CSCI-341 Spring 2019 **Name:**
Test 1

Four pages of reference information are included with this test:

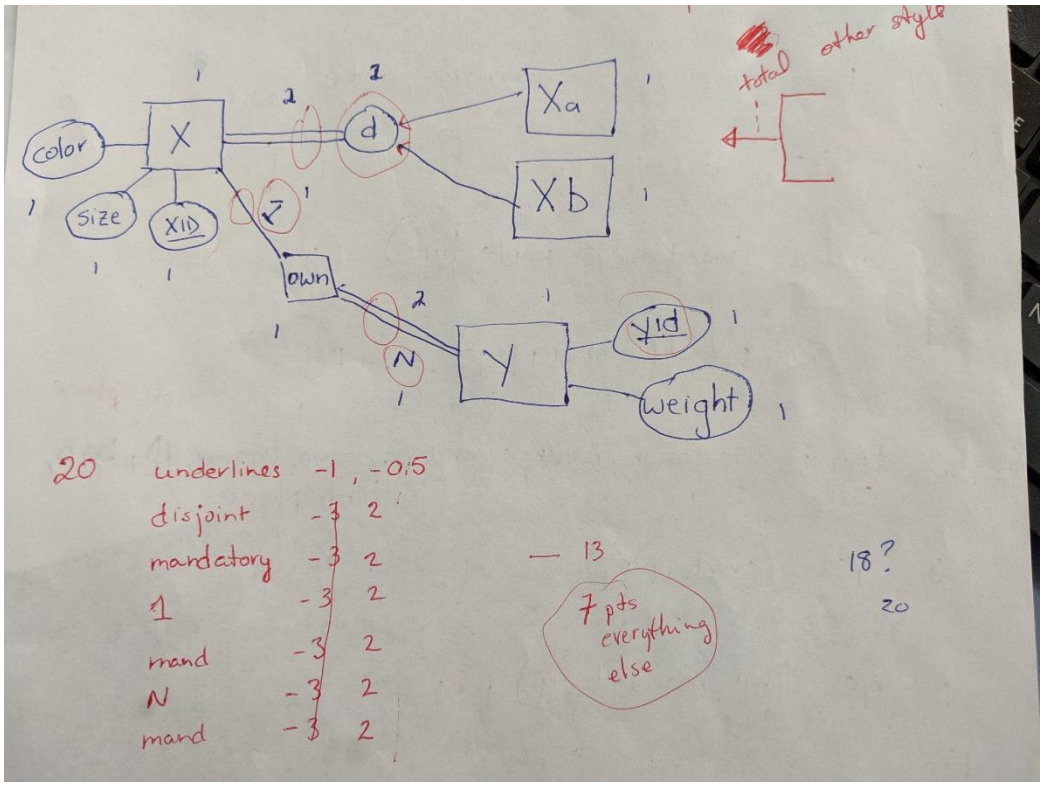
- *an ER diagrammatic notation reference (for the ER questions),*
- *the relational model of the COMPANY database (for the SQL questions),*
- *an instance of the COMPANY database with data (for the constraint questions), and*
- *an EER model representing a baseball league (for the ER questions).*

While any single student has a test paper, do not speak or signal to anyone in the class except the instructors or TAs. *Suspected cheating on this test will result in a 0 on the test. Confirmed cheating on this test will result in failure of the course.*
Please read the questions carefully and answer all parts

1. Draw an EER model diagram that represents all of the following scenario:

   An **X** has a unique *xid*, and a *color* and *size*. There are exactly 2 types of **X's**, called **Xa** and **Xb**.
   If an **X** is an **Xa**, it cannot be an **Xb**.
   If an **X** is not an **Xa**, it must be an **Xb**.
   An **X** may or may not own some **Y's**, but all **Y's** have a single owner **X**.
   Each **Y** is uniquely identified by its *yid*, and has a *weight*.

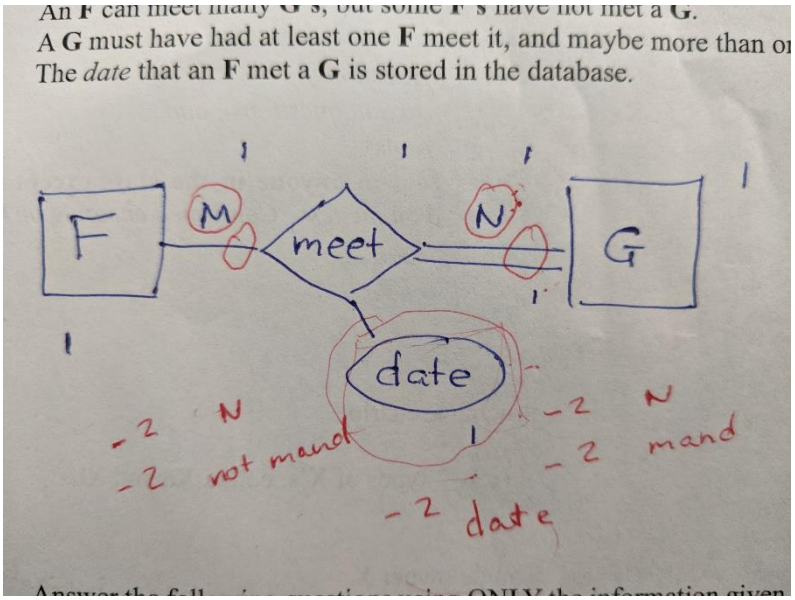
20pts total



2. Draw an EER model diagram that represents all of the following scenario:

   An **F** can meet many **G's**, but some **F's** have not met a **G**.
   A **G** must have had at least one **F** meet it, and maybe more than one.
   The *date* that an **F** met a **G** is stored in the database.

   10pts (disregard the points on image)



3. Write a single SQL statement for each of the following queries on the COMPANY database. Each statement is independent. None of these involves more than one table. **Do not** use the reference showing the data in the database or it may cause confusion. **10pts total**

- Find the SSNs of all employees who work on project number 18.

```
Select ESSN from WORKS_ON
Where Pno = 18;
```

  Extra joins ok if done right.

- Find the SSNs and last names of all employees who would be earning over $100000 if you gave everyone a $5000 raise.

```
Select SSN, LName from EMPLOYEE
Where salary + 5000 > 100000;
```

  Salary > 95000 also OK

- Give everyone a $5000 raise.

```
Update EMPLOYEE
Set salary = salary + 5000;
```

4. Answer the following questions using ONLY the information given in the Baseball ER diagram. For each question, **briefly explain how the diagram gave you the answer**.

- How is a GAME uniquely identified? 4pts

Home team name, visitor team name, and date
Because it has 2 identifying relationships with TEAM, plus its own partial key, date.

- What is the minimum number of TEAMs in a GAME? 2pts

Two, because each of the identifying relationships of GAME with TEAM are, by definition (and as shown) mandatory.

  - Minimum number of PLAYERs in a TEAM? 2pts

One, because TEAM has a mandatory relationship with PLAYER

  - Minimum number of PITCHERs in a GAME? 2pts

Zero, because although GAME has 3 relationships with PITCHER, none of them are mandatory

- List all the attributes of a PITCHER. 4pts

ERA, *its own*
BatOrientation, BattingAverage, *inherited from PLAYER*
ID, Lname, Fname, DoB, BirthPlace, *inherited from PERSON*

- Can there be a PLAYER who is also a MANAGER? 3pts

Yes, because the specialization is overlapping

- Can there be any PERSONs in the database who are not a COACH, MANAGER, PLAYER or UMPIRE? 3pts

Yes, because the specialization is not mandatory

5. Consider the COMPANY database and the data that is currently shown in it on the attached page. For each of the following correct SQL statements, explain what integrity constraint would be violated (if any) and why? 3pts each

```
delete from WORKS_ON
where Pno = 10;
```

No problem, no other table refers to WORKS_ON

```
update EMPLOYEE
set Super_ssn = '121212121'
where Ssn = '123456789';
```

Referential integrity, because super_ssn must refer to an existing SSN in the EMPLOYEE table (and there is no such employee as 121212121

```
insert into DEPT_LOCATIONS (Dnumber, Dlocation)
values (1, 'Stafford');
```

No problem, the pair (1, Stafford) does not already exist

```
update DEPARTMENT
set Dnumber = 5
where Dname = 'Administration';
```

Either:
Referential integrity, because by removing department 4, all the FKs that refer to it (in PROJECT and DEPT_LOCATIONS) become wrong.

OR:
Key integrity, because a department 5 already exists

```
delete from PROJECT
where Plocation = 'Sugarland';
```

Referential, because the project being deleted, project 2, has many FK references in the WORKS_ON table