**ISMG6080 Homework 1. Submit an ACCESS file to Canvas, by Sunday 1/24/2021, 11:00 pm.**

10 Points. Graded on 70-Point basis then scaled down using this formula: homework score out of 10 = GradedScore/70\*10.

###### Submission Instructions: Submit an ACCESS file named hw1.accdb.

###### Problem 1. (20 Points): Follow the requirements below to create the tables, identify and set the primary keys; identify and set the foreign keys; enforce referential integrity.

###### Consider the tables given on Pages 2-3:

* Doctor table gives a list of doctors.
* Patient table gives a list of patients and their info.
* Shift table gives a list of shifts in a day.
* Appointment table gives a list of appointments between a doctor and a patient. An appointment is scheduled on a specific day during a specific shift.

**1). Create an ACCESS database file** containing the following 4 tables (Doctor, Patient, Shift, Appointment.). Use copy-paste from the datasheet view to copy the data directly from this Word file unto a database table. Or you can copy-paste a table to EXCEL then import from EXCEL. If you want to just type in the data for the smaller tables (e.g., Doctor table), that’s fine. Name your tables with the names given here. **Name your database file HW1.accdb.**

2). Considering the business rules described below, **identify and set the primary key in ACCESS** for each table. DO NOT ADD A COLUMN TO A TABLE AS THE PRIMAY KEY. If there are multiple possibilities for primary key, choose the one that you think is the best.

* Each doctor has a unique id.
* Each patient has a unique patient id.
* Each shift is assigned a unique shift number.
* Each appointment is assigned a unique appointment number.
* Each appointment is scheduled for one patient with one doctor on one specific date and shift.

3) After setting the primary keys, **identify and set foreign keys** in ACCESS. Enforce referential integrity for all foreign keys.

Doctor: (DoctorIdLastname, FirstName, DateJoined)

|  |  |  |  |
| --- | --- | --- | --- |
| **DoctorId** | **LastName** | **FirstName** | **DateJoined** |
| D1 | Johnson | Emily | 5/1/2010 |
| D2 | Michaels | Susan | 6/7/2012 |

Patient:(PatientID, Lastname, FirstName, Phone, Insurance, FirstVisit, Email)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **PatientId** | **Lastname** | **FirstName** | **Phone** | **Insurance** | **FirstVisit** | **Email** |
| P1 | Ford | George | (860) 645-5678 | BCBS | 5/1/2010 | Ford12@comcast.net |
| P2 | Gibbs | Mary | (860) 429-8790 | Kaiser | 6/5/2010 | Gibbs34@comcast.net |
| P3 | Jordan | Jeff | (860) 486-4646 | BCBS | 6/8/2012 | Jeff1200@gmail.com |
| P4 | Rhees | John | (617) 424-1234 | Cigna | 7/5/2012 | John32@hotmail.com |
| P5 | Skoog | Jane | (860) 644-8585 | BCBS | 7/7/2012 | Jane.Skoog@email.cudenver.edu |
| P6 | Smith | Dan | (860) 643-4687 | Kaiser | 8/9/2012 |  |

Shift: (ShiftNum, From, To)

|  |  |  |
| --- | --- | --- |
| **ShiftNum** | **From** | **To** |
| 1 | 9:00 AM | 9:30 AM |
| 2 | 9:30 AM | 10:00 AM |
| 3 | 10:00 AM | 10:30 AM |
| 4 | 10:30 AM | 11:00 AM |
| 5 | 11:00 AM | 11:30 AM |
| 6 | 1:00 PM | 1:30 PM |
| 7 | 1:30 PM | 2:00 PM |
| 8 | 2:00 PM | 2:30 PM |
| 9 | 3:00 PM | 3:30 PM |
| 10 | 3:30 PM | 4:00 PM |

Appointment: (AppNum, ApptDate, DoctorId, ShiftNum, ScheduledWith, ShowedUpOrNot)

| **AppNum** | **ApptDate** | **Doctorid** | **ShiftNum** | **ScheduledWith** | **ShowedUporNot** |
| --- | --- | --- | --- | --- | --- |
| 1001 | 1/10/2013 | D1 | 1 | P1 | No |
| 1002 | 1/10/2013 | D1 | 2 | P2 | No |
| 1003 | 11/15/2014 | D1 | 1 | P1 | Yes |
| 1004 | 11/15/2014 | D1 | 1 | P4 | No |
| 1005 | 11/15/2014 | D1 | 2 | P2 | Yes |
| 1006 | 11/15/2014 | D1 | 3 | P4 | Yes |
| 1007 | 12/11/2014 | D1 | 6 | P4 | Yes |
| 1008 | 12/11/2014 | D2 | 6 | P2 | No |
| 1009 | 12/11/2014 | D2 | 6 | P3 | No |
| 1010 | 3/10/2015 | D2 | 4 | P5 | Yes |
| 1011 | 3/10/2015 | D2 | 4 | P6 | No |
| 1012 | 5/12/2015 | D2 | 8 | P6 | Yes |
| 1013 | 5/16/2015 | D2 | 1 | P2 | No |
| 1014 | 6/7/2015 | D1 | 1 | P1 | Yes |
| 1015 | 6/7/2015 | D1 | 2 | P2 | Yes |
| 1016 | 6/7/2015 | D1 | 3 | P2 | No |
| 1017 | 6/7/2015 | D1 | 3 | P3 | Yes |
| 1018 | 6/7/2015 | D1 | 4 | P4 | Yes |
| 1019 | 6/7/2015 | D1 | 5 | P5 | Yes |
| 1020 | 6/7/2015 | D1 | 6 | P6 | No |
| 1021 | 6/16/2015 | D1 | 4 | P2 | Yes |
| 1022 | 10/10/2015 | D1 | 2 | P1 | No |
| 1023 | 10/11/2015 | D2 | 3 | P1 | No |
| 1024 | 12/10/2015 | D1 | 1 | P1 | No |
| 1025 | 12/10/2015 | D1 | 2 | P2 | No |
| 1026 | 12/10/2015 | D1 | 5 | P4 | No |
| 1027 | 12/10/2015 | D2 | 2 | P5 | No |

**Problem 2 (10 Points)**

1). For Patient table, use Input Mask on Phone and FirstVisit columns. Use Short Date for FirstVisit input mask.

2). Set the rule that FirstVisit is later than 1/1/2010.

**The tables that you’re asked to create in Problems 3-5 do not belong to the above database. For ease of grading, please create the tables in the same database file.**

**Problem 3 (20 Points): Before attempting this problem, review data integrity rules listed in Module 1 handout.**

1. Make a table in the same database file. Call it P3Answer. **P3Answer: (Id, Answer).** **Id** is the primary key defined as AutoNumber. **Answer** is text (short or long) data type.
2. Study the following set of tables in a database application. The business rules are listed below. Identify cells whose values violate any of the three integrity rules (refer to the Module 1 PowerPoint file or Module 1 Handout Word file). **State what database integrity rule is violated and why**. **For submission, enter each violation discussion in the “Answer” column of P3Answer table from the datasheet view.** For each violation, 1) indicate the value(s) that causes the violation, 2). State the name of the integrity rule violated, and 3). Provide a brief explanation. Each violation discussion should occupy one row of P3Answer table. So if there are five violations, P3Answer table should have five rows of data.

**Note:** Business rules are not the same as data integrity rules. When the value of a cell violates a business rule, it normally violates an integrity rule, either domain or entity integrity rule. Referential integrity rules are usually not stated as business rules. In this problem, you need to identify any values that violate a data integrity rule regardless of whether or not they also violate a business rule.

All data in Customer, Job, and Employee tables are shown (See Page 5). There are more data in EmpJob table than shown.

**Primary keys are underlined in the tables (turn off Spell Check so you can see the underlines). Data types of fields are self-evident: For example, a number is Number Type; a date is Date/Time type, etc. Foreign keys are self-evident.**

The basic business rules that should have been incorporated are the following:

* Each Customer has a unique Customer id. Each job has a unique job id. Each employee has a unique employee id.
* There is a minimum per job charge of $2,000.
* Every job is performed for a customer. Database should record the customer id for each job.
* Database should record the total number of hours each employee worked on each job, if that employee worked on that job at all.

**Customer:** (CustID, CustName, CustAddr, CustPh, CustFax)

| **Customer** | | | | |
| --- | --- | --- | --- | --- |
| **CustID** | **CustName** | **CustAddr** | **CustPh** | **CustFax** |
| C101 | Range Fuels | 121 Range Dr. Broomfield, CO 80020 | (303) 323-4456 | (303) 323-4460 |
| C102 | Urroz | 446 Urroz St. Fairview, WY 82202 | (919) 665-7765 | (919) 665-7770 |
| C103 | CO2 Nexus | 235 N. N St. Denver, CO 80029 | (720) 990-3030 | (720) 990-3040 |
| C104 | MV | 616 16th Ave. Golden, CO 80401 | (303) 887-8980 | (303) 887-8990 |
| C105 | Striker | 5612 32nd Ave. Wheat Ridge, CO 80316 | (720) 663-6574 | (720) 663-6570 |

EmpJob: (JobNo, EmpId, HrsWorked)

| **EmpJob** | | |
| --- | --- | --- |
| **JobNo** | **EmpId** | **HrsWorked** |
| J121 | E02 | 8 |
| J121 | E03 | 12 |
| J125 | E04 | 14 |
| J125 | E04 | 12 |
| J124 | E04 | 23 |

Job: (JobNo, JobDesc, Total Charge, CustId)

| **Job** | | | |
| --- | --- | --- | --- |
| **JobNo** | **JobDesc** | **Total Charge** | **CustID** |
| J121 | 30" Vessel | $4,000.00 | C103 |
| J122 | 2" Manifold | $1,500.00 | C103 |
| J123 | 6" Heat Exchanger | $3,400.00 |  |
| J124 | 40" Vessel | $6,500.00 | C101 |
| J125 | Skid for 3" HX | $3,600.00 | C106 |

Employee: (EmpNo, Ename, Eaddr, Eph, Title)

| **Employee** | | | | |
| --- | --- | --- | --- | --- |
| **EmpNo** | **EName** | **EAddr** | **EPh** | **Title** |
| E01 | Kenny Jones | 122 N Hymie St. Denver, CO 80029 | (303) 669-1212 | President |
| E02 | Sam Sloane | 3224 W. 132nd. Thornton, CO 80021 | (720) 421-4332 | Engineer |
| E03 | Perry Jones | 4576 Pierce St. Wheat Ridge, CO 80221 | (720) 544-8997 | Welder |
| E04 | Kim Lancaster | 3492 First St. Golden, CO 80401 | (303) 467-3112 | Fitter |
| E05 | Paulie Short | 9967 Geraldine Ave. Arvada, CO 80223 | (720) 433-7263 | Shop Hand |

**Problem 4 (10 Points).** Use the Excel file **HW1 Volunteer Opportunity.xlsx** posted with this homework.

1. Import the EXCEL file to form a table (Table **Volunteer Opportunity**) in **HW1.accdb**. Open it in design view and fix data types as what best fit the data. When importing, import it with no primary key defined.
2. The table **Volunteer Opportunity** contains descriptions of volunteer opportunities. An opportunity is defined as a role in a certain ministry area. For example, co-teacher in the Greenhouse and co-teacher in potter’s shed are two opportunities. For each opportunity, the table records number of people needed. Identify the primary key **for Volunteer Opportunity** table based on the business rules just described and **set the primary key** in ACCESS. DO NOT ADD A COLUMN TO A TABLE AS THE PRIMAY KEY.

Sample data are listed below:

|  |  |  |  |
| --- | --- | --- | --- |
| Role | Ministry Area | Description | Num Needed |
| Co-teacher | The Backyard | Teacher for 1st,2nd,3rd grade class | 0 |
| Co-teacher | The Garage | Teacher for 4th-5th grade boys' class | 1 |
| Co-teacher | The Workshop | Teacher for 3-4 year old class | 0 |
| Lead teacher | Greenhouse | Teacher for toddler class | 0 |

**Problem 5 (10 Points).** Use the database file **HW1AdTracking.accdb** posted with this homework. **HW1AdTracking.accdb** contains one table, AdRating.

1. **Import this table** to **HW1.accdb**. When importing**, import it with no primary key defined**
2. The table, **AdRating**, contains Ad\_Id, where it is promoted (AdSource), the slot or space where the ad appeared, and a rating for that appearance. So a rating is given for each ad promoted in a particular source in a particular space or slot. The same ad can be promoted in the same source at a different spot, in which case it may have a different rating. Identify the primary key for AdRating table based on the business rules just described and **set the primary key in ACCESS**. DO NOT ADD A COLUMN TO A TABLE AS THE PRIMAY KEY

Note: In a real database, all tables should be linked and there should not be any "islands", that is, and two tables are connected directly with each other via a foreign key OR indirectly through other tables via other foreign keys. So if there are 2 tables in the database, there should be at least 1 FK. If there are 3 tables, there should be at least 2 FKs etc. If there are n tables, there should be at least n-1 foreign keys in a well-designed database.

 The reason I’m asking students to put all tables in one database file in hw1 is for ease of grading, so my TA only needs to open one file as opposed to multiple files for each student and get the grading done.