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Updates to ER Diagram:

For our submission to Phase 2, our group completely misunderstood the true purpose of the database/application for our domain, so we essentially recreated the entire ER diagram from the ground up. Based on the feedback received, we removed entities that were redundant/pointless and added several meaningful attributes that we missed in Phase 2.

Entities:

In the User entity, we made naming convention changes (pwd is now password, username is now username, ufname is now user_first_name, ulname is now user_last_name). Additionally, we changed the primary key from username to a newly created attribute, UID (integer), to improve access time. Also, we removed the email attribute; we felt it was redundant information since we already had the username. We added a new attribute, balance, to keep track of the User's account balance for purchasing tools.

In the Tool entity, we also had naming convention changes (name is now tool_name).

We created a new entity, Category, which has attributes tool_category and the primary key CID. In concurrence with these changes, we removed the Hand, Power, and Record entities because they were redundant and not meaningful.

Relations:

For our relations, the "has a" relations between User and Tool and between Tool and Record were entirely removed.

A new M:N relation ("owns") was created between User and Tool; this relation has attributes date_purchased, date_sold, and sale_price. Another M:N relation ("borrows") was created between User and Tool; this relation has attributes due_date and lend_date.

A new M:N relation ("has") was created between Tool and Category.

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Updates to Reduction to Tables:

Similarly to the ER diagram, much of our reduction to tables was completely redone based on feedback that we received. Firstly, for each of the removed entities and relations from the ER Diagram (Power, Hand, and Record), their respective tables were removed from the reduction.

For the User table, the naming conventions were updated in accordance with the ER diagram; for the columns, the balance column was added and the new UID primary key and email column were removed.

For the Tool table, the naming conventions were also updated in accordance with the ER Diagram. Because we deleted the previous 1:N relation between User and Tool, the username foreign key in Tool was removed.

Since we added a new Category entity, a new table having the CID primary key and attribute tool_category was created. To represent the M:N relation between Tool and Category, a new Has relation was created; the relation has columns of a TID (Tool) and CID (categories) foreign keys.

To represent the M:N relation between User and Tool, a new Owns relation was created; Owns has the UID (User) and TID (Tool) foreign keys and attributes date_purchased, date_sold, and sale_price.

Lastly, to represent a secondary M:N relation between User and Tool, a new Borrows relation was created; Borrows has the UID (User) and TID (Tool) foreign keys and the attributes due_date and lend_date

Sample SQL Statements:

```
create table "User"
(
   username        varchar(64)       not null,
   user_first_name varchar(64)       not null,
   user_last_name  varchar(64)       not null,
   password        varchar(64)       not null,
   balance         integer default 0 not null,
   uid             serial            not null
       constraint user_pk
           primary key
);
```

```
create table "Category"
(
   cid           serial      not null
       constraint category_pk
           primary key,
   tool_category varchar(64) not null
);
```

```
create table "Tool"
(
   tid         serial               not null
       constraint tool_pk
           primary key,
   tool_name   varchar(64)          not null,
   lendable    boolean default true not null
);
```

```
create table "Owns"
(
   uid            integer
       constraint owns_user_uid_fk
           references "User",
   tid            integer
       constraint owns_tool_tid_fk
           references "Tool",
   date_purchased date,
   date_sold      date,
   sale_price     integer
);
```

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How Data Was Loaded:

We used a variety of ways to upload our data into the database. For the User table, Mockaroo was used to generate a csv file of randomized users which was then imported into the table via Datagrip. In addition to Mockaroo, we wrote several Python scripts capable of generating the necessary data for Tool, Owns, Borrows, and Has. For each of the scripts, a csv was created and the files were once again imported into their respective tables via Datagrip.

For the Category table, we hand-wrote in several entries to give a solid base number of assignable categories for users. Additionally, throughout testing our application was used to add, modify, lend, and sell various tools between different user accounts, resulting in various entries being added in their respective tables.