COURSEWORK 1

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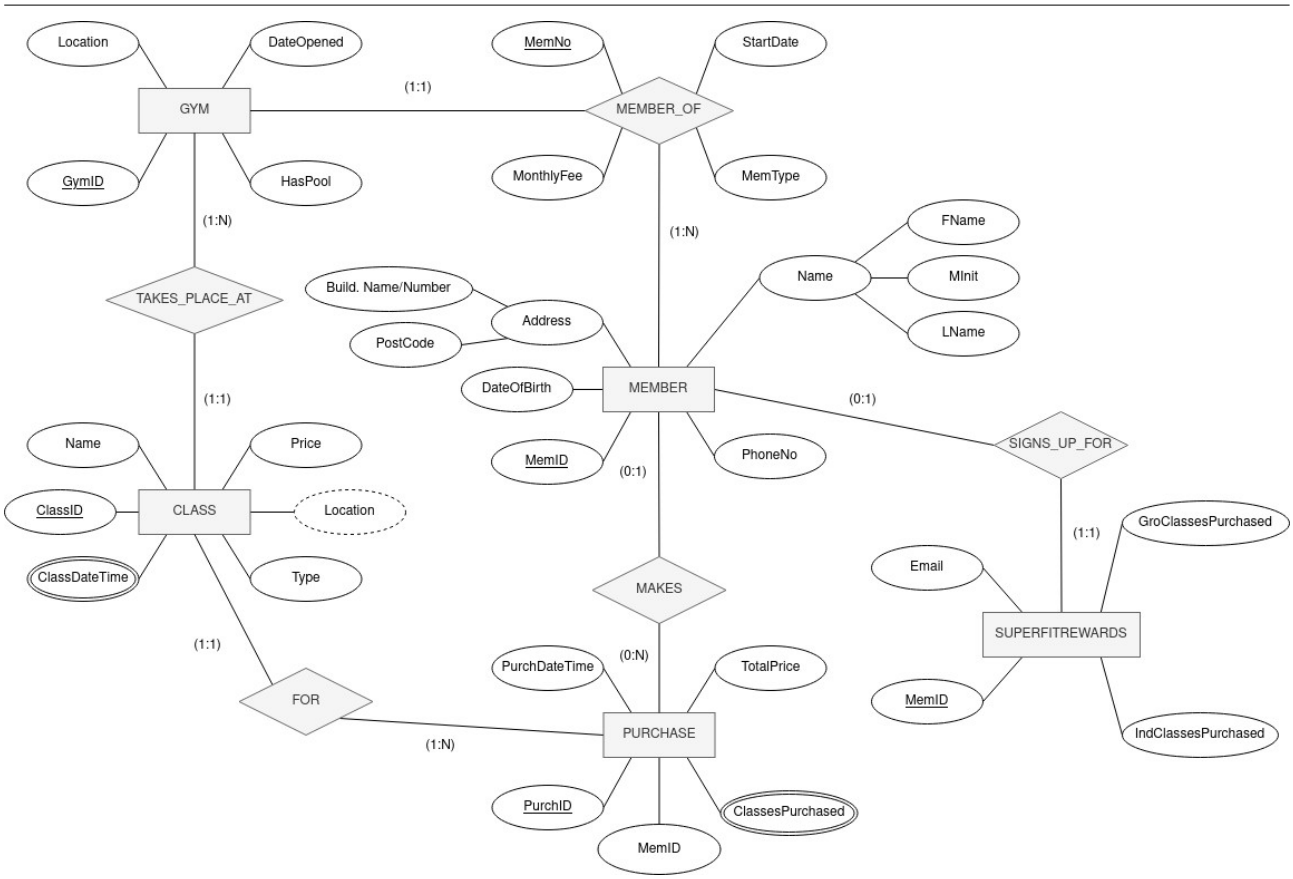
1.1 ER DIAGRAM



1.2 CARDINALITIES AND ASSUMPTIONS

SUPERFITREWARDS

- A MEMBER can SIGN_UP_FOR SUPERFITREWARDS only once.
    - The handling of the free classes offered by SUPERFITREWARDS will be handled by an external program, thus it does not have a relation – it only stores the necessary information for handling the free classes.

MEMBER

- A MEMBER can be a MEMBER_OF many GYMs, but can only have one membership for a particular gym at a time.

PURCHASE

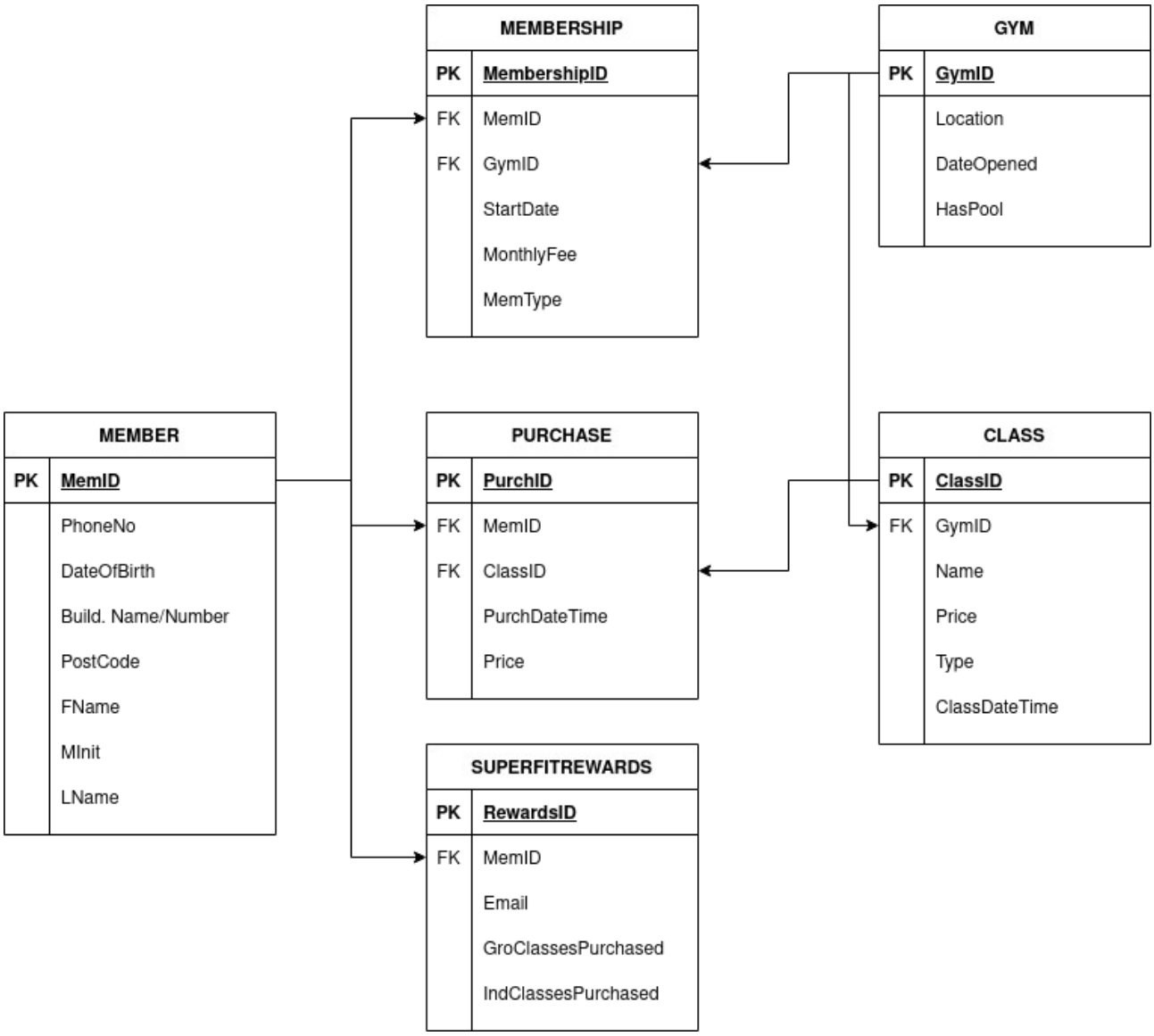
- A MEMBER can MAKE a PURCHASE, which can be FOR multiple CLASSes. It will be recorded
    - The member's information can be accessed from the PURCHASE entity as it stores the MEMBER's MemID, and can be cross referenced.
    - This attribute does not need to be filled, to allow non-members to purchase classes too.

CLASS

- The same CLASS takes can take place many GYMs at different ClassDateTimes.
- The CLASS Name identifies what kind of class it is, therefore multiple instances of the same class can occur, but under a different ClassID.
- The CLASS LOCATION is *derived* by where it TAKES_PLACE_AT. Therefore, it is also a multivalued attribute
- A CLASS's sessions is stored under a single CLASS instance, e.g.:

ClassID	Name	Type	Price	ClassDateTime	Location
13120	0	0	0	01/01/2021 18:00:00	P.E.I
				08/01/2021 16:00:00	P.E.I
				15/01/2021 18:00:00	P.E.I
				22/01/2021 16:00:00	Toronto

1.3 RELATIONAL SCHEMA



1.4 CONSTRAINTS

PRIMARY/FOREIGN KEYS

All primary and foreign keys have been identified in the schema, with PK indicating the primary key, and FK indicating the foreign key.

DOMAIN CONSTRAINTS

MEMBER

```
CREATE TABLE MEMBER (
      MemID                   INTEGER           NOT NULL,
      PhoneNo                 INTEGER           NOT NULL,
      DateOfBirth             DATE              NOT NULL,
      Build.Name/Number       VARCHAR(35)       NOT NULL,
      PostCode                VARCHAR(8)        NOT NULL,
      FName                   VARCHAR(50)       NOT NULL,
      MInit                   CHAR(1),
      LName                   VARCHAR(50)       NOT NULL,
      PRIMARY KEY (MemID)
);
```

- Not everyone has a middle name, therefore `MInit` can be null.
- The `VARCHAR` lengths may need to be extended if there exists a name longer than what the database intends to store.

MEMBERSHIP

```
CREATE DOMAIN MONEY AS DECIMAL(4,2) CHECK (VALUE > 0);

CREATE TABLE MEMBERSHIP (
      MembershipID            INTEGER           NOT NULL,
      MemID                   INTEGER           NOT NULL,
      GymID                   INTEGER           NOT NULL,
      StartDate               DATE              NOT NULL,
      MonthlyFee              MONEY             NOT NULL,
      MemType                 VARCHAR(8)        NOT NULL,
      PRIMARY KEY (MembershipID)
      FOREIGN KEY (MemID) REFERENCES MEMBER(MemID),
      FOREIGN KEY (GymID) REFERENCES GYM(GymID)
);
```

- The `MONEY` domain might be used by other relations, e.g. in `PURCHASE`.

GYM

```
CREATE TABLE GYM (
      GymID                   INTEGER           NOT NULL,
      Location                VARCHAR(35)       NOT NULL,
      DateOpened              DATE              NOT NULL,
      HasPool                 BOOLEAN           NOT NULL,
      PRIMARY KEY (GymID)
);
```

SEMANTIC INTEGRITY CONSTRAINTS

- `MemType` needs to be either ‘GymOnly’, ‘SwimOnly’, or ‘Gym&Swim’, nothing else, as these are the types of memberships Fitness4All offers.
- The domain `MONEY` must be > 0. You can not purchase something with a negative value.
- ‘SwimOnly’ and ‘Gym&Swim’ are only available if `GYM(HasPool)` is `true`. This is because the gym will not offer these memberships if a pool is not available in the facility.