**Al Yamamah University Introduction to Database system** (CIS221)

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**Lab #2 – The Relational Data Model and Constraints**

In this lab you will learn the following:

1. Create a database with MySQL Workbench data modeling tool
2. Choose the right attribute datatypes to comply with the domain constraint
3. Create relationships and check the integrity constraints
4. Populate the database (add entities to tables)
5. Add new tuples and explain the violations that may occur.

# The Software Database

Consider the Software database which includes the tables below. This database records the development and use of software applications where developers develop applications under different categories and users may download, review and rank these applications.

**Software Database Tables:**

**APPLICATION**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Appname | Description | ReleaseDate | CatID | Size |
| Snapchat | Life is more fun when you live in the moment | 2016-09-21 | 2 | 84.9 |
| Whatsapp | Whatsapp is a free messenger app in real time | 2009-10-27 | 4 | 92.8 |
| Twitter | See what's happening in the world right now | 2012-05-15 | 3 | 44.4 |
| Instagram | Capture and share the world's moments | 2015-02-18 | 2 | 37.6 |
| Hungerstation | Oder food online | 2014-10-01 | 1 | 32.5 |

**DEVELOPER**

|  |  |  |  |
| --- | --- | --- | --- |
| DevID | DevName | DevAddress | DevEmail |
| 1221 | Snapchat, Inc | CA 90291 | info@snapchat.com |
| 1321 | Whatsapp, Inc | CA 94041 | info@whatsapp.com |
| 1432 | Twitter, Inc | CA 94103 | [info@twitter.com](mailto:info@twitter.com) |
| 1223 | Instagram, Inc | CA 94025 | [info@instagram.com](mailto:info@instagram.com) |
| 1454 | Ejj est | SA 99321 | [info@hungerstation.com](mailto:info@hungerstation.com) |

**USER**

|  |  |  |
| --- | --- | --- |
| UserName | UserEmail | UserAddress |
| Maha | [Maha@hotmail.com](mailto:Maha@hotmail.com) | 2122 Riyadh , Saudi Arabia |
| Noura | [Noura@hotmail.com](mailto:Noura@hotmail.com) | 2122 Jedda , Saudi Arabia |
| Ahmed | [Ahmed@live.com](mailto:Ahmed@live.com) | 2122 Medina , Saudi Arabia |
| Wael | [Wael@hotmail.com](mailto:Wael@hotmail.com) | 2133 Riyadh , Saudi Arabia |
| Tareq | [Tareq@gmail.com](mailto:Tareq@gmail.com) | 2872 Riyadh , Saudi Arabia |
| Turki | Turki@yahoo.com | 1364 Riyadh , Saudi Arabia |

**DOWNLOAD**

|  |  |  |
| --- | --- | --- |
| UserName | Appname | Review |
| Maha | Snapchat | 5 |
| Noura | Whatsapp | 4 |
| Ahmed | Twitter | 5 |
| Wael | Instagram | 3 |
| Tareq | Hungerstation | 2 |
| Noura | Snapchat | 5 |
| Turki | Twitter | 3 |
| Noura | Instagram | 4 |

**DEVELOP**

|  |  |
| --- | --- |
| DevID | Appname |
| 1221 | Snapchat |
| 1321 | Whatsapp |
| 1432 | Twitter |
| 1223 | Instagram |
| 1454 | Hungerstation |

# Apply the following:

1. Create the database tables (only the Entity Sets) using MySQL Workbench data modeling tool
2. Identify the relationships and create them in the ER model using MySQL Workbench data modeling tool. Update the attribute names of the relationships
3. Populate the database tables by inserting all the tuples
4. Suppose each of the following insert operations is applied directly to the Software database state. Discuss all integrity constraints violated by each operation, if any.
5. Insert <’Talabat’, ‘Best Saudi food delivery service’,’2016-10-31’,6, 34.6 > into APPLICATION.
   1. The command is: “INSERT INTO `mydb`.`application` (`name`, `description`, `release\_date`, `category\_id`, `size`) VALUES ('Talabat', 'Best Saudi food delivery service', '2016-10-31', '6', '34.6');” and it succeeded.
   2. No integrity constraints were broken.
6. Insert <’Hungerstation’, ‘We deliver to your door in no time’,’2011-09-12’,1, 55 > into APPLICATION.
   1. The command is: “INSERT INTO `mydb`.`application` (`name`, `description`, `release\_date`, `category\_id`, `size`) VALUES ('Hungerstation', 'We deliver to your door in no time', '2011-09-12', '1', '55');” and it failed.
   2. Reason for failure is key constraint violation.
7. Insert <1321, ‘Vine’ > into DEVELOP.
   1. The command is “INSERT INTO `mydb`.`develop` (`developer\_id`, `application\_name`) VALUES ('1321', 'Vine');” and it failed.
   2. Reason for failure is referential constraint violation.
8. Insert <’null’, ‘Telegram’ > into DEVELOP.
   1. The command is “INSERT INTO `mydb`.`develop` (`application\_name`) VALUES ('Telegram');”.
   2. Reason for failure is that developer\_id can’t be NULL, it must have a value.
9. Suppose each of the following delete operations are applied directly to the Software database state. Discuss all integrity constraints violated by each operation, if any.
10. Delete the APPLICATION tuple with Appname = ‘snapchat’.
    1. The command is “DELETE FROM `mydb`.`application` WHERE (`name` = 'Snapchat');” and it failed.
    2. Reason for failure is referential key constraint, the primary key of this entry is used a foreign key in another entry.
11. Delete the USER tuple with UserName = ‘Turki’.
    1. The command is “DELETE FROM `mydb`.`user` WHERE (`name` = 'Turki');” and it failed.
    2. Reason for failure is referential integrity constraint violation.
12. Delete the DEVELOP tuple with DevID=1221 and Appname=’Snapchat’.
    1. The command is “DELETE FROM `mydb`.`develop` WHERE (`developer\_id` = '1221') and (`application\_name` = 'Snapchat');” and it succeeded.
    2. No integrity constraints were broken.
13. Suppose each of the following update operations are applied directly to the Software database state. Discuss all integrity constraints violated by each operation, if any.
14. Modify the DevID attribute of the DEVELOPER tuple with DevID= ‘1221’ to ‘Ahmad’.
    1. The command is “UPDATE `mydb`.`developer` SET `id` = 'Ahmad' WHERE (`id` = '1221');” and it failed.
    2. Reason for failure is domain integrity constraint.
15. Modify the AppName attribute of the DEVELOP tuple with DedID= ‘1321’ to ‘Time management’.
    1. The command is “UPDATE `mydb`.`develop` SET `application\_name` = 'Time Management' WHERE (`developer\_id` = '1321') and (`application\_name` = 'Whatsapp');” and it failed.
    2. Reason for failure is referential integrity constraint, there is not application\_name called Time Management.