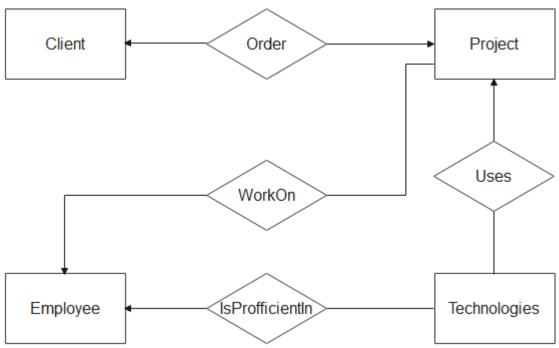
## **Assignment 3 ER**

1. (40 points) Problem: You are building a project management database for a software company. The company works for a number of outside clients. For each client we know the company name, corresponding address, contact phone, email and fax number, and the name of the contact person. The software company works on a number of projects. Each project has a code name, date of inception, date of completion, and budget. Each project had been initiated by exactly one client.

The projects involve various technologies (e.g., Java, .Net, C++, Python, Embedded programming, etc.). The company keeps a list of technologies it employs on its projects. With each technology, you need to store the year it was first used in the company, and a total number of projects on which this technology was used.

The database also keeps track of the employees working for the company. For each employee, the database must contain information about his/her ID, name, date hired, current position and salary. Each employee is proficient in one or more of the technologies the company uses on the projects. Each employee also works on one or more projects. For each project, the percentage of effort the employee spends on it must be recorded (e.g. an employee John Smith works for three projects, A, B and C at present time, with 40%, 30% and 30% of his time devoted to each project respectively).

The E-R diagram for the problem is shown below:



Design a relational database for the provided E-R diagram. Your database must be a mapping of the E-R diagram.

- 1). Specify the complete list of relational tables in the database.
- 2). For each table, specify its schema (including attributes and their data types), indicate the primary key for each table with an underline.
- 3). Write the SQL create table statement for each table using DDL, indicating foreign keys and any other important constraints (not null, key).
- 4). Generate an ER diagram using workbench reverse engineering. Compared to the ER diagram provided above, any difference?
- 2 (60 points) You are hired to build a database for a local association of realtors. The database has to contain information about the properties that are for sale in the area, realty agencies and agents, as well as keep track of the history of property sales. In particular, you are told the following about the desired database:
  - The database has to contain information about the realty agencies. Each agency has a name, address and a phone number.
  - The database also must have a list of all realty agents. For each agent, the database stores his/her name, phone number and the agency of employment. Each agent works for exactly one agency.
  - The key part of the database is the property listing. Each property offered for sale has the following information associated with it: unique list number, list date, current price, property address, seller's name, type (house, townhouse, condominium), number of bedrooms, number of bathrooms, number of floors, square footage, age, and how many cars can fit in the garage (0 = no garage). In addition, each property is being sold by exactly one realty agency, and within the agency, by exactly one agent.
  - The database must also store all the property transfers (sales) that have already occurred. Each property may transfer several times, and a transfer consists of the list number, date of property transfer, names of the buyer and the seller, name of agent and name of agency where the agent works for the transfer and the purchase price.
- 1) Specify all entity sets present in the database. For each entity set, specify its **attributes** and indicate the **primary key with underline**.

- 2) Specify all relationship sets present in the database. For each relationship set, specify the entity sets it associates with each other and any additional attributes that may be needed.
- 3) Specify any constraints present in the database.
- 4) Draw the ER diagram of the database you are proposing to build.
- 5) Write the SQL create table statement for each table using DDL.
- 6) Generate an ER diagram using workbench reverse engineering. Compared to ER diagram you created in step 4, any difference?