IMAT3104: Database Management and Programming

Coursework	Coursework II: Blackboard Phase Test
Duration	40 minutes
Number of Questions	19

MONGODB QUERY LANGUAGE

1. Concepts of MongoDB query language
2. ***Relevant lectures and labs:***
    a. Introduction to MongoDB (lecture)
    b. Introduction to MongoDB (lab)

DATABASE INDEXES IN MONGODB

1. Definition of Index
2. Types of Index
3. ***Relevant lectures and labs:***
    a. Importing/Exporting and Indexing in MongoDB (lecture)
    b. Indexes with Zip Codes (lab)

NOSQL DATABASE MODEL CONCEPTS

1. Aggregate data modelling
2. Schema-less structure
3. MongoDB structure and JSON representation
4. Cluster Computing and distributed database
5. ***Relevant lectures and labs:***
    a. Introduction to NoSQL
    b. Introduction to MongoDB
    c. Relational Normalisation
    d. Replication and Sharding

MONGODB DATABASE DESIGN

1. Different MongoDB design methods: Embedding versus Referencing
2. Design MongoDB collection(s) to support queries
3. ***Relevant lectures and labs:***
    a. MongoDB Database Design (lecture)
    b. Introduction to MongoDB (lecture)
    c. Introduction to MongoDB (lab)
    d. MongoDB Database Design and Migration of Relational Data (lab)
    e. MongoDB Database Design Extensions (lab)

NOSQL MANAGEMENT ISSUES: REPLICATION AND SCALING

1. NoSQL Replication versus Relational Recovery
2. Different types of Replication
3. Sharding method and keys
4. ***Relevant lectures and labs:***
    a. Replication and Sharding
    b. Relational Database Transactions and ACID Properties

ACID PROPERTIES AND CAP THEOREM

1. Database transactions and ACID properties
2. CAP theorem
3. Special aspects of CAP
4. ***Relevant lectures and labs:***
    a. Relational Database Transactions and ACID Properties
    b. NoSQL: ACID and CAP
    c. Replication and Sharding

DIFFERENT TYPES OF DATABASE

1. Graph Databases
2. Definitions, examples and applications of non-relational and relational databases.
3. ***Relevant lectures, labs and tutorials:***
    a. Introduction to Graph Databases (lecture)
    b. Introduction to Graph Databases using Neo4j (lab)
    c. Module Introduction (lecture)
    d. Introduction to NoSQL (lecture)
    e. Introduction to Graph Databases with Neo4j (tutorial)
    f. Introduction to a Column Family Database called Cassandra (tutorial)