F28DM Report
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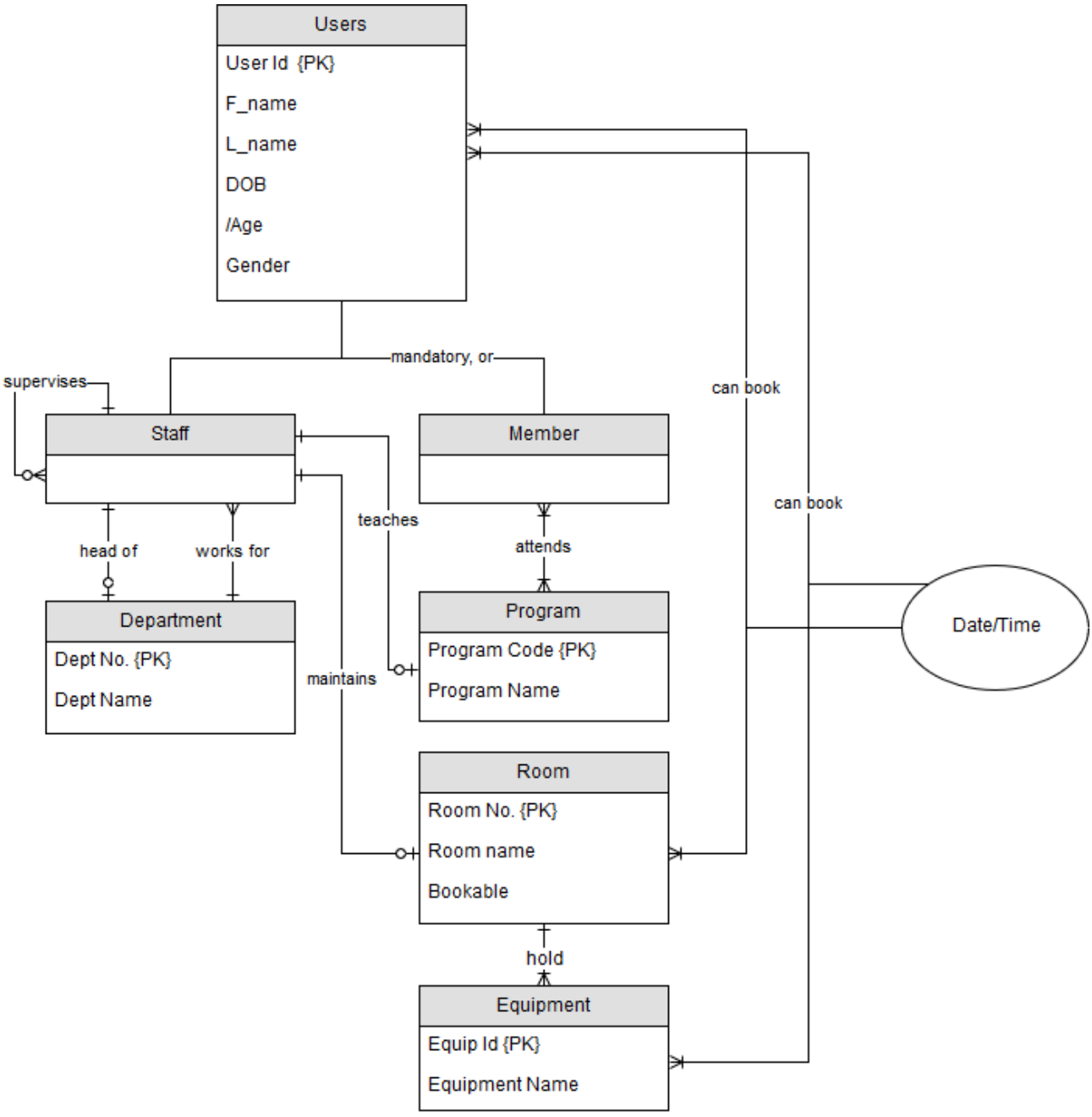
Task: “A sports center needs a booking system to manage members and allow them to book rooms and equipment.”

Diagram



Scenario

A Member visits the Sports Center and uses our application to enroll in a single program, this program is taught by a member of staff. Each staff member is part of a different department which is headed by a Department manager. Staff also report to a Supervisor who is a member of staff. Each room is maintained by a staff. After the program the member wishes to train on their own. Using the Booking system he reserves a private room to train in and books time with a piece of equipment. Some public use rooms are unavailable and if a room has not been maintained then it is

unavailable as well.

Relational Schema

Departments *(deptID, deptName, headId)*

Room (roomID, roomName, roomSize, *maintainerID*, available)

Equipment (equipmentId, equipmentName, *RoomID)*

Program (programID, programName, *trainerId*, available*)*

Bookings_room (*roomID*, start_time, end time, *memberID*)

Booking_equipment (*equipmentID*, start_time end time, *memberID*)

Member (memberID, firstname, lastname, dateOfBirth, gender)

Program_member(*memberID*, *programID*, completed)

Staff (staffID, firstname, lastname, gender, dateOfBirth, *deptID*, *supervisorID)*

Relationships

Staff teach Programs.(1 to 0...1)
Staff work for Departments.(M to 1)
Staff supervise other Staff. (1 to 0...M)
Staff head Departments (1 to 0...1)
Staff maintain Rooms (1 to 0...1)
Staff are Users.(Mandatory or)
Members are Users.(Mandatory or)
Members attend Programs.(1..M to 1..M)
Rooms hold Equipment.(1 to 1..M)
Users make Bookings (Room/Equipment).(1..M to 1..M)

Decision explanation (ER to Schema)
Attendance was made into a foreign key table to reduce attributes/repeated data.
Booking table could not be shown in the ER diagram as it is an attribute attached to a relation.

Data Dictionary

Indexes

It was decided that composite search terms would be used as secondary indices due to the primary reason that all Foreign keys were indexed already by MySQL. Moreover, there was a lack of feasible individual attributes that could be indexed hence the above choice.

The indices, program_trainer, equipment_room, equipment_member, room_member, were chosen since they had a high probability of being frequently composite searched.

For example, equipment/rooms that are booked by a particular member might be of interest to staff thus it has a high probability of being searched often hence the equipment_member and room_member indices were created.

The indexes, staff_names and member_names, were chosen since the two columns together are unique and thus indexing those columns would result in a more efficient search.