# Database Review

## Week 1

## National College of Ireland

## Dublin, Ireland.

# MODULE INTRODUCTION

1 Timetable

2 Assessment Structure

3 References & Resources

4 Q&A

# 1 Timetable

- Lectures
  - Monday 3:00pm – 5:00pm SCR1
- Labs
  - Tuesday 2:00pm – 3:00pm SCR3

# 2 Assessment Structure

| ALLOCATION OF MARKS | |
|---|---|
| **Continuous Assessment** | **50%** |
| **Final Examination** | **50%** |
| **Total** | **100%** |

| CA STRUCTURE & DATES | |
|---|---|
| **CA 1 – Data- Warehouse Research – Week 6** | **15%** |
| CA 2 – Research Paper – Week 9 | 15% |
| **CA 3 – In Class Test (Moodle) – Week 12** | **30%** |

# 3 References & Resources

Eamon Nolan


- **Thomas Connolly, Carolyn Begg 2014, Database Systems: A Practical Approach to Design, Implementation, and Management, 6th Edition Ed., Pearson Education [ISBN: 1292061189] [Present in our Library]**
- **Stephen Morris 2012, Database Principles, 10 Ed., South Western Educational Publishing [ISBN: 1133311970]**
- **Abraham Silberschatz, Henry F. Korth, S. Sudarshan 2010, Database System Concepts, 6th Edition Ed., McGraw Hill Higher Education [ISBN: 0071289593]**
- **Ramez Elmasri and Shamkant Navathe 2013, Fundamentals of Database Systems, 6th Edition Ed., Pearson Education [ISBN: 1292025603]**
- **C.J. Date 2012, Database Design and Relational Theory, O'Reilly Media [ISBN: 1449328016]**
- **Larry Rockoff 2010, The Language of SQL, Course Technology PTR [ISBN: 143545751X]**

# 4 Q&A

# Why Data Bases?

- A huge amount of information being stored.
- The College, Medical records, Employers, Companies, Government Agencies etc.
- Managing that data is a mammoth task
- Data Base Management Systems (DBMS)
- Storing is easy, managing is the issue
- A number of models available

# Data Models

- Hierarchical
- Network
- Relational
- Object-Oriented
- Distributed Databases

# Benefits of Database Approach

- Data can be shared
- Redundancy can be reduced
- Inconsistency can be avoided
- Transaction support can be provided
- Integrity can be maintained
- Security can be enforced
- Conflicting requirements can be balanced
- Standards can be enforced

# Disadvantages of Database

- Shared data can be abused
- Controls needed to ensure data quality is maintained
- Data integrity during multi user access must be maintained
- Enterprise vulnerability
- Cost

# Models

- First Generation
  - File Based DB
  - Hierarchical DB
  - Network DB
- Second Generation
  - Relational DB
- Third Generation
  - Object-Oriented DB
  - Deductive DB
  - Distribution

# The Relational Model

- Formulated by Codd in 1970
- Commercial RDBMS in 80s
- 12 Rules  specified by Codd
- Most widely used Model at present
  - Access, Oracle,  MySQL,  SQL Server, Teradata etc

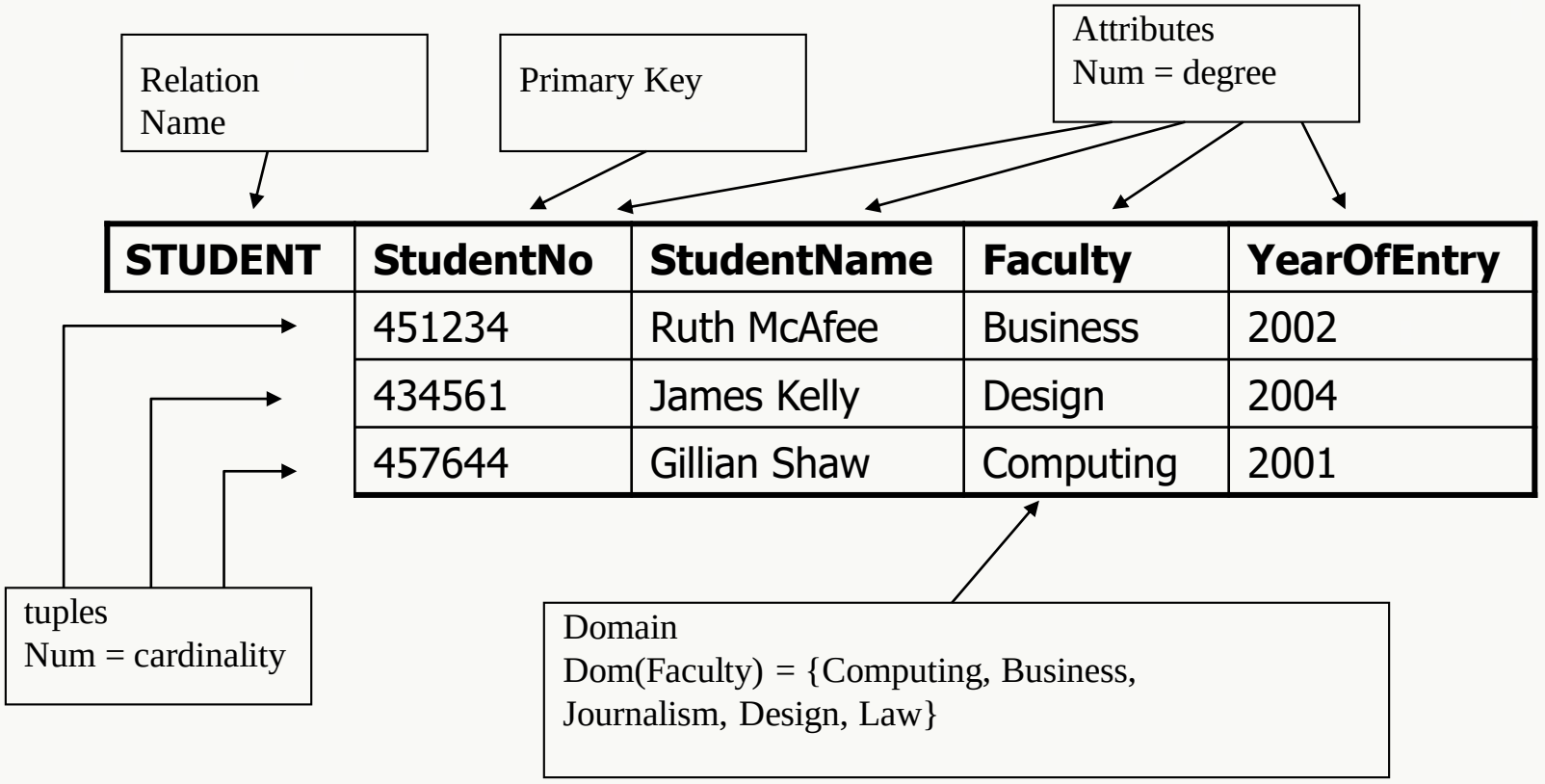
# Relational Concepts

- Data is represented as collections of **relations**
- Each relation is **table** of values
- Each table consists of **rows** and **columns**
- Each **row** represents an **entity** or **record**
- Rows are unordered
- No duplicate rows are allowed
- Each row has a **primary key** which uniquely identifies the record/entity
- Each column represents an **attribute**
- Table name and Column name are used to help interpret the values

# Database Terminology

- **Relation** is a mathematical term for a **table**
- **Row** is called a **Tuple**
- **Column** is called an **Attribute**
- **Domain** is used to describe the types of values that can appear in a column
- **Degree** is the number of attributes
- **Atomic Value** – precisely one value at each row intersection
- **Cardinality** – the number of tuples/rows in a relation
- **Null Value** – Missing, not known or irrelevant data (not the same as zero or blank)

# Student Table



# Data Independence

- Two types of data independence
  - Physical
  - Logical
- Physical is the idea that applications that use the data should not have to worry about detail of how it is stored
- Data Independence allows database to grow, shrink, add attributes
- Applications deal with the DBMS which in turn deals with the Database
- Differing degrees of success