

Semester Project
MIS 3373 -- Sections 1 and 2
Fall 2002

Due Date: Friday, December 6, 2002, 4:25 p.m.¹
Early Bonus: Friday, November 29, 2002, 4:25 p.m. (Receive up to 10 bonus points)
Points: 200 points

Big Horn Dental

Big Horn Dental (BHD) is a dental clinic located in Sheridan, Wyoming. The clinic, which employs five dentists, five dental technicians, four hygienists, and six office staff workers, offers a full line of dental services. BHD currently has a customer base of 5,500 patients from 1,800 different households.

BHD patients are employed by 250 different employers, many of which provide dental insurance policies for their employees. Consequently, BHD currently has to deal with 34 different insurance companies.

Emmy Roberts, the BHD office manager, recently asked for permission to hire an additional office clerk. She feels the current staff can no longer handle the growing workload. Subsequently, the members of the clinic's governing board decided to investigate the possibility of computerizing some of the clinic's office systems. Dr. Colette Early, one of the clinic's dentists who sits on the board was asked to head up a project to investigate this possibility.

Since no member of the current clinic staff is a computer expert, Dr. Early asked your consulting team to analyze their method of scheduling patients, keeping patient records, billing patients, and billing insurance companies. Although these systems currently exist as three separate manual systems, the BHD associates would like to have one automated system which allows all three systems to be integrated.

Operations at Big Horn Dental

Until now, operations at BHD have been conducted using three separate manual information systems: the patient record system, the patient scheduling system, and the billing system. After a series of detailed interviews and observing the work of the individuals involved in the existing manual systems at BHD, your group has learned the following about each of the BHD systems.

Patient Record System

BHD is required by the American Dental Association to maintain accurate records for each patient who receives dental care from the clinic. Based upon your interviews with Mandy Wright, the administrative assistant who oversees the maintenance of patient records, you have learned the following regarding the manual patient record system.

When a new patient comes to the clinic, the patient is required to fill out a patient information sheet. On the information sheet, the new patient provides information about himself or herself

¹ Projects may be turned in during class or hand-delivered to my office, AH 308A, anytime before 4:25 p.m. on the due date. The syllabus describes my policy regarding projects that are submitted late. In short, if a project is turned in one second after the designated time, the project is considered late and will receive a 25% point penalty (i.e., I reduce your grade by 25% of the total possible points). I will be using my watch to determine the due time.

(her/his name, address, phone number, social security number, birth date, allergies) and information about his/her insurance provider (provider name, provider number², provider address, provider phone). Furthermore, if the new patient is a minor or related to another patient in some way (i.e., a patient's spouse), the head of household will be indicated on the individual's information sheet. The information provided by the patient is placed in a folder and filed by patient name with the other patient records.

After a patient receives services at the clinic, the patient's record is retrieved from the file cabinet and a journal entry is added to the file to maintain a record of the services provided for the patient. In addition, information about the patient and the service received is written on a services received form and sent to Cassie Mayan, the billing clerk.

A separate record is also maintained for each of the dentists which lists the date and time each patient was seen, the patient's name, and services provided. From these lists, a weekly provider report is generated. The weekly provider report lists each dentist by name and the charges generated by the dentist on a month-to-date (MTD) and year-to-date (YTD) basis. This report is used by the governing board in planning, controlling, and evaluating the level of service provided by each member of the professional dental staff.

Periodically, patients will call the clinic to request that a copy of their dental records be sent either to the patient directly or to a different dental provider. In these cases, the patient's record is retrieved from the file cabinet, photocopied, and sent to the correct party.

Patient Scheduling System

The primary function of the scheduling system is to schedule appointments for dental services. Patients call BHD to indicate days when they would like to make appointments for dental services. When the receptionist receives a patient call, s/he checks the calendar for that day to see if any time slots are available. A patient may request to see a particular dentist. If so, only the schedule for that dentist is checked. When a patient does not specify which dentist, the receptionist randomly selects one of the available dentists for the appointment.

Patients often call to cancel appointments or to change appointments. A canceled appointment is erased from the calendar. If the appointment is changed, the original appointment is erased and a new appointment is entered.

Before a patient leaves the office after receiving dental services, the receptionist tentatively schedules a check-up appointment for when the patient should return for services. These appointments are scheduled for dates 6 months in advance.

Twice each month, a member of the office staff reviews the scheduling calendar for upcoming appointments and mails a postcard to remind the patient of the appointment. This review happens on or near the 1st day of the month and the 15th day of the month. At the first of the month, the staff member sends postcards for appointments between the 16th day of the month and the end of the month. In the middle of the month, the staff member sends postcards to patients with appointments between the 1st day and the 15th day of the following month. Thus, each patient receives a reminder postcard sometime between 2 and 3 weeks before his/her scheduled appointment.

²The provider number is the individual's dental insurance policy number.

Two reports are created on a daily basis as part of the patient scheduling system: 1) a daily appointment list for each dentist and 2) a daily call list. The contents of these lists are described in the following paragraphs.

For each dentist, a separate daily appointment list shows all scheduled appointment times and patient names, along with the services to be performed on each patient. The services are listed by service code and an abbreviated service description. The dentist receives one copy of this report when he/she arrives at the office each morning. The receptionists use a duplicate copy of these lists as patients arrive at the front desk to check-in for an appointment.

The daily call list contains information about the patients who have appointments for the following day (on Fridays, the daily call list has the upcoming Monday appointments). Shown on the list are the patient name, telephone number, appointment time, and dentist name. Sometime during the day, the receptionists call each person on this list to remind them about their appointment.

Billing System

At the end of each week of operations, statements are mailed to each insurance carrier. The insurance carrier statement requests payment for services rendered to those patients insured by the carrier. The header information of the statement identifies the insurance carrier by name, address, and phone number and contains the statement date. The detail section of the statement contains two parts. The first part lists a patient's provider number, the date service was provided, the service code for the service provided, a brief description of the service provided, and the charge for the service for all services provided during the previous week. The second part lists the date, patient provider number, and amount of each payment received from the carrier for the previous week. The statement footer contains the previous week's balance due, the total charges for the week, the total payments for the week, and the new balance.

Insurance companies send payments to BHD on a regular basis. A separate payment is made for each patient that has covered services provided by BHD. A payment has the patient's name and policy number, the service code and description of service, and the amount paid. In addition, the insurance companies sometimes deny payment for a service. A denial has the patient name, patient policy number, the service code, service description, and the reason for denial.

Patient's statements are generated and mailed on a monthly basis. Header information on the patient statement contains the statement date, account number, head of household's name and address, the previous month's balance, the total household charges MTD, the total payments received MTD, and the current balance. The detail section of the report lists every account activity for the month in date order. For every service performed, there is a line showing the patient's name, the service date, the service description, and the service fee. For every adjustment and payment received, there is a line showing the date and amount. If payment is received from an insurance company, then that source is noted on the line. A running balance appears at the far right of each activity line.

Patient's also submit payments to BHD on a regular basis. When a patient makes a payment, the amount received is deducted directly from the patient's account balance. The patient provides the following payment information when a payment is made: patient's name and address, account number, and amount paid.

Project Requirements

Use the computer tool of your choice to document the design specification deliverables listed below. Your team will be expected to deliver the following on the due date of the project:

1. **Project report.** The project report has two purposes: 1) to give an overview of the project learning experience and 2) to convey any assumptions your group makes in designing the new automated scheduling and billing system. In the overview, you should write about problems you encountered in designing the new system and how your group dealt with these problems. Problems can range from issues in interpreting parts of the case to issues of group conflict. This report should only be two or three pages in length.
2. **Context Level Diagram.** On the context level diagram, identify all the inputs and outputs relevant to the new system. All three manual systems described above will be combined into one automated system.
3. **Entity-Relationship Diagram.** Use the entity-relationship diagram to identify the things about which BHD should store information and how these entities are related to one another. Your entity relationship diagram must include the conceptual and logical data models.
4. **Data Flow Diagram.** You may include as many separate diagrams as necessary to illustrate all parts of the new BHD system. At a minimum, you must demonstrate how and where the information from each major input is distributed and stored and how and from where each major output is retrieved and generated.
5. **Design Repository.** Include entries in the design repository for each of the following. A template document for the design repository is available from Blackboard.
 - a. **Tables and attributes.** Define and describe each table that will be created from the entity-relationship diagram. Include a list of the attributes for each relation.
 - b. **Data flows.** Give a brief description of each data flow. Identify the origin, destination, and data contents for each data flow.
 - c. **Processes.** Give a brief description of each process. Use structured English or pseudocode to outline processing logic for each process.
6. **Form, Screen and Report Designs.** Designs for the following must be created using a computer tool of your choice (e.g., MS Word, MS Access, Visual Basic). Regardless of how it is created, a hard copy must be included in your project. For each item, create sample data to include on the item. It is each team's

responsibility to ensure that their sample item demonstrates all essential qualities of the item.

- a. **Form Design.** Patient Information Sheet. This form is filled out by patients so that the office has accurate information. Include all the information specified in the narrative. Ensure that your form can be easily and accurately completed. Should have a professional appearance. It should make the kind of impression that gives clients confidence that BHD is a professional, top-notch operation.
 - b. **Output Report.** Weekly Provider Report. This report is used by the governing board to monitor the activities of the business. Include all the information specified in the narrative. The report must be easy to understand, the information well presented, and it should have a professional appearance. Style counts!
 - c. **Input Screen Design.** Screens to record services performed. Design any screens necessary to record the services performed during an appointment. Should be easy to use, require little training, and have a professional appearance. Style counts! But, if you go overboard it can detract from the usability of the screen (and your grade).
7. **Peer evaluations.** Each group member must evaluate every other person in the group, including themselves, at the end of the project. Peer evaluations are to be submitted separately to the instructor on the same day the project is due. **Individuals who do not turn in the peer evaluation, with all parts filled out, will not receive any points for the peer evaluation portion of the project (50 points or 25% of the possible points for the project).** I will not accept any late peer evaluations. Evaluations are considered late if they are not submitted to me before the time indicated as the due time for the project.

A copy of the peer evaluation form is attached to this case document. *PLEASE NOTE: The peer evaluation form for the semester case is not the same evaluation for that was used during the semester for the group homework assignments.*

Peer Evaluations

Peer evaluations are based on two factors, quality of work and level of effort. Two rules are in effect for peer evaluations.

1. No one may turn in a low evaluation of another group member unless I have been notified about the problem at least 2 weeks before the evaluations are due (i.e., November 22, 2002). This rule corresponds to the policy many organizations have that an individual must be counseled if his/her performance could lead to dismissal.

2. Each member of the group must be allowed to play a significant part in the development and implementation of the project. If an individual feels that he/she is being shut out by the group, the individual must notify me early. This rule is meant to preclude one or two individuals from monopolizing the project and then giving poor evaluations later.

Your evaluation of your fellow group members should not come as a “surprise” to them. In other words, you should be providing plenty of feedback to each other throughout the project. You may obtain a copy of the peer evaluation form from the course webpage.

Project Guidelines

- I reserve the right to amend the project requirements
- No fluff. Address the points described above, but do so in a concise manner.
- Grammar and spelling matter (just as they will for a professional organization).
- The deliverables should look professional but not flashy.
- Bind all project deliverables together in a three-ring binder.
- Do not use plastic sheet holders for the pages of your project.
- Make sure that I can still read everything in your report after it is bound.
- Include a table of contents.
- Use tabs to mark the beginning of each project section.
- Include each group member’s name, phone number, and e-mail address on a title page.

Hints:

- Use a log book to record the activities that occur in your group meetings. This can help you to document design decisions that have already been established.
- Document your system as you design and build it. It will make your life easier, really. (See previous hint.)
- Get started early! You cannot build this at the last minute; things will not come together simply because there’s only a day or two left before the due date.
- Make frequent back-ups.
- The dental clinic problem is not a structured problem. Neither is system design and development. It is supposed to be somewhat fuzzy.
- To accurately identify data contents of inputs and outputs, you might benefit by actually creating the forms or reports discussed. This will be particularly helpful for the patient bill and insurance bill.

Early Submission

Your graded project will receive up to 10 bonus points if it is completed and submitted for grading before November 29, 2002 at 4:25 p.m. It is not possible to receive more than 200 total points for the project. BE ADVISED, in the rush to turn the project in early, students often overlook many important details of the project and end up losing more than 10 points due to carelessness in completing the project!

Project Evaluation

Your project grade will be based on the following criteria and weights. Use this information as guidance in allocating your effort.

Project Requirement	Points
Context Level Diagram	20
Entity-Relationship Diagram	30
Data Flow Diagrams	30
Design Repository	30
Interface Design	30
Project Report	5
Project Details (grammar, spelling, binding, format, etc.)	5
Peer Evaluations	50
Total	<u><u>200</u></u>

Availability of Instructor

I am available for consultation during office hours to assist your team in understanding this case. If your team needs guidance from me, I expect at least two members of the team to meet with me. This means I will not give consultation sessions with a single member of the team. You can see me during office hours or use e-mail to schedule appointments with me (see syllabus policy).

If you meet with me to discuss the project, I will not meet with you unless you bring documentation of your current work. This documentation must be diagrams that are output from the computer tool of your choice. If you are not yet serious enough about your design that you have committed it to a tool, then your group has not done sufficient work on your own to merit feedback from me. Remember this is your group project not mine!

I will **NOT** be available for student consultation about this project for the last 72 hours before the project is due. This means that after office hours on Tuesday December 3, 2002, I will not meet with any group to discuss the project and I will also not discuss the project via e-mail or phone. After the deadline, you are on your own. This is to encourage you to get to work on the project now. Just because your group puts off the project until just before the due date does not mean that I have to scramble to help you get the project done.