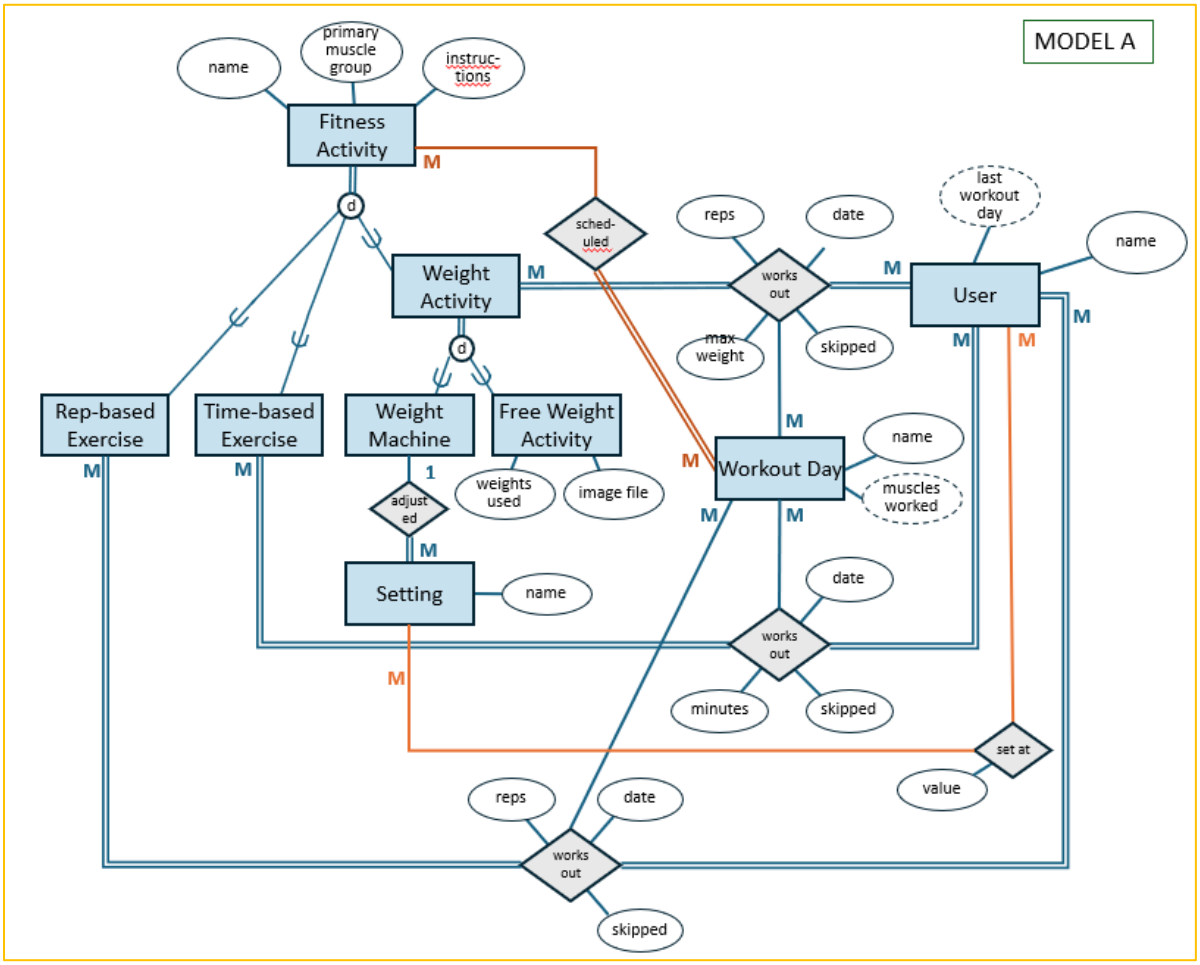
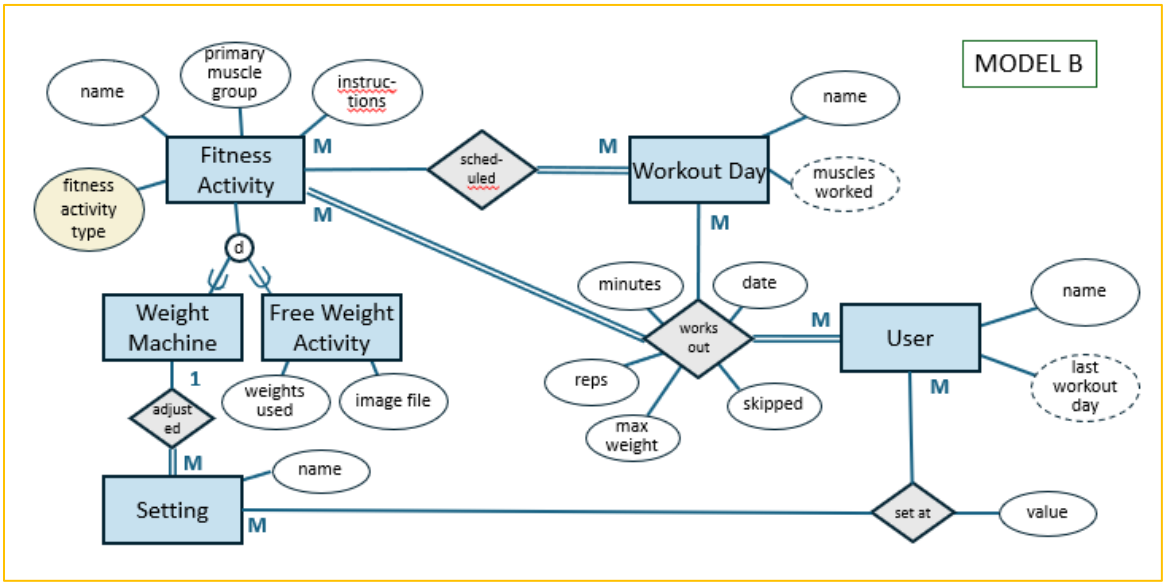
Fitness Application Project
Database Construction

In elvis, under your username, you will create tables to support a fitness application project. Here are two EER diagrams, one of which you will use to build the tables. Please pay attention to the cardinalities and the entity participation levels.





Instructions:

1. Answer the following design questions:

    1.1. What are the implications of the participation levels in the Workout Day – Fitness Activity relationship?

    1.2. Why are the Weight Machine and Free Weight Activity entity types correctly depicted as a subclasses?

    1.3. In Model A, the Weight Activity entity type is both a superclass and a subclass. Why did the database modeler not make the Weight Machine and Free Weight Activity entity types direct subclasses of Fitness Activity thereby eliminating the Weight Activity entity type?

    1.4. Model A is the most complicated, but also the most precise. What advantage does it have over Model B? What disadvantage does it have over Model B?

    1.5. In Model B, what kind of attribute is "fitness activity type"? Why does Model B require this attribute? How can Model B achieve the precision of Model A?

2. Design the physical database from the EER diagram (Model B) above. Please note the following:

    - We want a controlled vocabulary on the primary muscle group. 'back', 'biceps', 'chest', 'triceps', 'legs', 'core', and 'shoulders' are all legitimate. But so is 'multiple' for activities like swimming.

    - How should we handle the fitness activity type?

    - Also for the free weights, we want a controlled vocabulary on the type of weights. 'Barbell', 'Dumbbells' and the 'EZ Curl Bar' are the only types currently in use.

    - Pay close attention to which fields should be nullable and which ones should allow nulls.

3. After your initial design, your customer decides that they would like the fitness activities listed in a recommended order for each workout day. Alter the database to accomplish this.

4. Create the tables in elvis under your account with primary and foreign key constraints. Show the table creation logic using "SHOW CREATE TABLE <tablename>"

5. Be aware that if you delete a weight machine, you should also automatically delete all of its settings.

6. Populate the tables with the data on the next page. A helpful spreadsheet can be found here: http://jackmyers.info/db/exercises/undergrad/fitnessActivityData.xlsx

7. Reverse engineer the database to produce a physical database diagram.

Please submit:

1. A Word file with your answers to questions 1.1 to 1.5 plus all the create table commands

2. An image of your physical database diagram.

Fitness Application Data

Most data on Fitness Activities is held in the Excel spreadsheet mentioned above. Here are some more data elements to add to your database.

name	weights_used	image_file
Barbell Bench Press	Barbell	
Bicep Curls	Dumbbells	
Concentration Curls	Dumbbells	concentration-curls.webp
Dead Lifts	Barbell	deadlift.webp
Double Explode Incline Press	Dumbbells	
EZ Bar Curls	EZ Curl Bar	ez-bar-curls.webp
EZ Preacher Curls	EZ Curl Bar	ez-preacher-curls.webp
Front Raise	Dumbbells	front_raise.gif
Hammer Curls	Dumbbells	hammer-curls.webp
Incline Barbell Press	Barbell	
Lateral Raise	Dumbbells	lateral_raise.gif
Shoulder Press	Dumbbells	shoulder_press.webp
Zottman Curls	Dumbbells	zottman-curl.gif

In addition, create two users in the system.

Name one of them 'chris'

The settings for the weight machines used by Chris

name	setting_name	setting_value
Cable Crossovers	cable height	8 holes showing from top
Hammer Strength Leg Extension	divergent angle	2 holes showing from top
Hammer Strength Leg Extension	start position	L
Hammer Strength Leg Extension	back position	up to the back of the seat
Lateral Pull Down	leg height	4
Pectoral Fly	seat height	aligned with chest
Pectoral Fly	range of motion	3
Prone Lying Leg Curl	start position	L
Prone Lying Leg Curl	divergent angle	B
Seated Leg Curl	start position	L
Seated Leg Curl	thigh pad	restricting but comfortable
Seated Shoulder Press	seat height	5
Standing Calf Raise	shoulder height	5
Torso Rotation	chest height	5

The activities scheduled for each workout day (named Day One, Day Two…)

workout_day	activities
Day One	Barbell Bench Press, Elliptical, Front Raise, Incline Barbell Press, Lateral Raise, Pectoral Fly, Treadmill, Tricep Cable Push Down
Day Two	Assisted Pull Ups, Concentration Curls, Dead Lifts, Elliptical, EZ Bar Curls, Hammer Curls, Seated Cable Row, Seated Shoulder Press, Treadmill
Day Three	Elliptical, Heel Touchers, Oblique Crunches, Prone Lying Leg Curl, Russian Twists, Seated Leg Curl, Seated Leg Press, Standing Calf Raise, Treadmill
Day Four	Cable Crossovers, Double Explode Incline Press, Elliptical, Front Raise, Lateral Raise, Seated Cable Chest Press, Treadmill, Tricep Cable Push Down
Day Five	Assisted Pull Ups, Dead Lifts, Elliptical, EZ Bar Curls, EZ Preacher Curls, Seated Cable Row, Treadmill, Zottman Curls
Day Six	Crunches, Elliptical, Planks, Prone Lying Leg Curl, Seated Leg Curl, Seated Leg Press, Standing Calf Raise, Torso Rotation, Treadmill