

# CPSC 304 Project Cover Page

Milestone #: 1

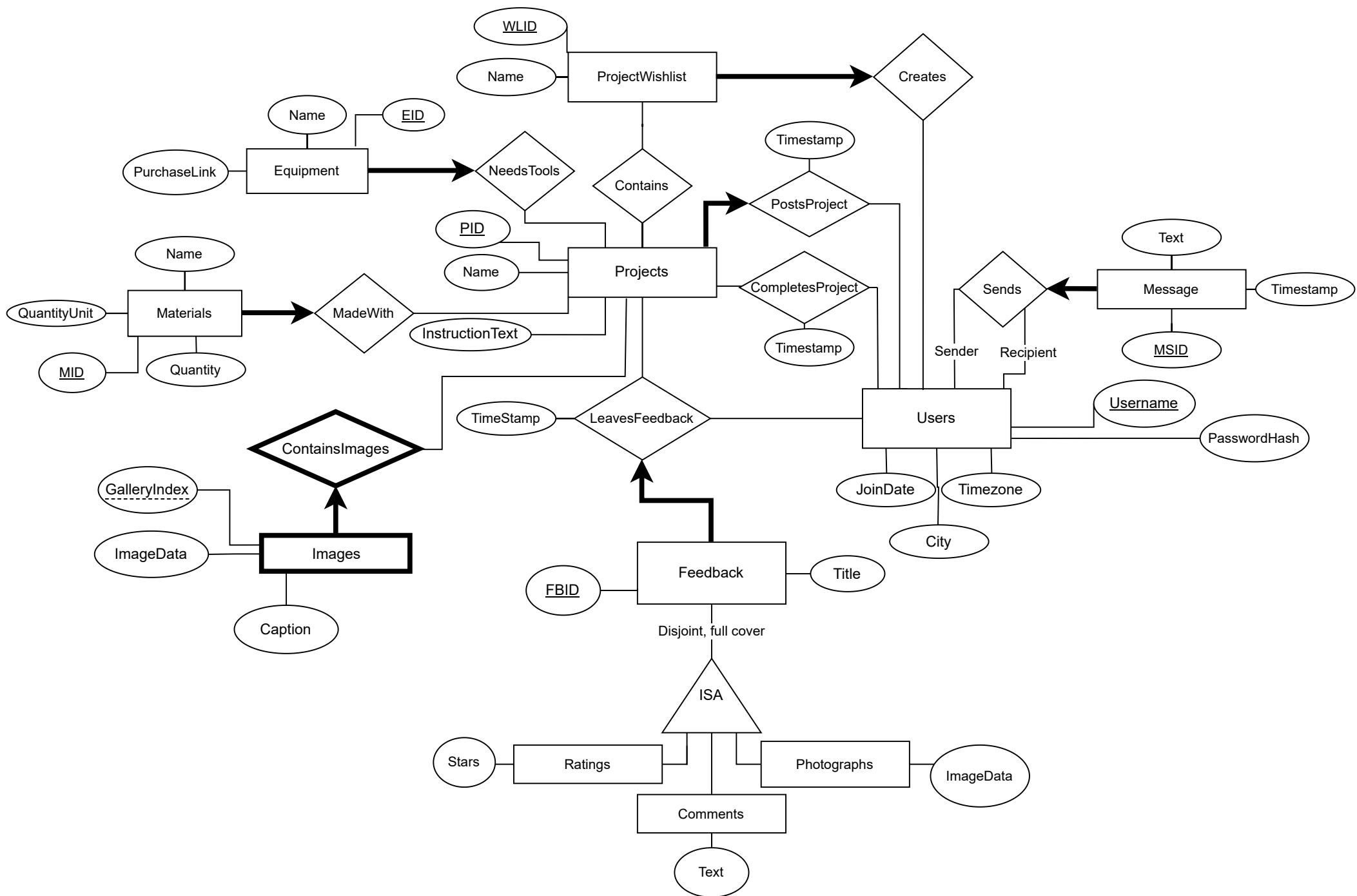
Date: Jan 28, 2024

Group Number: 1

Name	Student Number	CS Alias (Userid)	Preferred E-mail Address
Ron Friedman	87518544	w9y4b	ron852719@icloud.com
Mudassir Abbas	53212999	l9a0z	baqarmabbas@gmail.com
Jacob Zhu	98490063	p5c5w	<a href="mailto:jzhu46@student.ubc.ca">jzhu46@student.ubc.ca</a>

By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)

In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia



## Project summary:

Our project is a web application which allows users to share tutorials that they have created. These tutorials can be for software projects, or for hardware projects which may require materials and tools. Once shared, other users may leave feedback, in the form of ratings, comments, and images, on the tutorial. Users may also compile collections of tutorials that they have made (or would like to make), and send messages to one another.

## Schema (not normalized):

### Entity sets

Users(Username: VARCHAR, PasswordHash: CHAR(32), JoinDate: DATE, City: VARCHAR, Timezone: INTEGER)

- PasswordHash NOT NULL

### Weak entity sets

Images\_ContainsImages(GalleryIndex: INTEGER, ImageData: MEDIUMBLOB, Caption: VARCHAR, **PID: INTEGER**)

- ImageData NOT NULL

### Combined relationship + entity sets

Feedback\_LeavesFeedback(FBID: INTEGER, Title: VARCHAR, Stars: TINYINTEGER, Comment: VARCHAR, ImageData: MEDIUMBLOB, Timestamp: DATETIME, **Username: VARCHAR, PID: INTEGER**)

- Username NOT NULL
- PID NOT NULL

Message\_Sends(MSID: INTEGER, Text: VARCHAR, Timestamp: DATETIME, **SenderUsername: VARCHAR, ReceiverUsername: VARCHAR**)

- Text NOT NULL
- SenderUsername NOT NULL
- ReceiverUsername NOT NULL

ProjectWishlist\_Creates(WLID: INTEGER, Name: VARCHAR, **Username: VARCHAR**)

- Name NOT NULL

- Username NOT NULL

Equipment\_NeedsTools(EID: INTEGER, Name: VARCHAR, PurchaseLink: VARCHAR, **PID: INTEGER**)

- PID NOT NULL
- PurchaseLink NOT NULL

Materials\_MadeWith(MID: INTEGER, Name: VARCHAR, Quantity: INTEGER, QuantityUnit: VARCHAR, **PID: INTEGER**)

- Name NOT NULL
- PID NOT NULL

Projects\_PostsProject(PID: INTEGER, Name: VARCHAR, InstructionText: VARCHAR, Timestamp: DATETIME, **Username: VARCHAR**)

- Name NOT NULL
- Username NOT NULL

## **Relationship sets**

Contains(**WLID: INTEGER**, **PID: INTEGER**)

CompletesProject(**Username: VARCHAR**, **PID: INTEGER**, Timestamp: DATETIME)

## **Functional dependencies**

Keys:

Username → PasswordHash, JoinDate

PID, GalleryIndex → Images\_ContainsImages.ImageData, Caption

FBID → Title, Stars, Comment, Feedback\_LeavesFeedback.ImageData, Feedback\_LeavesFeedback.Timestamp, Username

MSID → Messages\_Sends.Text, Messages\_Sends.Timestamp, SenderUsername, ReceiverUsername

PID → Projects\_PostsProject.Name, InstructionText, Projects\_PostsProject.Timestamp

EID → Equipment\_NeedsTools.Name, PurchaseLink, PID

WLID → ProjectWishlist\_Creates.Name, Username

MID → Materials.Name, Quantity, QuantityUnit, Projects.PID

Username, PID → CompletesProject.Timestamp

Non-key FDs:

PurchaseLink → Equipment\_NeedsTools.Name

City → Timezone

## BCNF Normalization:

PurchaseLink → Equipment\_NeedsTools.Name violates BCNF since PurchaseLink is not a superkey in Equipment\_NeedsTools.

We can decompose Equipment\_NeedsTools into two relations:

Equipment\_NeedsTools(EID: INTEGER, **PurchaseLink: VARCHAR**, **PID: INTEGER**)

- PID NOT NULL
- PurchaseLink NOT NULL

PurchaseLink\_Name(PurchaseLink: VARCHAR, Name: VARCHAR)

City → Timezone violates BCNF, since City is not a superkey in Users. We can decompose Users into two relations:

Users(Username: VARCHAR, PasswordHash: CHAR(32), JoinDate: DATE, **City: VARCHAR**)

- PasswordHash NOT NULL

City\_Timezones(City: VARCHAR, Timezone: INTEGER)

As no more problematic functional dependencies hold, our final BCNF decomposition is:

### Entity sets

Users(Username: VARCHAR, PasswordHash: CHAR(32), JoinDate: DATE, **City: VARCHAR**)

- PasswordHash NOT NULL

City\_Timezones(City: VARCHAR, Timezone: INTEGER)

### **Weak entity sets**

Images\_ContainsImages(GalleryIndex: INTEGER, ImageData: MEDIUMBLOB, Caption: VARCHAR, **PID: INTEGER**)

- ImageData NOT NULL

### **Combined relationship + entity sets**

Feedback\_LeavesFeedback(FBID: INTEGER, Title: VARCHAR, Stars: TINYINTEGER, Comment: VARCHAR, ImageData: MEDIUMBLOB, Timestamp: DATETIME, **Username: VARCHAR, PID: INTEGER**)

- Username NOT NULL
- PID NOT NULL

Message\_Sends(MSID: INTEGER, Text: VARCHAR, Timestamp: DATETIME, **SenderUsername: VARCHAR, ReceiverUsername: VARCHAR**)

- Text NOT NULL
- SenderUsername NOT NULL
- ReceiverUsername NOT NULL

ProjectWishlist\_Creates(WLID: INTEGER, Name: VARCHAR, **Username: VARCHAR**)

- Name NOT NULL
- Username NOT NULL

Equipment\_NeedsTools(EID: INTEGER, **PurchaseLink: VARCHAR, PID: INTEGER**)

- PID NOT NULL
- PurchaseLink NOT NULL

PurchaseLink\_Name(PurchaseLink: VARCHAR, Name: VARCHAR)

Materials\_MadeWith(MID: INTEGER, Name: VARCHAR, Quantity: INTEGER, QuantityUnit: VARCHAR, **PID: INTEGER**)

- Name NOT NULL
- PID NOT NULL

Projects\_PostsProject(PID: INTEGER, Name: VARCHAR, InstructionText: VARCHAR, Timestamp: DATETIME, **Username: VARCHAR**)

- Name NOT NULL
- Username NOT NULL

### **Relationship sets**

Contains(**WLID: INTEGER**, **PID: INTEGER**)

CompletesProject(**Username: VARCHAR**, **PID: INTEGER**, *Timestamp: DATETIME*)

## SQL CREATE TABLE statements

*Note: the syntax of some features (namely CURRENT\_TIMESTAMP, AUTOINCREMENT, specifics of BLOB type) will change depending on the DBMS we use in our implementation—these were written for SQLite. These DDL statements reflect our intentions and schema design, not final project code.*

```
CREATE TABLE Users (  
    Username VARCHAR PRIMARY KEY,  
    PasswordHash CHAR(32) NOT NULL,  
    JoinDate DATE DEFAULT CURRENT_TIMESTAMP,  
    City VARCHAR,  
    FOREIGN KEY (City) REFERENCES City_Timezones  
);
```

```
CREATE TABLE City_Timezones (  
    City VARCHAR PRIMARY KEY,  
    Timezone INTEGER  
);
```

```
CREATE TABLE Images_ContainsImages (  
    GalleryIndex INTEGER,  
    ImageData BLOB NOT NULL,  
    Caption VARCHAR,  
    PID INTEGER,  
    PRIMARY KEY (GalleryIndex, PID),  
    FOREIGN KEY (PID) REFERENCES Projects_PostsProject  
        ON DELETE CASCADE  
);
```

```
CREATE TABLE Projects_PostsProject (  
    PID INTEGER PRIMARY KEY AUTOINCREMENT,  
    Name VARCHAR NOT NULL,  
    InstructionText VARCHAR,  
    Timestamp DATETIME DEFAULT CURRENT_TIMESTAMP,  
    Username VARCHAR NOT NULL,
```



```
FOREIGN KEY (Username) REFERENCES Users
    ON DELETE CASCADE
);

CREATE TABLE Feedback_LeavesFeedback (
    FBID INTEGER PRIMARY KEY AUTOINCREMENT,
    Title VARCHAR,
    Stars TINYINTEGER,
    Comment VARCHAR,
    ImageData MEDIUMBLOB,
    Timestamp DATETIME DEFAULT CURRENT_TIMESTAMP,
    Username VARCHAR NOT NULL,
    PID INTEGER NOT NULL,
    FOREIGN KEY (Username) REFERENCES Users
        ON DELETE CASCADE,
    FOREIGN KEY (PID) REFERENCES Projects_PostsProject
        ON DELETE CASCADE
);
```

```
CREATE TABLE Message_Sends (
    MSID INTEGER PRIMARY KEY AUTOINCREMENT,
    Text VARCHAR NOT NULL,
    Timestamp DATETIME DEFAULT CURRENT_TIMESTAMP,
    SenderUsername VARCHAR NOT NULL,
    ReceiverUsername VARCHAR NOT NULL,
    FOREIGN KEY (SenderUsername) REFERENCES Users(Username)
        ON DELETE CASCADE,
    FOREIGN KEY (ReceiverUsername) REFERENCES Users(Username)
        ON DELETE CASCADE
);
```

```
CREATE TABLE ProjectWishlist_Creates (
    WLID INTEGER PRIMARY KEY AUTOINCREMENT,
    Name VARCHAR NOT NULL,
    Username VARCHAR NOT NULL,
```

```

FOREIGN KEY (Username) REFERENCES Users
    ON DELETE CASCADE
);

CREATE TABLE Equipment_NeedsTools (
    EID INTEGER PRIMARY KEY AUTOINCREMENT,
    PurchaseLink VARCHAR NOT NULL,
    PID INTEGER NOT NULL,
    FOREIGN KEY (PurchaseLink) REFERENCES PurchaseLink_Name
        ON DELETE CASCADE,
    FOREIGN KEY (PID) REFERENCES Projects_PostsProject
        ON DELETE CASCADE
);

CREATE TABLE PurchaseLink_Name (
    PurchaseLink VARCHAR PRIMARY KEY,
    Name VARCHAR
);

CREATE TABLE Materials_MadeWith (
    MID INTEGER PRIMARY KEY AUTOINCREMENT,
    Name VARCHAR NOT NULL,
    Quantity INTEGER,
    QuantityUnit VARCHAR,
    PID INTEGER NOT NULL,
    FOREIGN KEY (PID) REFERENCES Projects_PostsProjects
        ON DELETE CASCADE
);

CREATE TABLE Contains (
    WLID INTEGER,
    PID INTEGER,
    PRIMARY KEY (WLID, PID),
    FOREIGN KEY (WLID) REFERENCES ProjectWishlist_Creates
        ON DELETE CASCADE,

```

```
FOREIGN KEY (PID) REFERENCES Projects_PostsProject
    ON DELETE CASCADE
);
```

```
CREATE TABLE CompletesProject (
    Username VARCHAR,
    PID INTEGER,
    Timestamp DATETIME DEFAULT CURRENT_TIMESTAMP,
    PRIMARY KEY (Username, PID),
    FOREIGN KEY (Username) REFERENCES Users
        ON DELETE CASCADE,
    FOREIGN KEY (PID) REFERENCES Projects_PostsProject
        ON DELETE CASCADE
);
```

## SQL INSERT statements

```
INSERT INTO Users (Username, PasswordHash, City)
VALUES ('Bob Jones', '5f4dcc3b5aa765d61d8327deb882cf99', 'Vancouver');
INSERT INTO Users (Username, PasswordHash, City)
VALUES ('John Fubar', '6134b81f81f5f52f023e9a56d7cd8cf2', 'Seattle');
INSERT INTO Users (Username, PasswordHash, City)
VALUES ('Jacob Zhu', 'faae576dc6a876e23fcb61cd03cff032', 'Geneva');
INSERT INTO Users (Username, PasswordHash, City)
VALUES ('Sally Jones', 'b8bba2baae4c2a08fdff4e223458577d', 'London');
INSERT INTO Users (Username, PasswordHash, City)
VALUES ('Michael Morbius', '6104b739e435902b40b54085aa3953f9', 'Berlin');
```

```
INSERT INTO City_Timezones (City, Timezone)
VALUES ('Vancouver', -8);
INSERT INTO City_Timezones (City, Timezone)
VALUES ('Seattle', -8);
INSERT INTO City_Timezones (City, Timezone)
VALUES ('Geneva', 1);
INSERT INTO City_Timezones (City, Timezone)
VALUES ('London', 0);
INSERT INTO City_Timezones (City, Timezone)
VALUES ('Berlin', 1);
```

```
INSERT INTO Images_ContainsImages (GalleryIndex, ImageData, Caption, PID)
VALUES (1, 'cat image data would go here', 'A Cat', 1);
INSERT INTO Images_ContainsImages (GalleryIndex, ImageData, Caption, PID)
VALUES (2, 'dog image data would go here', 'A Dog', 1);
INSERT INTO Images_ContainsImages (GalleryIndex, ImageData, Caption, PID)
VALUES (1, 'house image data would go here', 'My House', 2);
INSERT INTO Images_ContainsImages (GalleryIndex, ImageData, Caption, PID)
VALUES (1, 'selfie image data would go here', 'Selfie', 3);
INSERT INTO Images_ContainsImages (GalleryIndex, ImageData, Caption, PID)
VALUES (2, 'tire image data would go here', 'A Flat Tire', 3);
```

```
INSERT INTO Feedback_LeavesFeedback (Title, Comment, Username, PID)
VALUES ('I hate this product', 'My wife left me because of these unclear instructions', 'Michael Morbius', 1);
INSERT INTO Feedback_LeavesFeedback (Title, Stars, Username, PID)
VALUES ('I'm confused', 2, 'Jacob Zhu', 2);
INSERT INTO Feedback_LeavesFeedback (Title, Comment, Username, PID)
VALUES ('I'm Satisfied', 'My wife managed to follow these instructions', 'Bob Jones', 1);
INSERT INTO Feedback_LeavesFeedback (Title, ImageData, Username, PID)
VALUES ('A picture', 'image data would go here', 'Bob Jones', 3);
INSERT INTO Feedback_LeavesFeedback (Title, Stars, Username, PID)
VALUES ('I'm moderately happy', 4, 'John Fubar', 4);
```

```
INSERT INTO Message_Sends (Text, ReceiverUsername, SenderUsername)
VALUES ('Hello!', 'Sally Jones', 'Bob Jones');
INSERT INTO Message_Sends (Text, ReceiverUsername, SenderUsername)
VALUES ('Hi Jacob', 'Jacob Zhu', 'Bob Jones');
INSERT INTO Message_Sends (Text, ReceiverUsername, SenderUsername)
VALUES ('Check out my projects', 'Jacob Zhu', 'Michael Morbius');
INSERT INTO Message_Sends (Text, ReceiverUsername, SenderUsername)
VALUES ('My wife left me because of your project.', 'Michael Morbius', 'Bob Jones');
INSERT INTO Message_Sends (Text, ReceiverUsername, SenderUsername)
VALUES ('Hello world!', 'Jacob Zhu', 'Sally Jones');
```

```
INSERT INTO ProjectWishlist_Creates (Name, Username)
VALUES ('Coding Project', 'Sally Jones');
INSERT INTO ProjectWishlist_Creates (Name, Username)
VALUES ('Interior Furnishing', 'Bob Jones');
INSERT INTO ProjectWishlist_Creates (Name, Username)
VALUES ('My TodoList', 'Michael Morbius');
INSERT INTO ProjectWishlist_Creates (Name, Username)
VALUES ('Homework Research', 'Sally Jones');
INSERT INTO ProjectWishlist_Creates (Name, Username)
VALUES ('Hiking Preparation', 'Jacob Zhu');
```

```
INSERT INTO Equipment_NeedsTools (PurchaseLink, PID)
```

```

VALUES ('https://www.amazon.ca/hammer/s?k=hammer', 1);
INSERT INTO Equipment_NeedsTools (PurchaseLink, PID)
VALUES ('https://www.bestbuy.ca/en-ca/category/laptops-macbooks/20352', 3);
INSERT INTO Equipment_NeedsTools (PurchaseLink, PID)
VALUES ('https://www.amazon.ca/b?ie=UTF8&node=15306831', 4);
INSERT INTO Equipment_NeedsTools (PurchaseLink, PID)
VALUES
('https://www.homedepot.ca/en/home/categories/outdoors/lawn-and-garden-centre/watering
-and-irrigation/garden-hoses.html', 2);
INSERT INTO Equipment_NeedsTools (PurchaseLink, PID)
VALUES
('https://www.homedepot.com/b/Tools-Hand-Tools-Screwdrivers-Nut-Drivers-Screwdrivers/N-5
yc1vZc993', 5);

```

```

INSERT INTO PurchaseLink_Name (PurchaseLink, Name)
VALUES ('https://www.amazon.ca/hammer/s?k=hammer', 'Hammer');
INSERT INTO PurchaseLink_Name (PurchaseLink, Name)
VALUES ('https://www.bestbuy.ca/en-ca/category/laptops-macbooks/20352', 'Macbook
Laptop');
INSERT INTO PurchaseLink_Name (PurchaseLink, Name)
VALUES ('https://www.amazon.ca/b?ie=UTF8&node=15306831', 'Calculus Textbook');
INSERT INTO PurchaseLink_Name (PurchaseLink, Name)
VALUES
('https://www.homedepot.ca/en/home/categories/outdoors/lawn-and-garden-centre/watering
-and-irrigation/garden-hoses.html', 'Garden Hose');
INSERT INTO PurchaseLink_Name (PurchaseLink, Name)
VALUES
('https://www.homedepot.com/b/Tools-Hand-Tools-Screwdrivers-Nut-Drivers-Screwdrivers/N-5
yc1vZc993', 'Screwdrivers');

```

```

INSERT INTO Materials_MadeWith (Name, Quantity, QuantityUnit, PID)
VALUES ('Wood', 1, 'LBS', 1);
INSERT INTO Materials_MadeWith (Name, Quantity, QuantityUnit, PID)
VALUES ('Water', 2, 'L', 2);
INSERT INTO Materials_MadeWith (Name, Quantity, QuantityUnit, PID)

```

```
VALUES ('PLA Filament', 0.5, 'KG', 3);
INSERT INTO Materials_MadeWith (Name, Quantity, QuantityUnit, PID)
VALUES ('Wood', 4, 'LBS', 4);
INSERT INTO Materials_MadeWith (Name, Quantity, QuantityUnit, PID)
VALUES ('Wood', 5, 'LBS', 5);
```

```
INSERT INTO Projects_PostsProject (Name, InstructionText, Username)
VALUES ('Arrange Plants', 'Arrange plants in an aesthetic way!', 'Bob Jones');
INSERT INTO Projects_PostsProject (Name, InstructionText, Username)
VALUES ('Read Textbook', 'Read the math textbook and finish the questions', 'Sally Jones');
INSERT INTO Projects_PostsProject (Name, InstructionText, Username)
VALUES ('Take a walk', 'Take a walk outside!', 'Jacob Zhu');
INSERT INTO Projects_PostsProject (Name, InstructionText, Username)
VALUES ('Tear down drywall', 'Use hammer to deconstruct drywall', 'Bob Jones');
INSERT INTO Projects_PostsProject (Name, InstructionText, Username)
VALUES ('Construct bed', 'Build IKEA bed', 'Michael Morbius');
```

```
INSERT INTO Contains (WLID, PID)
VALUES(1, 1);
INSERT INTO Contains (WLID, PID)
VALUES(1, 2);
INSERT INTO Contains (WLID, PID)
VALUES(3, 2);
INSERT INTO Contains (WLID, PID)
VALUES(4, 3);
INSERT INTO Contains (WLID, PID)
VALUES(4, 4);
```

```
INSERT INTO CompletesProject (Username, PID)
VALUES ('Bob Jones', 1);
INSERT INTO CompletesProject (Username, PID)
VALUES ('John Fubar', 2);
INSERT INTO CompletesProject (Username, PID)
VALUES ('Jacob Zhu', 3);
INSERT INTO CompletesProject (Username, PID)
```

```
VALUES ('Sally Jones', 4);  
INSERT INTO CompletesProject (Username, PID)  
VALUES ('Michael Morbius', 5);
```

## **Changes in ER diagram from Milestone 1:**

- Removed redundant timestamp attribute
- Renamed Messages.MID to Messages.MSID to avoid name collision with Materials.MID
- Added City and Timezone attributes to Users to fulfill requirement for a second non-primary-key FD