in order by time. The report can be run for any week desired, not only for the current week.

Accounts Receivable: This report summarizes payments that are due each month.

Client Report: This report can be run as desired to provide information about individual clients. It is typically run for corporate clients, to provide a summary of the services provided to them.

Photographer Availability Transaction: The database must be able to support a transaction in which the user enters the photographer's name and the date, and the output screen tells the hours he or she is available on that date.

In addition to the forms and reports listed here, there are several others that would be useful but these are the basic forms and reports used and needed at this time.

6.2   PROJECT 2: WELLNESS CLINIC - MEDICAL GROUP

6.2.1   General description

The Wellness Clinic is a facility providing medical care in a rural area of the country. Its professional staff consists of five medical doctors (physicians), two nurse-practitioners who provide non-acute care and can prescribe medication, two registered nurses, two midwives who provide pre-natal care and supervise delivery except in cases with complications, a pharmacist, and a medical technician. The non-professional staff members include an office administrator, a receptionist, and a bookkeeper who works part time. The clinic serves several thousand patients, each of whom may visit the clinic any number of times per year, both for preventative care such as checkups or immunizations, and for treatment of illness. Its facilities consist of a waiting room with a reception desk, an administrative office, a nurses' station, ten examining rooms with adjoining consultation rooms, a small operating room, a birthing room, a recovery room, a pharmacy, and a small laboratory.

6.2.2   Basic Operations

The clinic has regular hours of operation weekdays, Saturday mornings, and two evenings per week. Normally two physicians or one physician and one nurse practitioner, one registered nurse, and one midwife are in the clinic during regular hours. In addition, the professional staff members rotate responsibility for covering emergency calls 24 hours per day, 7 days a week. At the end of each day, the administrator or receptionist sets up call forwarding so that emergency calls are automatically directed to the telephone number of the person providing emergency coverage. When the clinic opens in the morning, the call forwarding is halted. Two of the physicians are surgeons who perform routine surgery not requiring general anesthesia at the clinic one morning a week, assisted by a nurse. Others have specialties in pediatrics and internal medicine. However, all of the physicians can provide general and acute care for any of the patients. Patients who require major surgery or other hospital care must go to a hospital located outside the immediate area served by the clinic. The clinic staff members do not normally visit their patients who are in the hospital, instead leaving their care to the hospital staff with whom they communicate during the hospitalization. However, the clinic provides both pre- and post-hospital care for the patients.

Hours of operation are divided into scheduled appointments and unscheduled hours, which are open for walk-ins. Patients usually schedule checkups and immunizations well in advance. Patients suffering from chronic or acute illness can usually schedule appointments promptly, or they may come in during the unscheduled hours. The administrator is responsible for setting up all schedules, both for the staff and for patients, and for keeping records updated. Prior to the beginning of each month, the administrator makes up complete coverage schedules for all staff.

The bookkeeper is responsible for doing all billing and recording payments. The receptionist is responsible for making appointments, for handling traffic, and for making the patient's medical records available in a folder during the visit. The nurse prepares the patient, takes medical history, performs some medical routines or tests, takes samples for lab tests, updates the folder, and assists the practitioner (the physician, nurse practitioner, or midwife) during the visit. The practitioner examines the patient, administers medical treatment, can perform some tests, can also take samples for lab tests, and write prescriptions for medications or orders for additional lab tests during a visit.

Each visit results in one or more diagnoses, which the practitioner adds to the patient's folder, along with any comments or observations. Prescriptions can be filled at the clinic's pharmacy at the patient's request. Some laboratory tests are performed at the clinic by the medical technician, using samples taken by one of the professionals. More specialized tests are performed at a medical laboratory at the hospital outside the region. Whenever possible, specimens, such as blood samples, are taken at the clinic by one of the professionals there and sent to the hospital laboratory. If the lab test requires the presence of the patient and equipment that is not available at the clinic, the patient is sent to the hospital laboratory for the test, and results are sent back to the clinic.

Medical care is provided for all patients, regardless of their ability to pay. Bills are generated based on the services provided, not on the payment method. Private patients who can afford to pay out of pocket can do so at the time of service or be billed at the end of each month. Those who have medical insurance provide information about their insurance policies, and the insurance companies are billed. Usually in that case patients pay a small amount of co-insurance (co-pay), which is determined by the type of policy they hold, at the time of the visit. Those who cannot afford to pay normally have government-provided health care, for which they have a government-issued medical card. They pay nothing and the clinic is reimbursed by the government for the entire cost of the visit, including any lab tests performed and medications dispensed there. A small number of indigent patients who do not have health coverage are treated and the cost is absorbed by the clinic until they qualify for government-provided coverage.

6.2.3 Information Needs

Currently all information about patients and their care is kept manually, and billing is done using a spreadsheet kept on a personal computer. Physicians use standard mail, fax or telephone communications to provide information to the hospital and receive information about patients who need hospital care. The clinic has recently upgraded its computer and it will have access to hospital records for its patients, as well as on-line systems provided by insurance companies and the government for third-party billing. It needs a database that keeps track of all the patient-related activities of the clinic and to provide information about billing and payments. The database will not keep track of medical supplies, plant maintenance, or payroll information.

6.2.4 The following forms are used for saving the information to the database

Weekly Coverage Schedule: This schedule should list the daily hours and the professional and non-professional staff who are scheduled to be in the clinic at specific times each day of the week. It should also list the name and telephone number of the person who is covering for emergencies during all hours each week. (Recall that the administrator provides the coverage information each month.)

Daily Master Schedule: This is a master schedule for all practitioners for each day. It should list each of the practitioners who are in that day, with all appointments scheduled for them. Most appointments are allocated 10 minutes each, so each hour has 6 timeslots. However, some appointments are given more than one timeslot, depending on the nature of the care needed. Each professional has hours dedicated to walk-ins during which no pre-scheduled appointments are made. As walk-ins sign in for care, they are assigned to a practitioner and the patient's name is added to the schedule. The registered nurses do not have appointments scheduled, and are available to assist the practitioners with visits, or to administer tests or take samples on an unscheduled basis. The lab technician also does not have an appointment schedule.

Individual Practitioner's Daily Schedule: Each of the practitioners should receive a printed copy of his or her own schedule for any day he or she is in the clinic. Appointments list the patient's name and the reason given for the visit. The copy is updated manually by the nurse as visits for walk-ins are conducted.

Physician's Statement for Insurance Forms: This is a pre-printed form that is used as a receipt primarily for insurance purposes. It lists the clinic name, address, and telephone number, along with the names and tax identification numbers of all the professionals on the staff. It also lists all the types of visits, the procedures that can be performed, with a code for each, and some blank lines for "other", along with a line to entering the fee for each. It also has a list of the common diagnoses and codes, with a few blank lines for "other". At the bottom are lines for Total Charge, Amount Paid, and Balance Due. The provider uses this form during a visit, to record visit type, procedures performed, and diagnosis. When the patient checks out after the visit, the receptionist fills in the fee for each service using a fee schedule, calculates the total, and writes in the amount paid, if any, and the Balance Due. One copy is kept by the clinic and another is given to the patient. At present, a third is mailed to the insurance company or government health agency, but in future the required information will be submitted electronically.

Prescription Label and Receipt: This form consists of two parts. The top part is gummed and used as a label for the container in which medication is dispensed. The label shows the Rx Number, Doctor Name, Patient Name, Patient Address, Directions, Drug Name, Form, Strength, Quantity, Pharmacist's Name, Date Filled, Original Date, and Number of Refills Remaining. The bottom part repeats the information on the label, and also lists the total price of the medication, the amount covered by insurance or the government, and the balance due from the patient, as well as more information about the drug, complete directions for use, and warnings about possible side effects and drug interactions. The receipt can be used for submitting claims for insurance coverage. In the future, this information will also be submitted electronically to insurance companies and the government medical care agency.

6.2.5   The following reports will be generated from the database

Patient Monthly Statement: Any patient who has an unpaid balance receives a statement that is compiled at the end of each month, listing all the services provided that month, any payments received, and the balance due.

Operating Room Schedule: This schedule provides information about all scheduled surgeries for the day.

Operating Room Log: This records information about the surgeries actually performed on a given day, including identification of the patient, surgeon, and nurse, and notations and observations about the surgery.

Daily Delivery Room Log: This records information about all the deliveries performed each day.

Recovery Room Log This report records information about the use of the recovery room, including the patient's name, attending practitioner, bed, date in, time in, date out, time out, and signature of the practitioner who signs the patient out. A nurse records the times and results of any medical checks performed while the patient is in recovery.

Monthly Activity Report: This is an internal report summarizing the clinic's activity each month. It shows such items as the number of visits conducted by each provider, the number of surgeries performed, the number of deliveries, the number of lab tests broken down by type, the number of prescriptions dispensed, the average time per visit, and so on.

In addition to the forms and reports listed here, there are several others that would be useful but these are the basic forms and reports used and needed at this time.

6.3   PROJECT 3: BETA UNIVERSITY ANNUAL FUND

6.3.1   General Description

The Development Office of Beta University seeks to obtain donations for its Annual Fund from a variety of donors. The fund collects over ten million dollars each year. Donors include graduating seniors, alumni, parents, faculty, administrators, staff, corporations, or other friends of the university. There are approximately 100,000 potential donors. The Annual Fund is directed by Suzanne Hayes, who is responsible for raising funds and keeping track of donations. Suzanne wishes to create a database to help with both of these major responsibilities.

6.3.2 Basic Operations

Suzanne tries to raise funds in several ways during each fiscal year, which extends from July 1 to June 30. Each fall, all potential donors to the Annual Fund receive personalized letters from her, emphasizing their close ties to Beta University. The letters contain reply envelopes and forms on which the donors can fill in the amount they are pledging to contribute that year, and the method of payment they choose. Payment can be sent as a single check in the envelope, donors can choose deferred payments over a period of a year, or they can provide their credit card numbers to pay in a single lump sum. Often, the employer of the donor or of the donor's spouse has a program to make a matching gift to the university, and the donor provides the contact information on the envelope. A letter acknowledging the gift and thanking the donor is sent as soon as the pledge is received. Suzanne is responsible for following up with the employer to collect the matching gift, which is paid in a single lump sum by the corporation.

Several fundraising events are held during the year. Suzanne solicits donations at a fall carnival, a holiday dinner dance, and a spring golf outing, among other events. Each class has a class coordinator who helps by contacting members of his or her graduating class. An additional letter from the class coordinator is made to ask for larger donations from reunion classes, those who are marking an important anniversary of graduation – whether five years, ten years, etc. – prior to their reunion celebration weekend. Each spring there is a phonothon during which current students and other volunteers call other potential donors and solicit pledges. All alumni who have not contributed by the end of May receive telephone calls from their class coordinator asking them for a donation. If the class coordinator is unable to contact his or her classmates, Suzanne or a volunteer makes these calls instead.

The donations are categorized by the group they are from, by the year of the donor (if applicable) and by size. There are ten "donor circles", which are categorized by the size of the gift – President's Circle for gifts over $50,000, Platinum Circle for gifts over $25,000, and so on. Gifts under $100 are not listed as belonging to a circle. An annual report listing all donors by category, year and donor circle is published and mailed to all actual and potential donors during the summer. The report does not list the actual amount each person contributed.

6.3.3 Information Needs

At present, Suzanne has a mailing list on a word processor that is used to generate labels and letters to potential donors. She would like to be able to personalize the letter further by adding a reminder of the amount of money the donor gave the previous year. A spreadsheet is used to keep track of pledges and donations. Large pledges from individual donors are ordinarily paid in monthly installments rather than in one payment, but currently there is no way to keep track of those payments. When a database is developed, Suzanne would like to be able to send reminders if payments are over a month late.

6.3.4 The following forms are used for saving the information to the database

An Annual Fund Gift form is sent with all letters soliciting funds, with blanks for the donor to fill in the applicable information, as follows:

Beta University Annual Fund Gift: Donor Name, Donor Address, Category (a check list specifying senior, alumnus/alumna, parent, administrator, etc.), Year of Graduation, Date of Pledge/Gift, Amount Pledged, Amount Enclosed, Payment Method, Number of Payments Chosen, Credit Card Number, Matching Corporation Name, Matching Corporation Address, Name of Spouse (if matching gift is from spouse's employer).

When pledges are received by class representatives or during the phonothon, the same information is collected on similar forms.

6.3.5 Reports needed include

Annual Report to Donors: This report was described previously. It lists names only, not amounts. However, the names have to be categorized as indicated. The report also includes summaries, including the total amount raised from all sources, the total for each class, the percent participation for each class, the total for each category, the grand total for each donor circle, and the class total for each donor circle. It is an important fundraising tool for the following year's drive, since it is mailed to each potential donor.

Monthly Report: This is an internal report that Suzanne uses to evaluate the progress of the fundraising for the year so far. It gives the totals and percentages of pledges and gifts received for the current month in all categories.

Payments Due Report: Suzanne would like a report each month listing the pledge payments that were due that month but were not received. It should list the donor's name and address, the amount due, the date due, the amount of the pledge, the amount received so far, and the date of the previous payment, if any.

Event Report: Suzanne would like to generate reports showing who attends each of the fundraising events, and what pledges and gifts were received from the attendees.

Class Representative Contact List: For each class representative, Suzanne would like a list of classmates to be contacted, including the name, address, telephone number, last year's donation information, and this year's donation information.

Phonothon Volunteer Contact List: Each volunteer caller is given a list with information about the potential donors he or she is expected to call, including the name, telephone number, address, category, year (if applicable), and last year's donation information.

6.4 PROJECT 4: PLEASANTVILLE COMMUNITY THEATER GROUP

6.4.1 General Description

The Pleasantville Community Theater Group is a nonprofit organization of about 200 members, amateurs who enjoy producing and performing in plays. Members pay dues of $50 per year. The group produces two plays each year, and the members work on the productions. Not all members are active workers every year.

6.4.2 Basic Operations

The group produces plays in the fall and in the spring. Some members of the group have roles in the plays, while others work on scenery, costumes, publicity, programs, and other tasks. The group has two general meetings per year. Each fall they meet to elect officers - a president, vice president, secretary, treasurer, and house manager, who serve for the entire year. At the end of the spring season, the group meets again to evaluate the previous year's activities and to select the two plays and their producers for the following year. The producer of each play is then responsible for managing all aspects of that production, including recruiting volunteers, promotion, casting, etc.

The group sometimes obtains sponsorship from local businesses for a production, and always prints a program with advertisements that help defray some of the production costs. The program also lists the cast, crew and credits for the show. The production work is generally done by the members, but skilled craftsmen are contracted as needed for specific tasks, such as electrical wiring. No professional actors are used. For a theater, the group uses the local high school auditorium, which has about 1000 seats.

6.4.3 Information Needs

The group wishes to have a database to keep track of members and productions. They also need to compile names and addresses of potential playgoers (patrons) so they can mail announcements to them for each production, to help sell tickets. In the past open seating has been used, but they would now like to use assigned seats, since the auditorium seats have identifying row letters and seat numbers. There are 26 rows (A-Z) with 40 seats per row. This would allow them to have subscriptions with assigned seating. The database should keep track of plays that are suitable for production by such a company. They also need to compile information about potential or past corporate sponsors.

6.4.4 Some of the forms or reports that would be helpful follow.

Play Listing: Plays that could be produced by the company are identified by the title, author, type (drama, comedy, musical, etc.), and number of acts.

Program - Cast and Credits: The program for each production should list the names of members along with the role each played and the jobs each had for the production.

Program – Sponsors: The program should list all the corporations and individuals who donated money, goods, or services for each production.

Report of Patrons: This internal report lists mailing information for patrons, as well as a list of the productions they bought tickets for in the past

Ticket Sales Report: This internal report should list the tickets, along with price and seat numbers that patrons have ordered for productions.

Admission Ticket: The database should be able to print tickets when a patron orders them. The ticket should list the name of the play, the date, time, price, and the seat.

Member Dues Payment Report: The treasurer needs a report that shows which members have paid dues and which members still owe them. Contact information for those who have not yet paid dues should be provided.

Balance Sheet: The treasurer is responsible for maintaining all information about income and expenditures for the year. Income comes from dues, sponsors, ticket sales, and any other sources. Expenditures include any costs for the productions, such as contractor's fees, equipment rental, auditorium rental fee, etc. At the end of the year the sheet may show at most a modest profit, but never a loss. Therefore, the treasurer must be able to report on the current financial condition at any time, so that expenditures can be evaluated before funds are spent.

Ticket Sale Transaction: The ticket sale process requires an interactive transaction. The user should be able to input a request for one or more seats for a particular performance, and the return screen should display sufficient information to allow the user to determine whether the seats are available. If so, the transaction should be completed by reserving the seats and printing the tickets. If not, it should be possible to find alternate seats, if they exist.