

**CZ2007 INTRODUCTION TO DATABASE SYSTEMS**

**LAB 1 ASSIGNMENT**

ER DIAGRAM & WRITTEN DISCUSSION OF SOLUTION (GROUP 2)

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**Reasons (with assumptions) for Chosen ER Diagram**

1. We used a **Person** Entity (Superclass) which consists of the shared attributes of the entities, **Stakeholders**, **Professors**, **Students** and **Staff** (Subclasses – ‘is-a’ relationship).
2. Every person is identified by its unique identifier *“Person\_ID”* (we presumed it to be NRIC), but each subclass will have its own extra identifier, which will be used for queries relating to a specific subclass. As such, we added the attribute “*Stakeholder\_ID”* to the **Stakeholder** Entity and *“Professor\_ID”* to the **Professor** Entity.
3. **Undergraduate** and **Graduate** exists as a subclass of **Students**; **Technical** and **Administrative** exists as a subclass of **Staff**; **Research Lab** and **Teaching Lab** exists as a subclass of Laboratory
4. We added a **School** Entity with *“School\_Name”* as its unique identifier to identify the different faculties in the University (E.g. School of Computer Science and Engineering; Nanyang Business School.
5. As a person can belong to more than one school (e.g. A student taking a double degree can belong to two schools (SCSE and NBS), we added a “belong” relationship (M:M) between the **Person** and **School** Entity to identify the school(s) that the person belongs to.
6. As each technical staff can be assigned to at most 1 laboratory, we used a “assign” relationship (1:M) between the **Technical** and **Laboratory** Entity.
7. As there can be laboratories with the same *“Lab\_Name”* but in different schools, we set **Laboratory** as a weak entity associated with the entity set **School** and thus the *“Lab\_Name*” (from **Laboratory** Entity) and *“School\_Name”* (from School Entity) will form a joint identifier for each laboratory.
8. Instead of identifying each equipment using only the name and school of the laboratory, we set *“Equip\_ID”* (from **Equipment** Entity), *“Lab\_Name”* (from **Laboratory** Entity) and *“School\_Name”* (from **School** Entity) as the joint identifier for each equipment.
9. We added a unique identifier, *“Course\_ID”,* to the **Course** Entity to uniquely identify each course.
10. We assumed that a School can offer many courses and a Course must be offered by a School. As such, this is a case of referential integrity between the **Course** and **School** Entity.
11. We assumed that a course (E.g. Introduction to Database Systems) can have many classes (E.g. Different Class Index) and thus we created a **Class** Entity with *“Class\_ID”* as its identifier to capture the different class indexes of courses. As there can be classes with the same index but from different courses, we set **Class** as a weak entity associated with the entity set **School** and thus *“Class\_ID”* (from **Class** Entity ) and *“Course\_ID”* (from **Course** Entity) will form a joint identifier for each Class.
12. As a professor can teach many classes and each class must be taught by at least one professor, we joined the two entities with a “teach” relationship, with a degree constraint of on **Class** Entity. The “teach” relationship contains records relating to all the classes a professor teach and vice versa, and along with the *“Date\_Time”* attribute in the **Class** Entity, we will be able to retrieve the timetable of classes for each professor.
13. We assume that a research can comprise of many topics (E.g. A research on Machine Learning for Cyber Defence can comprise of multiple research topics such as Neural Networks, Cyber Security, Deep learning, etc.). As such, we created a **Research Topic** Entity with *“Topic\_Name”* as its identifier to capture the different research topics for a specific research. As there can be research topics with the same name but is a part of different researches, we set **Research Topic** as a weak entity associated with the entity set **School** and thus *“Topic\_Name”* (from **Research Topic** Entity) and “*Research\_ID”* (from **Research** Entity) will form a joint identifier for each **Research Topic.**
14. We added a *“Research\_Name”* attribute to the **Research** Entity to better identify each Research.
15. As a professor can supervise many research topics and a research topic must be supervised by at least one professor (M:M Relationship), we added a degree constraint of for the **Research Topic** Entity. The “supervise” relation joining these two entities will contain all the records relating to all the research topics that a professor supervises and vice versa.
16. As there can be many comments made on the same date and time but is being made by different stakeholders, we set **Comment** as a weak entity associated with the **Stakeholder** Entity and thus the *“date\_time”* (from **Comment** Entity) and Stakeholder\_ID (from **Stakeholder** Entity) form a joint identifier to uniquely identify each comment.
17. We added a “about” relationship between the **Comment** and **School** Entity to keep track of the comments that are being made about each school.