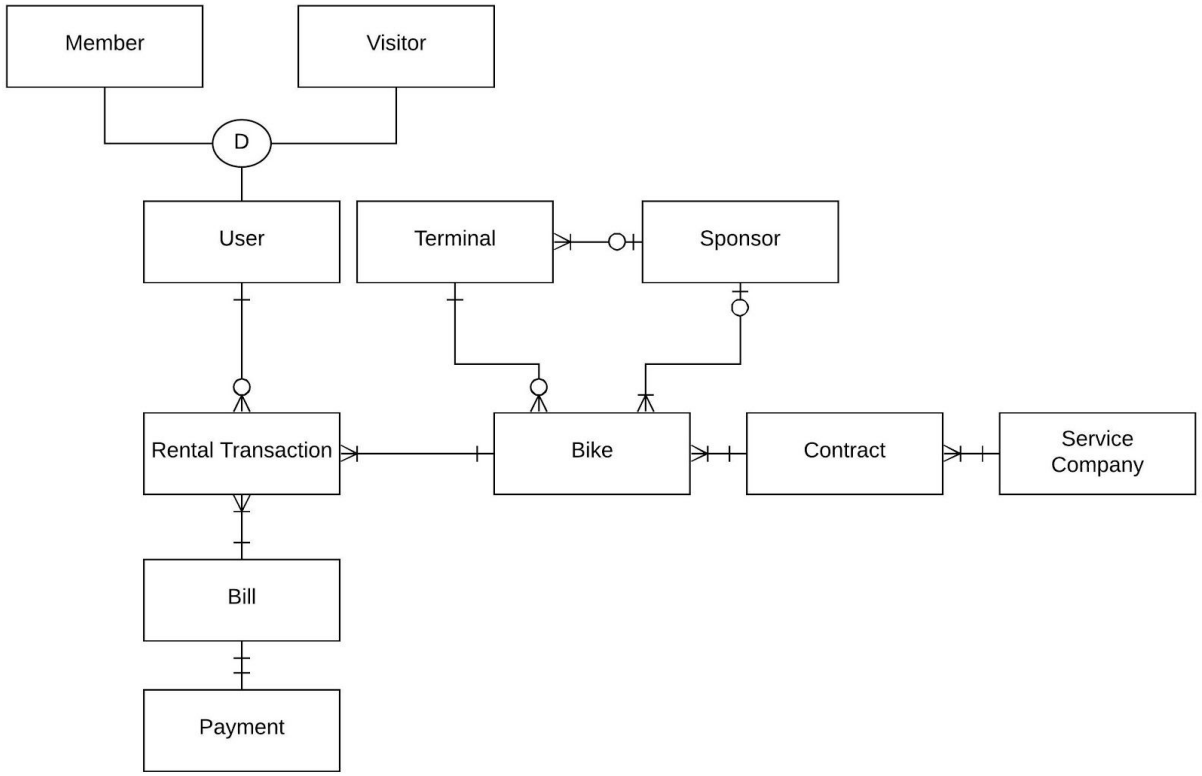
EERD and Assumptions

EERD



Assumptions

1. Bikes can have a maximum of one sponsor and one service company.

2. As it is necessary to have a contract for each of the service companies, it makes sense to collect all contract info in a separate table.

3. Bikes are not unique to one terminal. Once a bike has been picked up from a terminal, it can then be dropped off at any other terminal owned by Hampshire's Social Welfare Service (HSWS). I decided on this as, after some research, it seems like the most common system that is used for bike rental services.

4. Bikes do not move between cities.

5. Once a bike is placed into a new terminal, it then belongs to this terminal and not in any way to the previous one. While the bikes are out of a terminal being used, they're still registered at their last known terminal.

6. ‘Membership status’ refers to the possible age ranges for the members.

7. GPS on the bikes gives an exact location. After some research I found that most GPS devices use Decimal Degrees (DD) format. I used the table below to decide upon using DD to 5 decimal places.

Degree precision versus length

decimal places	decimal degrees	DMS	Object that can be *unambiguously* recognized at this scale	N/S or E/W at equator	E/W at 23N/S	E/W at 45N/S	E/W at 67N/S
0	1.0	1° 00′ 0″	country or large region	111.32 km	102.47 km	78.71 km	43.496 km
1	0.1	0° 06′ 0″	large city or district	11.132 km	10.247 km	7.871 km	4.3496 km
2	0.01	0° 00′ 36″	town or village	1.1132 km	1.0247 km	787.1 m	434.96 m
3	0.001	0° 00′ 3.6″	neighborhood, street	111.32 m	102.47 m	78.71 m	43.496 m
4	0.0001	0° 00′ 0.36″	individual street, land parcel	11.132 m	10.247 m	7.871 m	4.3496 m
5	0.00001	0° 00′ 0.036″	individual trees, door entrance	1.1132 m	1.0247 m	787.1 mm	434.96 mm
6	0.000001	0° 00′ 0.0036″	individual humans	111.32 mm	102.47 mm	78.71 mm	43.496 mm
7	0.0000001	0° 00′ 0.00036″	practical limit of commercial surveying	11.132 mm	10.247 mm	7.871 mm	4.3496 mm
8	0.00000001	0° 00′ 0.000036″	specialized surveying (e.g. tectonic plate mapping)	1.1132 mm	1.0247 mm	787.1 µm	434.96 µm

8. A report on bicycle records would include most of the attributes in the bicycle table, as well as some from rental transaction. This would not include detailed data such as which terminals the bike has been at, its GPS location at different times etc as this seems like irrelevant data and a waste of storage.

9. Visitors may use a foreign address when filling in their details, which means the database must be able to accommodate a wide range of different address and postcode types. This also takes into account that some countries do not use post codes.

10. A company provides both a sponsor name and company name when sponsoring bikes. This is because a company may want to promote a specific product/service and not the main company itself. An example of this would be Coca Cola prompting a new flavour of their drink, the company name would be Coca Cola, but the sponsor name would be the new flavour.

11. Payments are automatically taken out and this information goes through the bills and payment table, no matter if you’re a member or visitor.

12. Payment number and bill number are the same as one bill can only have one payment.

13. Visitor, service company and sponsor details are deleted after a fixed time period once they stop their involvement with the service, this is what the General Data Protection Regulation (GDPR) recommends.

14. While Visitor details are deleted, the rental transaction for the visitors are kept for the purpose of statistics and reports.

Clarification of design decisions

I decided to Generalize ‘Member’ and ‘Visitor into ‘User’. I did this as both entities (member and visitor) have similar information (name, email, phone, etc.) and only really have a couple differences. This is disjointed as you cannot be both a member and a visitor.