**Lab 3: Anomaly Detection and Normalization**

**Objective**

The objective of this lab is to enable students to identify anomalies in a relational database schema and apply normalization techniques through systematic decomposition. Students will learn to detect redundancy, insertion, update, and deletion anomalies, and refine database design by producing well-structured relations.

**Provided Relation Schema**

After completing Lab 2, the group already has a database schema(tables, attributes, keys). This schema will be used to perform Lab 3.

**Tasks**

Each group is required to:

1. **Analyze Anomalies**
   * Identify redundancy, update anomalies, insertion anomalies, and deletion anomalies in the given schema.
   * Provide clear examples for each type of anomaly.
2. **Identify Normal Forms**
   * Determine whether the given relation is in 1NF, 2NF, 3NF, and BCNF.
   * Justify your reasoning for each step.
3. **Perform Decomposition**
   * Decompose the relation step by step into higher normal forms until BCNF (if possible).
   * Ensure **lossless join** and **dependency preservation** properties.
   * Document each step with explanation.
4. **Final Normalized Schema**
   * Present the final set of relations after decomposition.
   * Show how anomalies are eliminated in the new schema.

**Submission Format**

* **File type:** Microsoft Word (.doc/.docx) or PDF (.pdf)
* **Structure of Report:**
  1. Cover page (Lab number, course name, group members, date).
  2. Objective.
  3. Analysis of anomalies.
  4. Identification of normal forms.
  5. Step-by-step decomposition.
  6. Final normalized schema.
  7. conclusion.