CS564 Group 6
Project stage 1
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Application: FitManage
Description: Managing both members and gym facilities in a fitness environment. We have
members, machines, fitness classes, instructors, staff and facilities in our ER diagram. An
instructor is a staff and each instructor teaches a fitness class; facilities include machines;
members can access multiple machines and join multiple fitness classes; staff manages multiple
machines.

ER diagram:
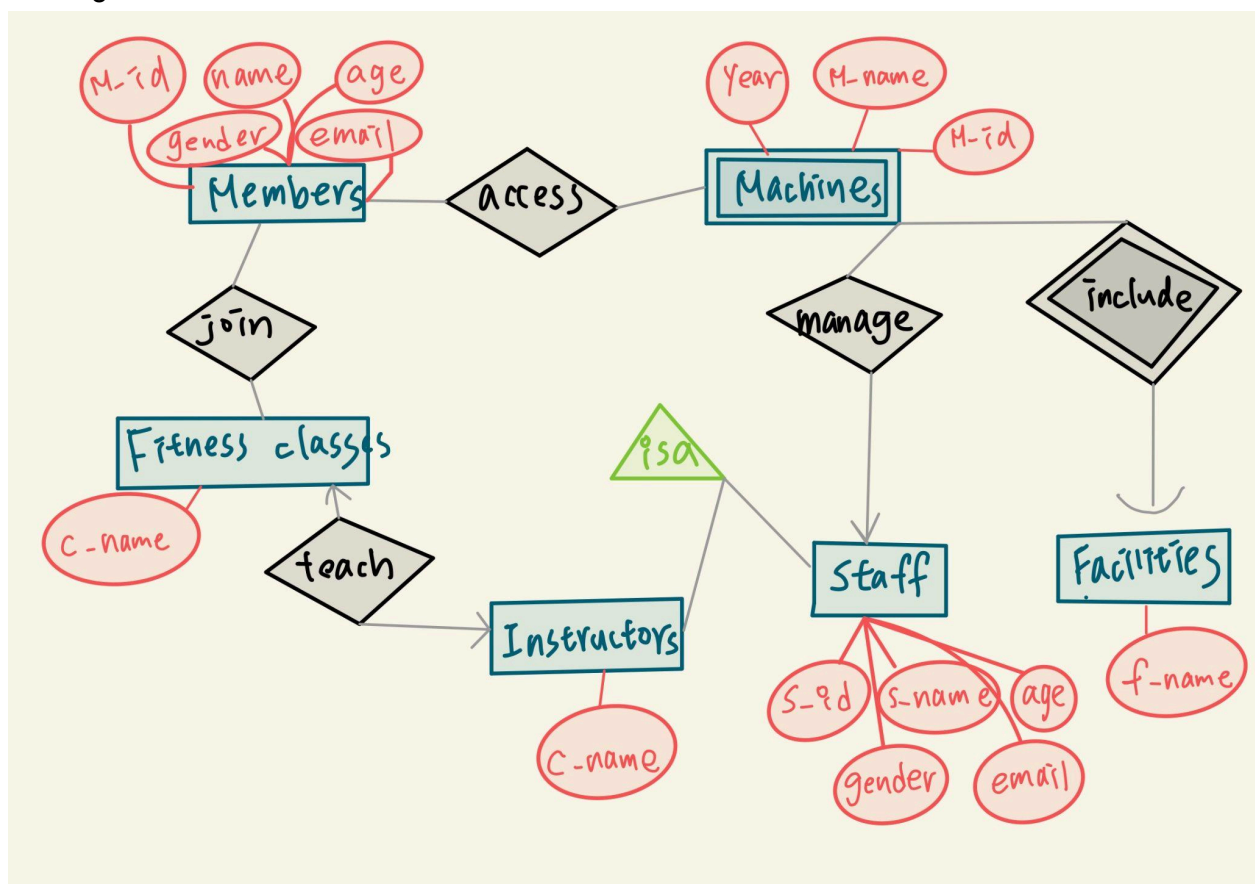
Domain constraints:
- A Member's age is between 16 to 70 years old. A Staff's age is between 18 to 50 years
  old.
- A Member and a staff's gender can be either female or male.
- A Machine's year should be less than 10 years from the current date.

General constraints:

- At most 30 members join the fitness classes.

Single value constraints:
- a staff/member can have only one email.

Entities:
- Members
  - Attributes: Mem_id, name, age, gender, email
  - Primary Key: Mem_id
- Machines (weak entity set of facilities)
  - Attributes: Machine_id, Machine_name, year, F_name
  - Primary Key: (F_name, Machine_id)
  - Foreign Key: F_name (points to facility)
  - Relationship: Machines are part of Facilities
- Fitness classes
  - Attributes: C_name, S_id
  - Primary Key: C_name
  - Foreign Key: S_id (points to instructor)
- Staff (general hierarchy entity)
  - Attributes: S_id, name, age, gender, email
  - Primary Key: S_id
  - Hierarchy: Staff entity with a specialization for instructors
- Instructors (Specialized Staff)
  - Inherits attributes from Staff (S_id, name, age, gender, email)
  - Primary Key: S_id
  - Foreign Key: C_name
  - Specialization: Instructors are part of the staff hierarchy
- Facilities
  - Attributes: F_name
  - Primary Key: F_name

Relationships:
- 1-to-Many: Staff manage Machines
  - Staff(S_id) manages Machines(F_name, Machine_id)
- Many-to-many: Members join Fitness classes
  - Members(M_id) join Fitness Classes(C_name)
- 1-to-1 instructors teach classes
  - Instructors(S_id) teach Fitness Classes(C_name)
- 1-to-Many: Facilities include Machines
  - Facilities(F_name) include Machines(F_name, Machine_id)
- Many-to-Many: Members access Machines
  - Members(Mem_id) access Machines(F_name, Machine_id)
- is-a hierarchy: Hierarchy instructor is under staff (Use ER style)
  - Instructors (S_id, C_name) is a staff (S_id, S_name, age, gender, email)
- Weak entity set: Weak entity set machines are an entity set of facilities

- Machines (F_name, M_id, M_name, year, S_id) depends on Facilities(F_name)

Schema:
- Members(<u>Mem_id</u>, name, age, gender, email)
- Facilities(<u>F_name</u>)
- Machines(<u>F_name, M_id</u>, M_name, year, S_id)
- Staff(<u>S_id</u>, S_name, age, gender, email)
- Fitness Classes(<u>C_name</u>, S_id)
- Join(<u>Mem_id, C_name</u>)
- Access(<u>Mem_id, F_name, Machine_id</u>)
- Instructor(<u>S_id</u>, C_name)

Contribution:

Tzu-Hsuan:

1. Formulate the partial schema.
2. Come up with the entity relationships.
3. Check the work with the TA.
4. Create an ER diagram.
5. Add domain constraints.

YuWei:

1. Formulate the partial schema.
2. Come up with the entity relationships.
3. Check the work with the TA.
4. Add domain constraints.

Una:

1. Come up with the database subject.
2. Formulate the partial schema.
3. Come up with the entity relationships.