CMPT 354 - Database Systems I

Group Project - Implementation of a Relational Database

Project Title:	Recreation Center Database
Project Milestone:	3

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By keying our names and student IDs in the above table, we certify that the work submitted with this cover page was performed solely by those whose names and student IDs are included above.

Also, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the SFU.

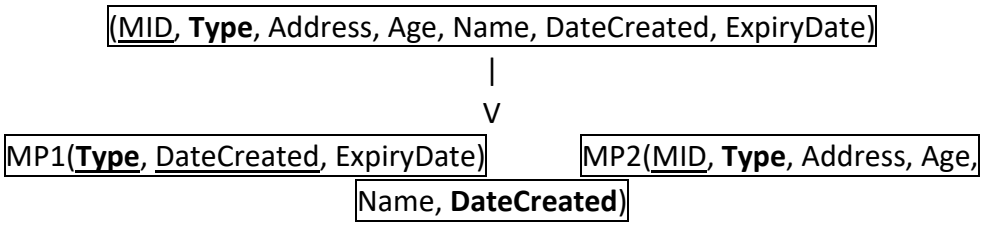
Memberships

- Relational Schema
  Memberships (Type, Price, Mday)
- Functional Dependencies
  Type ->Price, Mday
- SQL DDL
  CREATE TABLE MEMBERSHIPS(
  Type CHAR(20),
  Price INTEGER,
  Mday CHAR(10),
  PRIMARY KEY (Type))
- Table

Type	Price	Mday
Free Trial	0	1 day
Regular	50	1 month
Bronze	100	3 months
Silver	250	6 months
Gold	450	1 year

Member_Purchases

- Relational Schema
  Member_Purchases (MID, **Type**, Address, Age, Name, DateCreated, ExpiryDate)
- Functional Dependencies
  MID -> Type, Address, Age, Name, DateCreated
  Type, DateCreated -> ExpiryDate
- Nomalization



- SQL DDL
  CREATE TABLE MP1(
  Type CHAR(20),
  DateCreated DATE,
  ExpiryDate DATE,
  PRIMARY KEY (Type, DateCreated),
  FOERIGN KEY (Type) REFERENCES Memberships(Type)

ON DELETE CASCADE
ON DELETE CASCADE)

CREATE TABLE MP2(
MID INTEGER,
Type CHAR (20),
Address CHAR (50),
Age INTEFER,
Name CHAR (50),
DateCreated DATE,
PRIMARY KEY (MID),
FOREIGN KEY (Type, DateCreated) REFERENCES MP1(Type, DateCreated)
ON DELETE CASCADE
ON UPDATE CASCADE)

- Table
  - Original Table

MID	Type	Address	Age	Name	DateCreated	ExpiryDate
1	Gold	100 No.1 St	27	Bill	2017-05-21	2018-05-21
2	Silver	216 Bob Rd	28	Bill	2017-05-22	2017-11-22
3	Bronze	100 No.2 St	10	Bob	2017-06-01	2017-07-01
4	Gold	103 No.3 St	42	Ben	2017-06-21	2018-06-21
5	Silver	103 No.3 St	12	Bang	2017-06-21	2018-12-21

  - Updated Table

MP1(**Type**, DateCreated, ExpiryDate)

Type	DateCreated	ExpiryDate
Gold	2017-05-21	2018-05-21
Silver	2017-05-22	2017-11-22
Bronze	2017-06-01	2017-07-01
Gold	2017-06-21	2018-06-21
Silver	2017-06-21	2018-12-21

MP2(MID, **Type**, Address, Age, Name, **DateCreated**)

MID	Type	Address	Age	Name	DateCreated
1	Gold	100 No.1 St	27	Bill	2017-05-21

2	Silver	216 Bob Rd	28	Bill	2017-05-22
3	Bronze	100 No.2 St	10	Bob	2017-06-01
4	Gold	103 No.3 St	42	Ben	2017-06-21
5	Silver	103 No.3 St	12	Bang	2017-06-21

Referred

- Relational Schema
  Referred (**NotReferredMID**, **ReferralMID**)
- Functional Dependencies
  NotRefferedMID -> ReferralMID
- SQL DDL
  CREATE TABLE Referred(
  ReferralMID INTEGER,
  NotReferredMID INTERGER,
  PRIMARY KEY (ReferralMID, NotReferredMID),
  FOREIGN KEY (NotReferredMID) REFERENCES MP2(MID)
  ON DELETE CASCADE
  ON UPDATE CASCADE,
  FOREIGNKEY (ReferralMID) REFERENCES MP2(MID)
  ON DELETE CASCADE
  ON UPDATE CASCADE)
- Table

ReferralMID	NotReferredMID
5	1
4	2
NULL	3
1	4
2	5

Enrolls

- Relational Schema
  Enrolls (**MID**, **Cnum**, **Dname**)
- SQL DDL
  CREATE TABLE Enrolls(
  MID INTEGER,

Cnum INTEGER,
Dname CHAR(50),
PRIMARY KEY (MID, Cnum, Dname),
FOREIGN KEY (MID) REFERENCES MP2(MID)
ON DELETE CASCADE
ON UPDATE CASCADE,
FOREIGN KEY(Cnum, Dname) REFERENCES Classes_Offers(Cnum, Dname)
ON DELETE NULL
ON UPDATE CASCADE)

- Table

MID	Cnum	Dname
1	100	Squash
2	101	Hockey
3	100	Squash
4	200	Hockey
5	100	Squash

Instructors_Works

- Raltional Schema
  Instructor_Works (IID, Dname, Iname, Certifications)
- Functional dependencies
  IID -> Dname, Iname, Certification
- SQL DDL
  CREATE TABLE Instructor_Works(
  IID INTEGER,
  Dname CHAR (20),
  Iname CHAR (50),
  Certification CHAR (50),
  PRIMARY KEY (IID))
- Table

IID	Dname	Iname	Certification
1	Squash	Welsh	Bachelors
2	Hockey	Will	Diploma
3	Tennis	Zed	Diploma
4	Tennis	Zod	Masters
5	Basketball	Welsh	PHDs

Teaches

- Relational Schema
  Teaches (**Cnum**, **Dname**, Time, **IID**, Day)
- Functional Dependencies
  IID -> Dname
- Normalization

(**Cnum**, **Dname**, Time, **IID**, Day)

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T1(**IID**, Dname) T2(**Cnum**, Day, Time, **IID**)

  - However, instead of creating T1, we can instead make use of our existing instructor_Works table, since Dname can be retrieved from Instructor_Works table for the corresponding IID.
- SQL DDL

```
CREATE TABLE Teaches(
        Day CHAR(20),
        Time INTEGER,
        check(Time < 24),
        Cnum INTEGER,
        IID INTEGER,
        PRIMARY KEY (IID, Cnum, Time, Day),
        FOREIGN KEY (Cnum) REFERENCES Classes_Offers(Cnum)
                ON DELETE SET NULL
                ON UPDATE CASCADE,
        FOREIGN KEY (IID) REFERENCES Instructor_Works(IID)
                ON DELETE SET NULL
                ON UPDATE CASCADE)
```

- Table
  - Original Table

Time	Dname	IID	Cnum	Day
10	Squash	1	101	Wednesday
11	Squash	1	100	Thursday
11	Hockey	2	100	Tuesday
11	Tennis	3	200	Wednesday
12	Tennis	4	200	Friday

  - Updated Table
    Teaches(**Cnum**, Day, Time, **IID**)

IID	Cnum	Day	Time
1	101	Wednesday	10
1	100	Thursday	11
2	100	Tuesday	11

3	200	Wednesday	11
4	200	Friday	12

Departments

- Relational Schema
  Department (Dname, Location)
- Functional Dependencies
  Dname -> Location
- SQL DDL
  CREATE TABLE Department(
  Dname CHAR(20),
  Location CHAR(50),
  PRIMARY KEY(Dname))
- Table

Dname	Location
Squash	Area 1
Hockey	Area 2
Tennis	Area 3
Golf	Area 4
Basketball	Area 6

Classes_Offers

- Relational Schema
  Class_Offers (Cnum, Dname, Cname)
- Functional Dependencies
  Cnum, Dname -> Cname
- SQL DDL
  CREATE TABLE Classes_Offers(
  Cnum INTEGER,
  Cname CHAR(20),
  Dname CHAR(20),
  PRIMARY KEY(Cnum, Dname),
  FOREIGN KEY(Dname) REFERENCES Department(Dname)
  ON DELETE CASCADE
  ON UPDATE CASCADE)
- Table

Cnum	Dname	Cname
100	Squash	Squash 100

101	Squash	Squash 101
101	Hockey	Hockey 101
104	Tennis	Tennis 104
200	Tennis	Tennis 200