

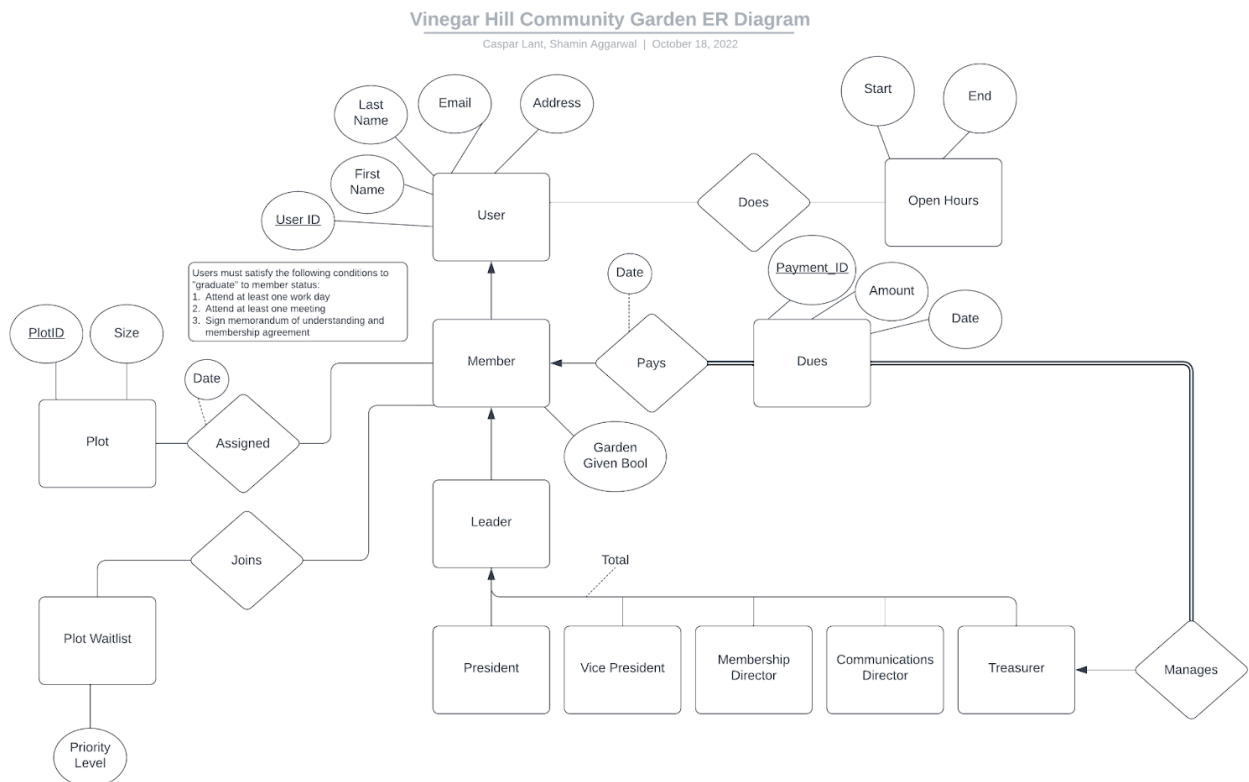
Membership management system for Vinegar Hill Community Garden (VHCG)

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Project 1 Part 2 — W4111 — Columbia University

1. Database Server UNI : sa4129

Our ER diagram has undergone a few minor changes, mainly, correcting mistakes in our first submission based on our mentor TA's feedback, adding attributes to a few entities.



2. SQL CREATE commands

a) Entity Sets

```
CREATE TABLE Users(  
  uid int PRIMARY KEY,  
  first_name varchar(255),  
  last_name varchar(255),  
  email varchar(255),  
  phone varchar(255),  
  address varchar(255)  
);
```

```

CREATE TABLE Members(
uid int REFERENCES Users PRIMARY KEY,
given_garden_key boolean
);

CREATE TABLE Leadership(
uid int REFERENCES Members PRIMARY KEY,
leadership_role varchar(255),
CHECK(
leadership_role IN ('President', 'Vice President', 'Membership Director',
'Communications Director', 'Treasurer')
)
);

CREATE TABLE Dues(
due_id int PRIMARY KEY,
amount float NOT NULL,
due_date date NOT NULL,
uid int NOT NULL REFERENCES Members,
manager_id int NOT NULL REFERENCES Leadership
);

CREATE TABLE Plots(
plot_id int PRIMARY KEY,
size varchar(255),
CHECK(
size IN ('Full', 'Double', 'Half'))
);

CREATE TABLE Assigned(
aid int PRIMARY KEY,
uid int REFERENCES Members,
plot_id int REFERENCES Plots,
assigned_date date
);

```

```
CREATE TABLE Plot_Waitlist(
uid int REFERENCES Members PRIMARY KEY,
priority_level int
);
```

```
CREATE TABLE Open_Hours(
hours_id int PRIMARY KEY,
start_time timestamp NOT NULL,
end_time timestamp NOT NULL
);
```

b) Relation Sets

```
CREATE TABLE Pays(
pay_datetime timestamp,
uid int REFERENCES Members,
due_id int REFERENCES Dues,
PRIMARY KEY (uid, due_id)
);
```

```
CREATE TABLE Does(
uid int REFERENCES Members,
hours_id int REFERENCES Open_Hours,
PRIMARY KEY (uid, hours_id)
);
```

3. SELECT Queries

(i) Users who've taken the maximum number of Open_Hours slots
= Users with maximum number of rows in Does relation table

As the counts of slots taken by each User is a metric required for multiple administrative purposes in the VHCG, we define it as a View

We return the ID, name and slot count of each such User

```
CREATE VIEW User_Hour_Counts AS
SELECT U.uid, U.first_name, U.last_name, COUNT(*)
FROM Users U, Does D
WHERE U.uid = D.uid
GROUP BY U.uid
```

```
SELECT *
FROM User_Hour_Counts U
WHERE U.count >= ALL (SELECT count FROM User_Hour_Counts);
```

(ii) All User Assignments of 'Full' size Plots

The inner join of Assigned and Plots will filter out the un-assigned plots

We return IDs and names of Users, IDs of the Assignment record and Plot, and the size of Plot

```
SELECT U.uid, U.first_name, U.last_name, A.aid, P.plot_id, P.size
FROM Users U, Assigned A, Plots P
WHERE U.uid = A.uid AND A.plot_id = P.plot_id AND P.size = 'Full'
```

(iii) All Paid Dues whose due date was at the end of this year

The inner join of Pays and Dues will filter out unpaid Dues

We return IDs and names of the Users with the timestamp of payment, as well as the amount and due date

```
SELECT U.uid, U.first_name, U.last_name, P.pay_datetime, D.amount,
D.due_date
FROM Users U, Pays P, Dues D
WHERE U.uid = P.uid AND P.due_id = D.due_id AND D.due_date = '2022-12-31'
```

4. Changes Made

(i) We realized each Due amount would need to be paid by exactly one Member and managed by exactly one Treasurer so we made those changes to the ER diagram.

This is enforced by making (Member ID, Due ID) the PRIMARY KEY of Pays relation between Members and Dues. Member ID and Manager (Treasurer) ID are also NOT NULL foreign attributes of Dues.

(ii) We removed the 'at most one' relation from Members on Plots as we decided instead of tracking which plot is assigned to which members, it'll be better to have a record of every assignment/re-assignment of a plot to any member. The Date attribute of Assigned table will allow us to query the latest members assigned to each plot.

iii) Based on feedback from Lia, we realized it was unnecessary to represent the leadership portion of the diagram as an aggregate relation.