# 1. URL for your Youtube video.

# 2. Your entity relationship diagram, giving any assumptions that it makes about the processes that use the data.

## 2.2 Assumptions made:

* **[User]** Users register with a unique email address as their username, and this email will also be stored as user’s id in the database.
* **[User]** User’s password only stores the hashed value.
* **[User]** All users are either buyers or sellers.
* **[User]** Sellers are buyers with extra privileges such as creating auctions and receiving auction notifications.
* **[Notification]** Notifications are read-only.
* **[Item]** Every item belongs to a category which is selected by the seller from the predefined set of categories.
* **[Category]** Category is separated from Item table for easier management of categories.
* **[WatchList]** User cannot add the same item to his/her watch list more than once. Hence WatchList has a composite PK of userId and itemId instead of having its own id.
* Restricted attribute values:

There are some restricted attribute values in the database. To implement these restrictions, only certain system processes are allowed to set or update these attributes.

* + accountType is either “Seller” or “Buyer”.
  + itemStatus is either “Open”, “Closed-Won” or “Closed-No-bid”.
  + bidStatus is either “Winning”, “Losing”, “Won” or “Lost”.
  + notificationType is either “Auction Close”, “Auction Update”, “Bid Update”, “Bid Close” or “WatchList Notification”.

# A listing of your database schema (list of table names and attributes) with an explanation of how it translates the ER diagram.

* User (Corresponds to the ‘User’ entity in the ER diagram)
  + id VARCHAR(255) PRIMARY KEY
  + firstName VARCHAR(30) NOT NULL
  + lastName VARCHAR(30) NOT NULL
  + password VARCHAR(255) NOT NULL
  + accountType VARCHAR(6) NOT NULL
* Item (Corresponds to the ‘Item’ entity in the ER diagram)
  + id INTEGER AUTO\_INCREMENT PRIMARY KEY
  + sellerId VARCHAR(255) NOT NULL
  + title VARCHAR(255) NOT NULL
  + description VARCHAR(255)
  + itemStatus VARCHAR(20) NOT NULL
  + startTime datetime NOT NULL
  + endTime datetime NOT NULL
  + reservedPrice decimal
  + startingPrice decimal NOT NULL
* Bid (Corresponds to the ‘Bid’ entity in the ER diagram)
  + id INTEGER AUTO\_INCREMENT PRIMARY KEY
  + buyerId VARCHAR(255) NOT NULL
  + itemId INTEGER NOT NULL
  + bidStatus VARCHAR(20) NOT NULL
  + bidTime datetime NOT NULL
  + price decimal NOT NULL
* WatchList (Corresponds to the ‘WatchList’ entity in the ER diagram)
  + itemId INTEGER NOT NULL
  + userId VARCHAR(255) NOT NULL
  + addedTime datetime NOT NULL
* Category (Corresponds to the ‘Category’ entity in the ER diagram)
  + id INTEGER AUTO\_INCREMENT PRIMARY KEY
  + name VARCHAR(255) NOT NULL
* Item\_Category (Corresponds to the ‘Item\_Category’ entity in the ER diagram)
  + itemId int NOT NULL
  + categoryId int NOT NULL
* Notification (Corresponds to the ‘Notification’ entity in the ER diagram)
  + id INTEGER AUTO\_INCREMENT PRIMARY KEY
  + userID VARCHAR(255) NOT NULL
  + itemId INTEGER
  + notificationType VARCHAR(20) NOT NULL
  + createdTime datetime NOT NULL
  + message VARCHAR(255)

# 4. An analysis showing that the database schema is in third normal form.

* First Normal Form
  + Requirement: every attribute in the schema only stores one piece of data.
  + => Requirement met as our tables do not contains attributes like address or contact numbers.
* Second Normal Form
  + Requirement: no non-PK attribute can be fully determined by a part of PKs
  + => The requirement implies only tables with composite PK can possibly break the rule.
  + => Tables with composite PK in our schema: WatchList and Item\_Category
  + WatchList => the only non-PK attribute is addedTime, which cannot be fully determined by just itemId or userId. Hence WatchList meets the requirement.
  + Item\_Category => there is no non-PK attribute, so it meets the requirement.
* Third Normal Form
  + Requirement: no functional dependencies exist between non-PK attributes.
  + Analysis for each table:
  + **User** 
    - Names (firstName and lastName) are quite likely to have duplicate values, therefore they cannot be used for determining other attributes.
    - password: Even though very unlikely, it is still possible to have 2 or more same passwords across different users, therefore it cannot be used for determining other attributes.
    - accountType: it cannot be used for determining other attributes as all users are divided into either Seller or Buyer.
    - **Result => Only id can be used for determining other attributes.**
  + **Item**
    - sellerId: as one seller can have multiple items, sellerId cannot be used for determining other attributes.
    - Other Item attributes: there can be multiple items with the same title/description/endTime … etc, so they cannot be used for determining other attributes.
    - **Result => Only id can be used for determining other attributes.**
  + **Bid**
    - buyerId: as one buyer can place multiple bids, buyerId cannot be used for determining other attributes.
    - itemId: as one item can be bid multiple times, itemId cannot be used for determining other attributes.
    - Other Bid attributes: there can be multiple bids with the same bidStatus, bidTime or price on different items, so they cannot be used for determining other attributes.
    - **Result => Only id can be used for determining other attributes.**
  + **WatchList**
    - itemId: an item can be added to multiple watch lists, so itemId cannot be used for determining other attributes.
    - userId: a user can add multiple items into his/her watch list, so userId cannot be used for determining other attributes.
    - addedTime: there can be multiple watch list items being added at the same time, so it cannot be used for determining other attributes.
    - **Result => Only itemId+userId can be used for determining other attributes.**
  + **Category**
    - **Result: this table contains only 1 PK and 1 non-PK attributes, so it cannot violate the rule.**
  + **Item\_Category**
    - **Result: this table only contains a composite PK, so it cannot violate the rule.**
  + **Notification**
    - userId: a user can receive multiple notifications, so userId cannot be used for determining other attributes.
    - itemId: there can be multiple notifications related to the same item, so itemId cannot be used for determining other attributes.
    - message: even though very unlikely, it is still possible to have 2 or more same message across different notifications, therefore it cannot be used for determining other attributes.
    - notificationType & createdTime: there can be multiple notifications with the same type or created time, so they cannot be used for determining other attributes.
    - **Result => Only id can be used for determining other attributes.**
  + **Final result => No table violate the rule, so the schema is in 3NF**

# 5. A listing and explanation of your database queries.

## Register

## Login

|  |  |
| --- | --- |
| **SQL queries** | **Note** |
| SELECT \*  FROM User  WHERE email = '$email' | The first purpose of this query is to check if there is a corresponding |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

## Display Item Create Auction

## Place Bid Create Notification

## Display Notification

## 