

REVIEW AND REVISION

COMP2004J: Databases and Information Systems

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MODULE REVIEW

Theory of Relational Databases

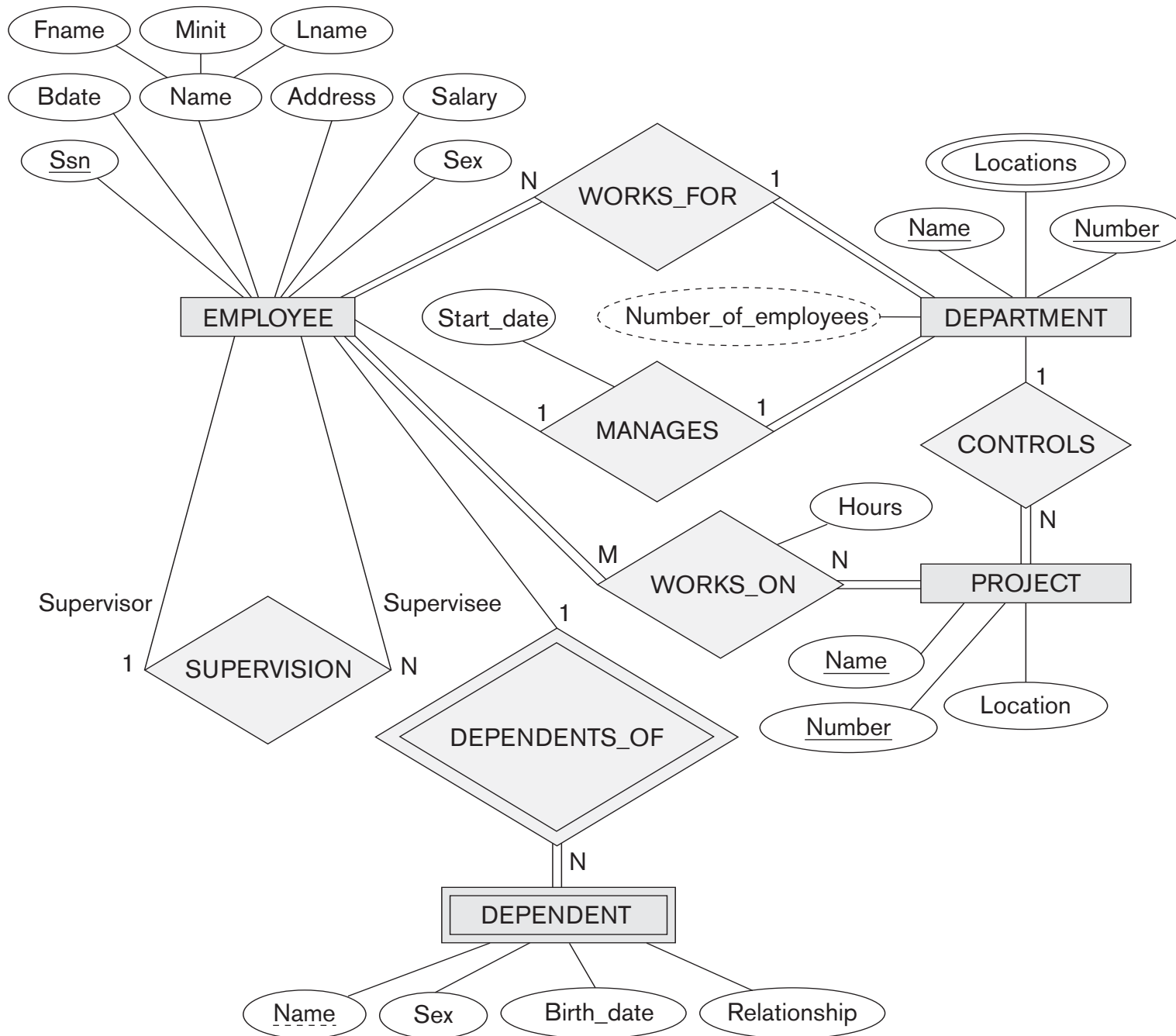
- **Language of database theory:** relation, attribute, integrity constraint, keys (primary and foreign), combined/compound keys, operators (project, restrict, join, Closure).

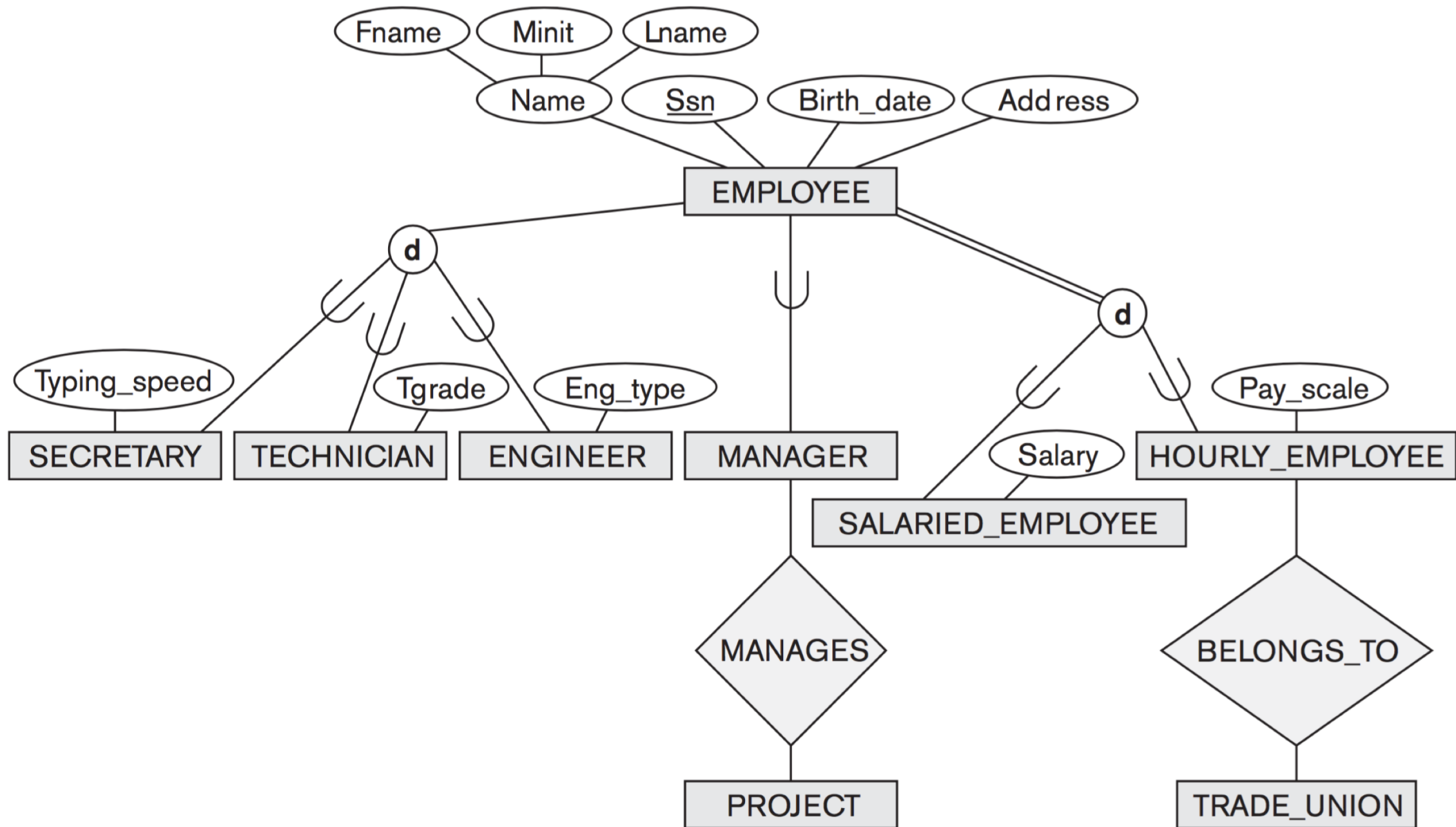
Structured Query Language (SQL)

- CREATE TABLE & constraints
 - Referential policy: ON UPDATE CASCADE, etc.
- ALTER TABLE
 - ALTER TABLE department ADD COLUMN numberoffices INT;
- SELECT
 - WHERE, JOIN (different types), Boolean expressions, LIKE, NULL, DISTINCT, ORDER BY, LIMIT, Aggregate Queries/GROUP BY, Nested Queries
- INSERT
- DELETE
- UPDATE
- **Lots** of practice in labs

Database Design

- Entity Relationship and Enhanced Entity Relationship Diagrams to show a conceptual schema.
 - Entity types, relationships, attributes, derived attributes, multi value attributes, cardinality and optionality of relationships, weak entities, supertypes/subtypes
- Examples of creating/interpreting an ER diagram in Worksheet 4 & Assignment





Mapping conceptual model to relational model

- Regular entities
- Weak entities
- 1:1 relationships
- 1:N relationships
- M:N relationships
- Multivalued attributes
- *N*-ary relationships
- Supertypes/subtypes
- Worksheet 5 & Assignment include mapping.

Normalisation

- Decomposing relations using Heath's Theorem to ensure data integrity and reduce data redundancy.
- Types of anomalies that can occur without normalisation.
- Normal forms:
 - 1NF: no repeating groups.
 - 2NF: no partial key dependencies.
 - 3NF: no transitive dependencies.
 - BCNF: every determinant must be a candidate key.

Java DataBase Connectivity (JDBC)

- Connecting to and using a database using Java.
- MySQL is client/server: the client is often a program.
- Connection, Statement, ResultSet, PreparedStatement (what's it better at?), executeQuery, executeUpdate.
- Web-based Information System
- ORM

FINAL EXAM

Exam

- 70% of final grade:
 - 10% for SQL lab test.
 - 20% for ER assignment.
 - **2 hours exam.**
- Exam paper contains 4 questions. Answer all questions. All questions carry equal marks (25%).

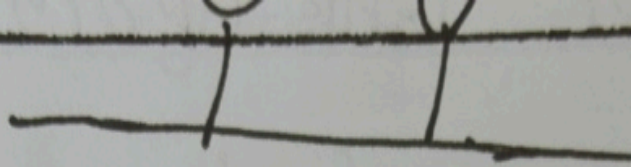
Exam Advice

- The exam is for you to show me what **you know**.
- I can't give you marks for things you don't write.
 - It is better to write too much than to write too little.
 - If you want more paper, just ask for it.
- I can't give you marks for things I can't read!
 - Make sure your writing is neat and your diagrams are clear!
 - PLEASE, PLEASE, PLEASE, don't do what these students did:

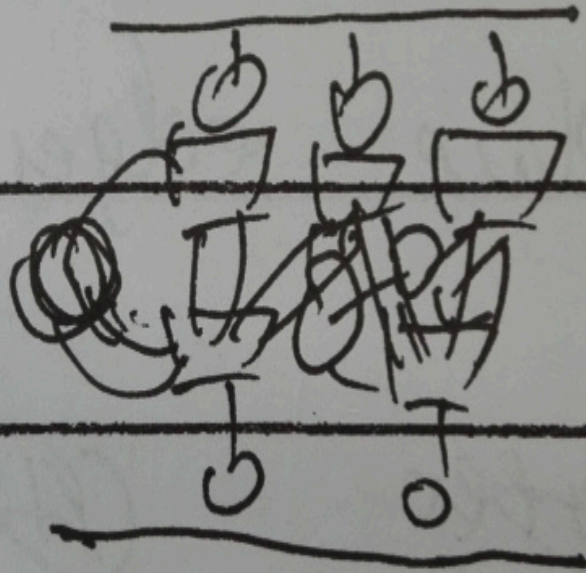
BDIC Examination Book

Q1.

(a) the closure property is that.
No other relation and
table, because other relation
will affect the operation
of relation.



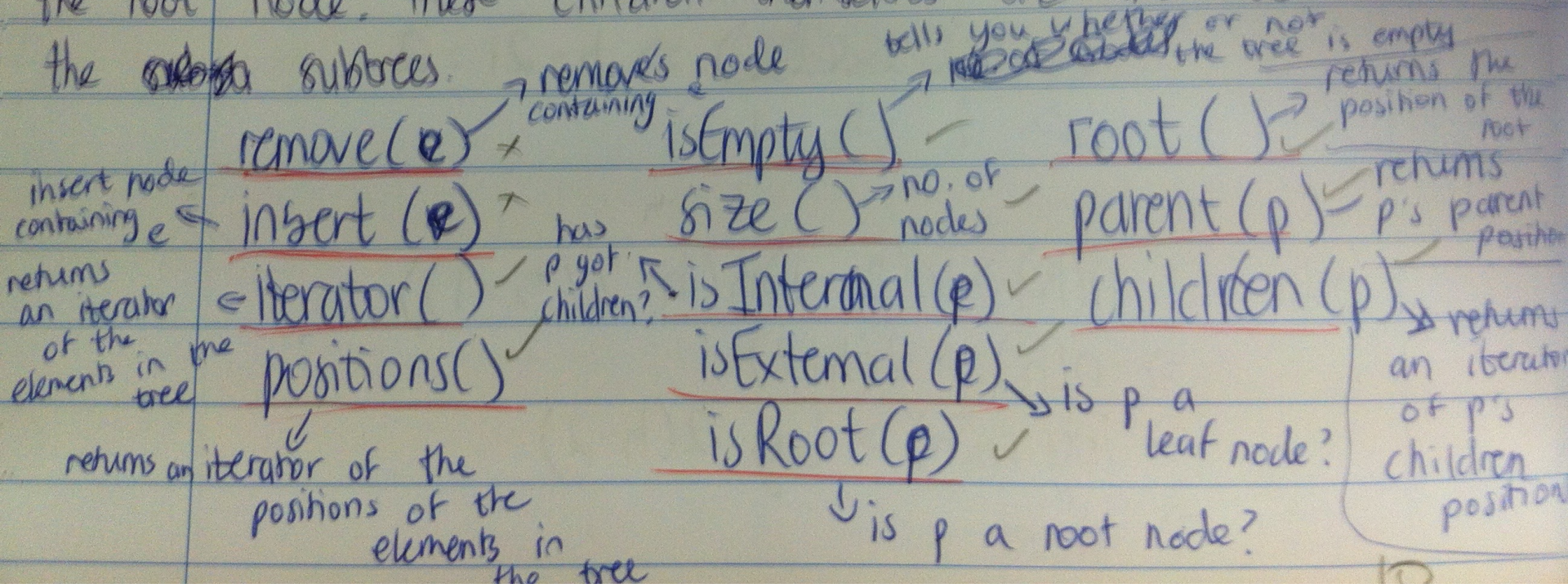
Each Vertex has inner lift to Home edges



Vertex



Question 1: (a) A tree is a hierarchical ADT that supports relationships in terms of parent-child relationships. A node can have zero ~~one or more~~ or more children. Every node has at most one parent. There is always one node in every tree that has no parent at all, and this is known as the 'root node'. Attached to the root node, you have the left subtree, and the right subtree. These are the children of the root node. These children themselves are the root nodes of the ~~subtrees~~ subtrees.



Exam Advice

- If you have doubts about describing something in English, maybe a diagram/picture will help?
- **BUT:** a diagram should **ALWAYS** be explained: a diagram with no explanation is **USELESS**.
- Read the paper before answering any questions. I will be visit the exam room during the early part of the exam. If you do not understand what a question is asking, you can **ask me**.

Exam Advice

- Do not write on the exam paper: answer books will be provided.
- During the exam, do not talk to anybody or communicate with other students. If you need me or an invilator to come to you, raise your hand.
 - If you need to borrow something from another student, you **must** ask an invigilator to get it for you.
- Using phones in exams is banned, and is a serious offence.
- Also, this is a "closed book" exam: you may not bring any notes or study material with you.
- Good luck!