The ARC is a recreation center with a variety of spaces and equipment. It has a front desk, a cardio room, a weight room, a pool, a yoga studio, and a basketball court. All the spaces have a maximum capacity listed. The cardio room has treadmills, ellipticals, and stair climbers. The weight room has weight machines and free weights. The pool has a lap pool and a leisure pool. The yoga studio has mats and blocks. Each of the above equipment -- weight machine, weights, hoop, blackboard, treadmill, elliptical, stair climber has a unique equipment id, which is an integer. Also, each equipment can be either in-use or is available. If the equipment is in use, it has one person listed as a user. Besides the above spaces listed, all other spaces in ARC are known as "other".

People in ARC can either be members or employees. Members can be either students, faculty, university staff, alumni, or family of another member. Students, themselves can be either graduate or undergraduate students. Associated with each member is a name, address, payment information and list of enrollments. Employees can be student employees. Each employee has an employee id number, and a schedule when they are at ARC. The employees are designated as trainers or desk employees.

All visitors to the ARC (both members and employees) swipe in to enter the ARC premises. The entry times are logged into a timekeeping system. The exit times of all the employees are also logged.

ARC has a variety of sensors that monitor the facility. Location sensors track the location of people within ARC. Occupancy sensors track the occupancy of spaces within ARC. Equipment usage sensors track when people are using equipment. Only members of ARC can use equipment at ARC.

To illustrate how the sensor system in the ARC works, consider the following example of a day at the ARC. A graduate student named John enters the ARC at 2pm - his original location observed by the sensor is "front-desk" at 2pm. He then moves through corridors after checking in at 2:01pm. Since the corridor is not explicitly identified by a name, the system marks John at the location "other" at 2:01. He enters the "weight room" at say 2:03pm for a workout. This causes the location sensor to trigger an event that John entered the weight room at 2:03. Let us assume that John uses a weight machine sometime after entering the weight room. The equipment usage sensor will detect then John starts using the weight machine W and sends a signal to the ARC's computer system. Assume that a little later John stops using the weight machine. This will trigger the equipment usage sensor to send a signal that the specific weight machine W is now free. Likewise, when John starts using a free weight, the equipment sensing system will raise a trigger about the weight being used by John. When John leaves the weight room, the location sensor will update his location to the new location where he moved to.

The ARC organizes events such as yoga classes. Events occur at a given location in the ARC and have a maximum capacity, a starting time and an end time. The capacity of the event must be less than or equal to the maximum occupancy of the location where the event is organized. Example of an event is a Yoga class which may occur at the yoga studio. Members of the ARC can register for ARC events. For instance, an undergraduate student named Mary may be taking a yoga class in the yoga studio. Same as with the case of John, when Mary enters the yoga room for her yoga class, the system will send a signal to the ARC's computer system, which records her location and the time.

In another part of the facility, a faculty member named Professor Smith is swimming laps in the pool. She is using a lap lane to avoid distractions. Each lane has an associated lane sensor which will detect Prof. Smith in the lane she is at. It will send a signal to the ARC's computer system, which updates the lane as occupied.

At the front desk, a staff member named Jane checks the membership status of people when they enter the ARC. Jane has an associated schedule when she arrives and when she leaves. Her location will be detected similar to that of members as she goes through different parts of ARC. Note that Jane, in the example, is a non-member but she is an employee of ARC. In general, employees can also be members.