Task1

1.1 Stakeholders and queries

1.Staff member:

query1: How long they worked on a particular project?

query2: How much income do a part-time staff get?

2.Project funding body:

query1: Retrieving the total budget that they are investing on the project?

query2: Which employees are working on a specific project?

3.Department

query1: Which staff members from our department are involved in EU-funded projects?

query2: what the staff's specific role in a project?

1.2 Data specification

- Staff: staff ID(primary key), name, job title, email, postal address, phone number, percentage of time

  Constraints: staff ID should be unique; phone number is a multivalued attribute; name is a composite attribute; project ID is a foreign key to project entity.

- Department: abbreviated name (primary key), department's full name, email, website, postal address, phone number

  Constraints: abbreviated name is unique; phone number is a multivalued attribute.

- Project: project ID (primary key), project name, budget, start dates, end dates, project days(), funding body, original currency, exchange rate

  Constraints: project ID is unique, project days() is a derived attribute
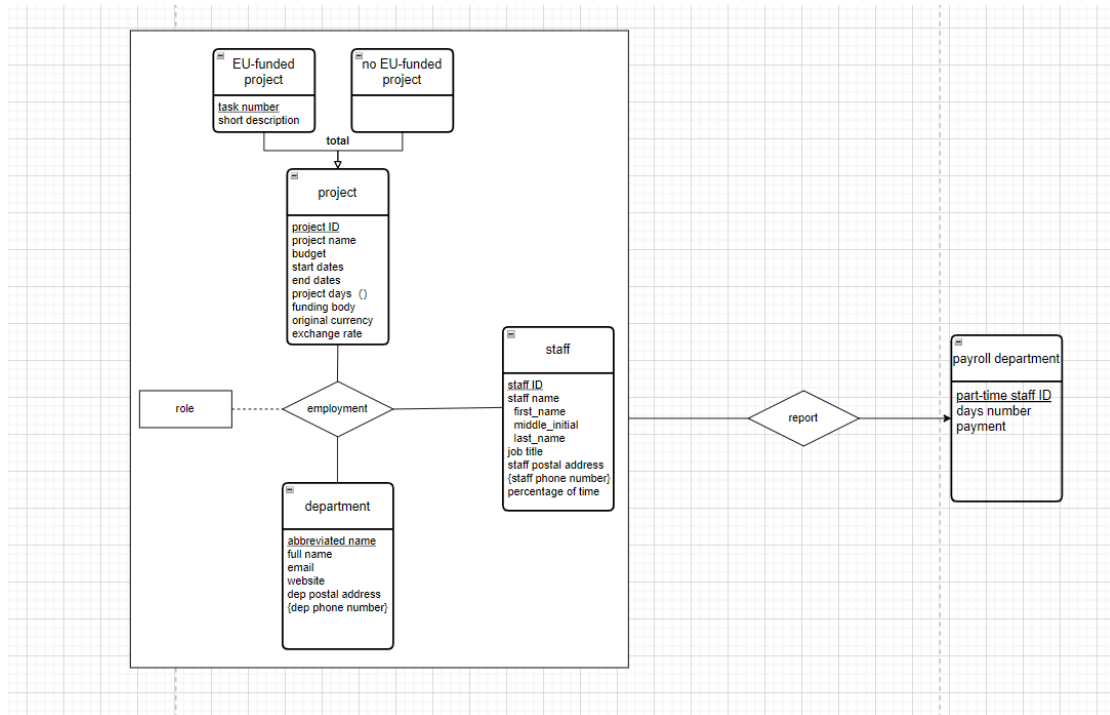
- payroll department: part-time staff ID (primary key), days number, payment

  Constraints: part-time staff ID should be a foreign key of this entity.

- EU-funded: task number (primary key), short description

  Constraints: task number is unique.

Task2

2.1

2.2

1.Staff member:

query1: according to the project ID and the staff ID, they will find the data in the staff entity through the relationship of employment.

query2: according to the part-time staff ID and days number, in the payroll department, a staff could know how much salary they will get.

2.Project funding body:

query1: In the project, if the funding body want to calculate the total budget, they can filter the funding body attribute and find out all of project ID that they invest, then sum all the budgets.

query2: because the project ID is the foreign key of the staff entity, according this attribute, they will know the specific staff ID and name of staff who works in a particular project.

3.Department

query1: according to the task number of the EU-project entity, they will know the corresponding project ID and then get the exact staff ID in the staff entity. Finally, they will know who is employed by EU-funded project.

query2: Through the employment relationship, they will get one staff's role from the Relationship Set called role.

Task3

Through this ER diagram modeling process, I found that I can easily identify the primary keys of entities and find out the relationships between entities. It can also determine whether an entity needs specialization. However, I still encountered many challenges when building the ER model diagram, so that I made many modifications for my initial version.

Firstly, the question is to determine whether a ternary relation set is needed. I found that if I choose a binary model, I will need three sets of relationships to describe their connections, which will make the entire model very complicated. Therefore, I chose the ternary relation set model because what exists between these three entities is an employment relationship. The second question is to determine whether the three-dimensional model needs to be aggregated. After thinking about it for a long time, I found that sometimes the combination of these three entities may not produce reports. Because some staff are not employed or their working days are 0. The third problem is that I am not very good at judging one-to-many, one-to-one, and many-to-many relationships. I always turn to my class notes or the book called Database System Concept to help me judge, because they have examples and detailed explanations.

In addition, when discussing with my classmates, I found that the model I built was very different from theirs. This would make me question whether my model is correct and whether I should follow their discussion. When I went back to the book to look for theoretical basis, I found that my ideas seemed to be in line with the explanations given in the book, so I chose to believe in my ER model and hoped that the teacher would point out the deficiencies in the feedback.

Last but not least, there is still a big gap between learning-related theory and practice. Because when learning theory, we all think about the application of theory from some simple examples, but the problems and conditions encountered in actual situations are more complex. For example, when I built the entity called payroll department, I found that this entity did not have a primary key, so I chose set a new primary key called part-time staff ID. In addition, the description of the theory is abstract and sometimes difficult to understand. For example, in the section of generalization and specialization, there are many concepts, such as superclass and s. For me, it is difficult to understand without the assistance of specific examples. I hope that taking this course will help me understand the world of databases through more realistic examples.