Database Beavers, Inc.

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URL: http://flip1.engr.oregonstate.edu:4221/
Feedback:

Wanjing Chen, Johnny Li, Brayden Aldrich

Noted the lack of ER diagram in my previous step. We included it in this one.

Cody Renfro, Martin Hill

A suggestion two people made was adding a foreign key between salary entries and employee entries to easily allow an easy look-up. I think this is a great suggestion, where each employee would have a current_salary attribute, but I'm not sure how to implement this without potentially introducing data inconsistencies since each employee may have multiple entries in the salaries table.
To clarify, the idea behind this is that each employee's salary history can be recorded, with the current salary for an employee being the one with the most recent effective_date attribute (this would be the salary that the FK current_salary would connect to). Importantly, this also allows for a manager to easily query how much an employee should be paid over any period of time, regardless of how many times their salary changed during that period, as you could apply the different pay rates to their corresponding times.

Actions based on Feedback:

- Added the ER diagram

Upgrades to the Draft Version:

- Changed the values of some attributes to better reflect their possible values. For example, pay_amount is now unsigned since nobody would receive a negative wage.

Overview:

The following proposal is for a database that will be used by the company “Beavers for Better” or BB. Beavers for Better is a company of 230 employees that focuses on creating custom-made, state-of-the-art robotic solutions for their clients. Though they are exceptional at creating these solutions, they have found that their current organization methods are causing problems; namely, projects are being completed late due to misunderstandings about who is, or will be, working on a project.
Additionally, as the company continues to grow, managers want a system that tracks how many hours each employee is working and what projects they are working on; they hope such a system can help them keep track of employees, give them insights into their workflow, and provide better estimates to clients regarding how long a project will take.

All-in-all, Beavers for Better wants a database that will track employees, the projects employees are working on and how long they are working on them, and each employee’s payroll.

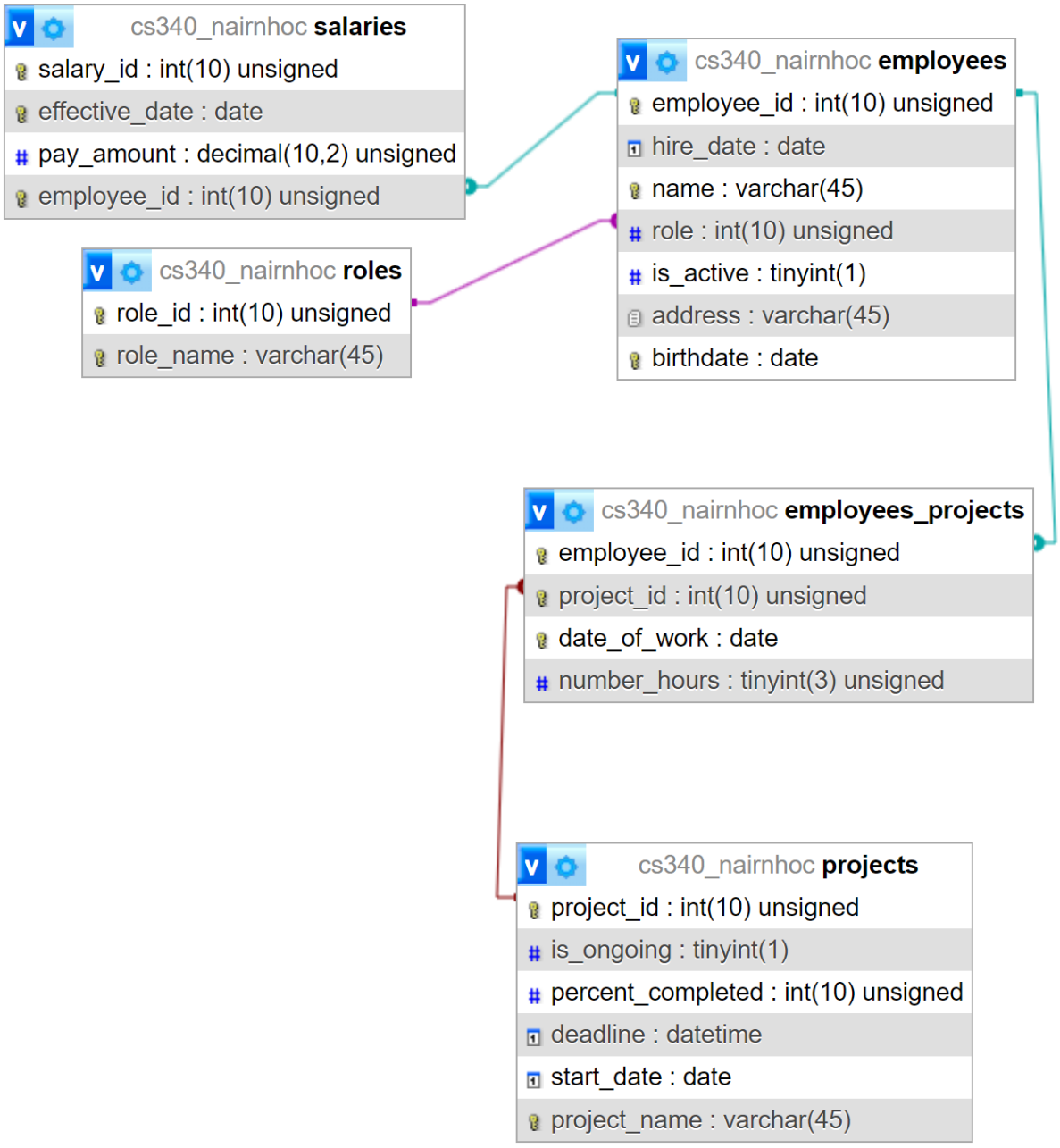
Database Outline:

- **employees:** The records and employment data of those employed past and present
  - *employee_id*: int, unsigned, PK, NN, UQ, AI
  - *hire_date*: date, NN
  - *is_active*: tinyint, unsigned, NN
  - *name*: varchar, NN
  - *address*: varchar
  - *birthdate*: date, NN
  - Relationships with
    - **roles**
      - Cardinality: 1:M implemented with *role_id* as a foreign key in **employees** table
      - Participation: Mandatory for **roles**, not mandatory for **employees**
    - **salaries**
      - Cardinality: 1:1 implemented with *employee_id* as a foreign key in **salaries**
      - Participation: Mandatory for **salaries**, not mandatory for **employees**
    - **projects**
      - Cardinality: M:N implemented with *employee_id* and *project_id* as foreign keys of a composite entity **employees_projects**
      - Participation: Not mandatory for **employees**, not mandatory for **projects**

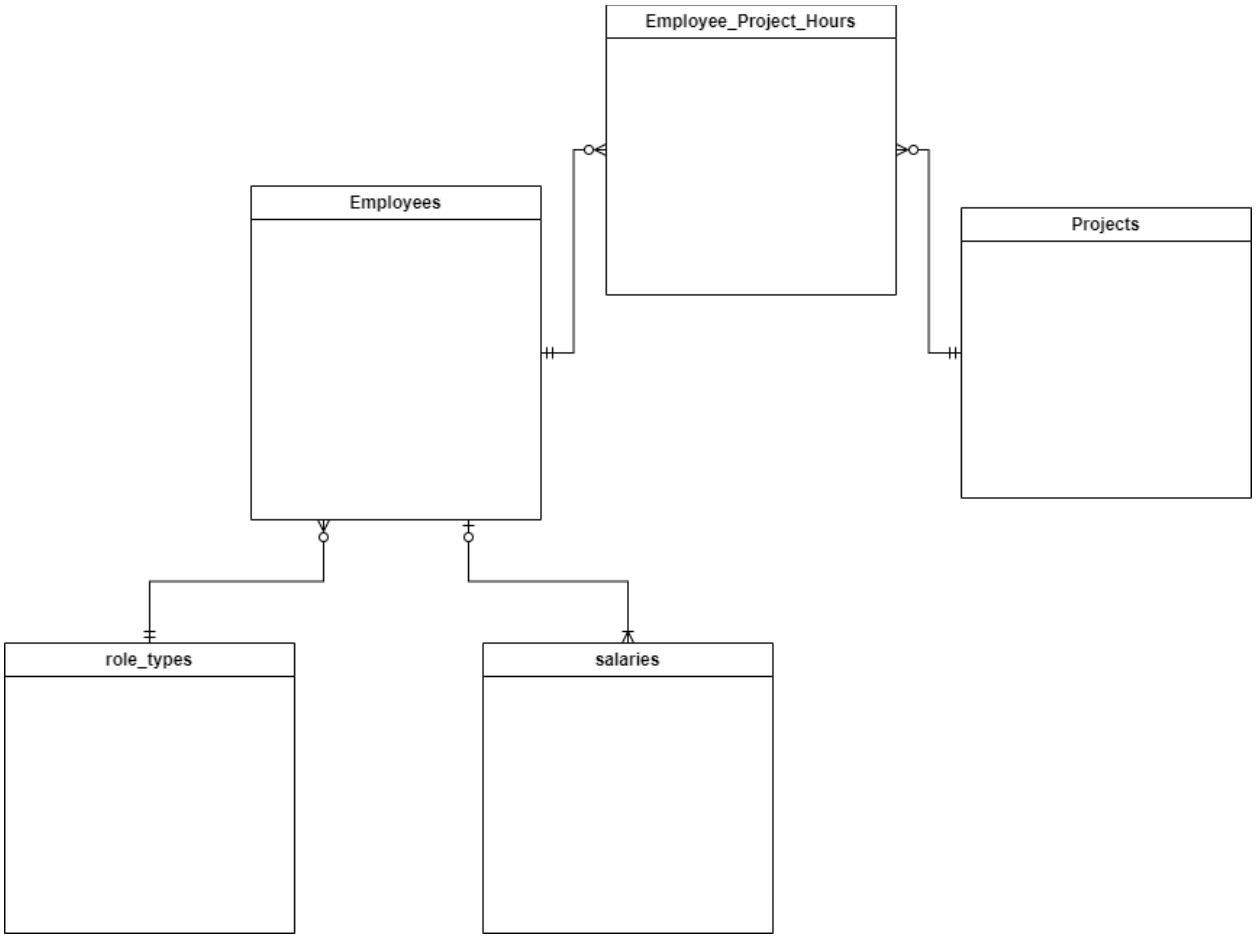
- **roles:** The job type employees are hired to fill
  - *role_id*: int, unsigned, PK, NN, UQ, AI
  - *role_name*: varchar, NN
  - Relationships with

        - **employees**
            - Cardinality: 1:M implemented with *role_id* as a foreign key in **employees** table
            - Participation: Not mandatory for **employees**, mandatory for **roles**
- **projects:** All projects the company has ever assigned an employee to
    - *project_id*: int, unsigned, PK, NN, UQ, AI
    - *project_name*: varchar(255), NN
    - *start_date:* date, NN
    - *deadline:* date, NN
    - *is_ongoing*: tinyint, NN
    - *perecent_completed*: int, unsigned
    - Relationships with
        - **employees**
            - Cardinality: M:N implemented with *employee_id* and *project_id* as foreign keys of a composite entity **employees_projects**
            - Participation: Mandatory for **projects**, not mandatory for **employees**
- **salaries:** All pay rates an employee has ever had
    - *salary_id*: int, PK, NN, UQ, AI
    - *effective_date*: date, NN
    - *pay_amount*: decimal(10,2), NN
    - employee_id: int, unsigned, NN
    - Relationships with
        - **employees**
            - Cardinality: 1:1 implemented with *employee_id* as a foreign key in **salaries**
            - Participation: Not mandatory for **employees**, mandatory for **salaries**
- **employees_projects:** A composite entity used to track employee and project relationships as well as employee hours spent on a project
    - *employee_id*: int, PK, NN
    - *project_id*: int, PK, NN
    - *date_of_work*: date, PK, NN
    - *number_hours*: tinyint, unsigned, NN
    - Relationships with
        - **employees**
            - Cardinality: 1:M implemented with *employee_id* as a foreign key in composite entity **employees_projects**
            - Participation: Mandatory for **employees**, not mandatory for **employees_projects**
        - **projects**
            - Cardinality: 1:M implemented with *project_id* as a foreign key in composite entity **employees_projects**
            - Participation: Mandatory for **projects**, not mandatory for **employees_projects**

Schema


cs340_nairnhoc salaries
salary_id : int(10) unsigned
effective_date : date
pay_amount : decimal(10,2) unsigned
employee_id : int(10) unsigned
cs340_nairnhoc employees
employee_id : int(10) unsigned
hire_date : date
name : varchar(45)
role : int(10) unsigned
is_active : tinyint(1)
address : varchar(45)
birthdate : date
cs340_nairnhoc roles
role_id : int(10) unsigned
role_name : varchar(45)
cs340_nairnhoc employees_projects
employee_id : int(10) unsigned
project_id : int(10) unsigned
date_of_work : date
number_hours : tinyint(3) unsigned
cs340_nairnhoc projects
project_id : int(10) unsigned
is_ongoing : tinyint(1)
percent_completed : int(10) unsigned
deadline : datetime
start_date : date
project_name : varchar(45)

ERD


Employee_Project_Hours
Employees
Projects
role_types
salaries

Sample Tables

Employees Table

employee_id	hire_date	name	role	is_active	address	birthdate
1	12/31/2020	Benny Beaverton	1	1	5551 NW Harrison Blvd	10/6/1990
2	12/31/2020	Blaid Beaverton	2	1	5551 NW Harrison Blvd	11/4/1992
3	3/1/2021	Oregon Duck	5	0	2555 SE Portland Ave	10/6/1990
4	12/31/2021	Roger Smith	6	1	8750 Rocky Way	5/5/1995

Employee Project (employee_project) Table

employee_id	project_id	date_of_work	number_hours
1	3	1/1/2020	7
1	3	1/2/2020	9
1	3	1/3/2020	8
2	3	1/1/2020	4
2	3	1/2/2020	9
2	3	1/3/2020	10
3	3	1/1/2020	1
3	3	1/3/2020	2

Projects Table

project_id	is_ongoing	percent_completed	deadline	start_date	project_name
1	1	85	2/12/2024 0:00	11/20/2022	OSURC Autonomous Mars Rover
2	1	10	10/19/2024 0:00	5/4/2023	Cryptic Technomancer
3	0	100	1/1/2023 0:00	1/1/2020	Wall-E

Roles Table

role_id	role_name
11	AI Systems Specialist
1	CEO of Beavers for Better
5	Electric Engineer
8	Head of Communications
10	Kinesthetics Specialist
3	Mechanical Engineer
4	Senior Electric Engineer
2	Senior Mechanical Engineer
6	Senior Software Engineer
7	Software Engineer
9	Technical Writer

Salary Table

salary_id	effective_date	pay_amount	employee_id
1	12/31/2020	18	1
2	12/31/2021	22	1
3	12/31/2022	30	1
4	12/31/2020	18	2
5	12/31/2021	23	2
6	12/31/2022	34	2
7	3/1/2021	18	3
8	3/1/2022	18.01	3
9	12/1/2022	18.02	3
10	12/31/2021	22	4
11	12/31/2022	32	4