INFORMATION MANAGEMENT (LABORATORY)

DATA PROCESSING

DATABASE

A collection of information organized and presented to serve a specific purpose

EXAMPLE OF A DATABASE

- Telephone directory
- Log-in / log-out
- Record book

DATA CAN BE COLLECTED BY:

I. PLAIN TEXT EDITOR – edit and retrieve, notepad
II. WORD PROCESSOR – edit and retrieve, word application
III. SPREADSHEET – add table, compute, calculation
IV. DBMS – add, format structure of a table

COMPONENTS OF A DATABASE

1. DEFINITION –
   - field names – title field
   - data format – data types
   - record structure - limitations
   - file structure – database itself
2. RULES FOR VALIDATING AND MANIPULATING DATA – rules and functions
3. DATA – being gathered result information

4 TYPES OF DATABASE ORGANIZATION

1. FLAT DATABASE –single record, redundancy, error
2. HIERARCHICAL DATABASE – link, one to many, top to bottom
3. RELATIONAL DATABASE – logical arrangement, independent table, relationship
4. OBJECT-ORIENTED DATABASE – methods and uses of data

TYPES OF OBJECT-ORIENTED

- ABSTRACTION – you get something and write something
- ENCAPSULATION – internal structure is hidden, set limit
- MODULARITY – grouping classes, module, how being categorized, sorting, filtering
- HIERARCHY – class and object like a term and definition

DBMS

- Software package for defining and managing a database
- Collection of computer programs that allow storage, modification and extraction of information from a database.

DBMS

COMPUTERIZED BASED SYSTEM

- Computerized inventory system
- Payroll system
- ATM
- Enrollment system

RDBMS

- Relationship was created and maintain
- Multiple user can update and transact

NON-RDBMS

- Search one by one
- No relationship

MICROSOFT ACCESS

LABORATORY

- A Relational Database stores its data in tables that are located in special database files.

- Microsoft Access is a Microsoft software product that is primarily a data management tool (database software).

IN A MICROSOFT ACCESS DATABASE, DATA APPEARS IN A *TABLE* THAT LOOKS VERY SIMILAR TO A SPREADSHEET.

- The column headings are called ***field names*** and the columns are called ***fields***.

- **The rows of data are called records.**

First Name	Last Name	Address	Phone Number
Corazon	Marcos	22 Irving Avenue	220-1290
Ferdinand	Ramos	9 Magsaysay Street	226-5623
Joseph	Aquino	75 Acacia Road	225-9090
Fidel	Ejercito	109 Rizal Blvd	221-6773

A TELEPHONE DATABASE, CALLED A TABLE, CONSISTS OF ROWS CALLED RECORDS AND COLUMNS CALLED FIELDS.

Following are a few common examples of information stored in databases:

- Employee data
- Students and classes
- Product inventory
- Customer purchases and orders
- Sales contacts
- Suppliers
- Audio and video collections

Database Development Process

Developing Databases are tied to the process of SDLC or **Systems Development Life Cycle** - A six step process used to design computer based applications.

TYPICAL PHASES IN THE SDLC ARE:

- Analysis,
- Design,
- Development,
- Integration and Testing,
- Implementation.

ANALYSIS

- The first step in analysis is to ***get something to analyze.***
- ***Define the problem being presented*** (or in systems analysis and Design, define the task to be accomplished).
- ***Research on the topic*** preferably, get your hands on some related systems previously constructed and study how they went through solving the problem.

DESIGN

- Analysis focuses on what to do, design focuses on ***how to do it.***
- This is when you analyze the current situation, define the end situation, and ***decide on solutions to get you there.***
- The technical team would ***define the technical solution to those requirements*** (ie how it is to be built).

DEVELOPMENT

- The Development Phase ***is the design phase put to reality…***
- It is ***the actuation of a strategic plan***, based on our assessment.
- This includes ***the development of a comprehensive focus and direction*** with measurable objectives and evaluation criteria.

INTEGRATION AND TESTING

- **Integration**
  - Integration is the ***progressive linking and testing of system components***

- **Testing**
  - A System Test ***creates technical results*** of a complete system including the functional results of the test, how the system functions, vulnerabilities, tweaks and other function related information about the system prior to delivery.

IMPLEMENTATION

- This is the ***final phase of the six stage process.***

- In implementation, ***the program is delivered and installed*** to finally fix the problem it was created for.

DATA MODELING

LABORATORY

- it is important to draw out what data are to be structured and how the Data shall be structured.

- is a process by which the data requirements within a given scope are grouped into objects called entities, relationships between those entities are documented, and a graphical representation called an entity-relationship diagram is produced.

THREE MAJOR COMPONENTS OF DATA MODELING

- A structural aspect
- An integrity aspect
- A manipulative aspect

STRUCTURAL ASPECT

- **Entities.**
  - An entity is a collection of objects (persons, places, things) described by the same attributes.

- **Attributes.**
  - It is a property of an entity.

*IN A MICROSOFT DATABASE, ENTITIES ARE CALLED *TABLES* AND ATTRIBUTES ARE CALLED *FIELDS*.

- EMPLOYEE RECORDS - is an entity or a table

- employee's name, birth date, employee number, job description and salary rate - are the attributes

AN EMPLOYEE FOR EXAMPLE WORKS FOR A CERTAIN DEPARTMENT. THUS A *RELATIONSHIP* BETWEEN OUR EMPLOYEE RECORD AND THE DEPARTMENT ENTITY EXIST.

INTEGRITY ASPECT

- ***Referential Integrity*** is a characteristic of an entity that ensures that an attribute has references only to attributes that actually exist.
- Maintaining referential integrity requires that, when any attribute is deleted, all references from other entities to the deleted attribute are removed.
- Referential integrity is a system of rules that Microsoft Access uses to ensure that ***relationships*** between records in related tables are valid and that you don't accidentally delete or change related data.

MANIPULATIVE ASPECT

- To implement a manipulative aspect of a Microsoft Access Database, Microsoft makes use of queries.
- A **Query** is a user's request for information from a database or search engine.
- For example, a user might request "all sales orders with a quantity greater than five".
- Queries are implemented in a Microsoft Access Database and create tables that get data from other tables.

RELATIONAL DATABASE

LABORATORY

Relational database - physically stores all data and metadata within a single structure.

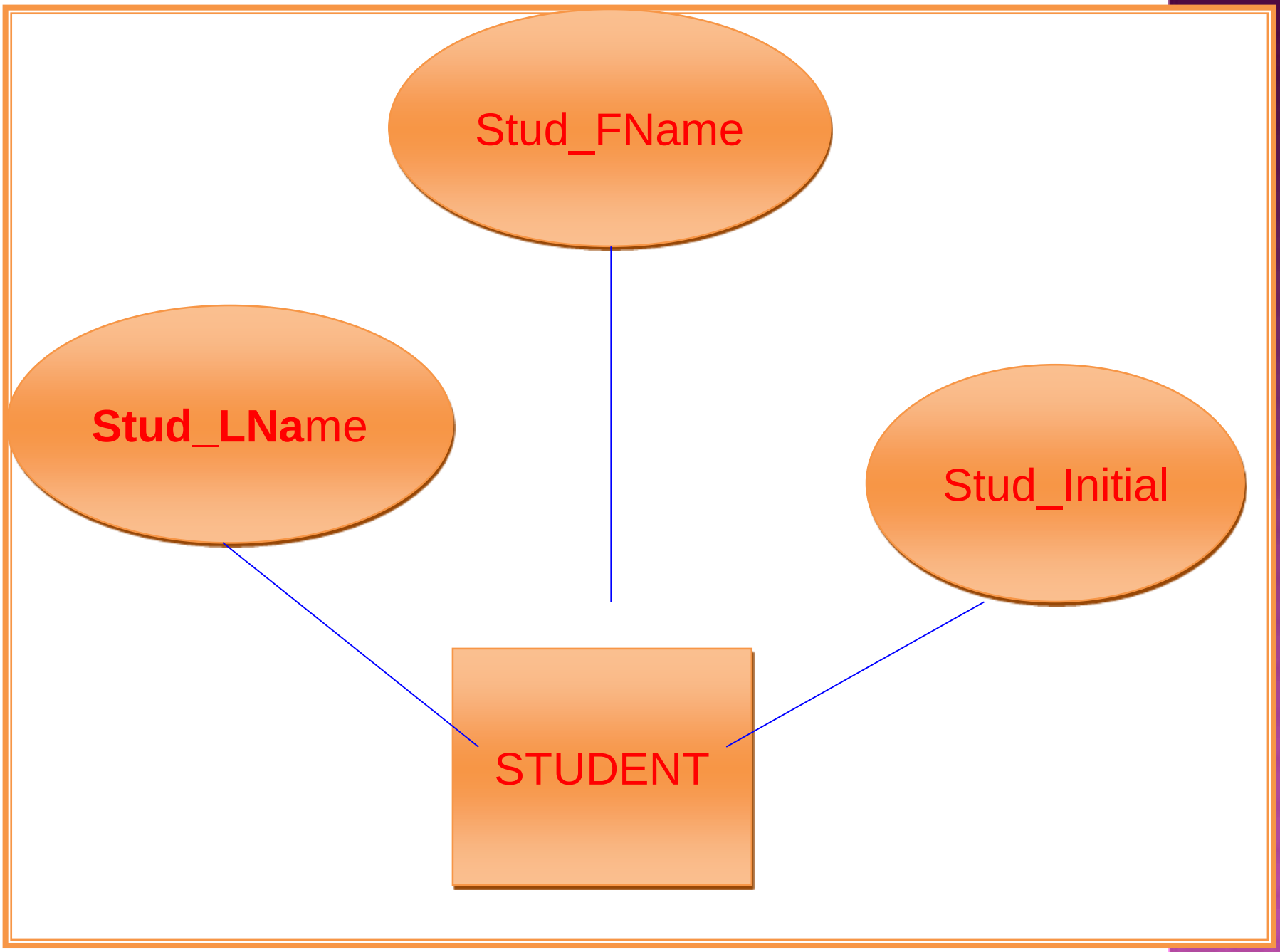
Entity - person, place, event, or thing for which we intend to collect data

Attributes - certain characteristics of each entity

Entity set - Grouping of related entities

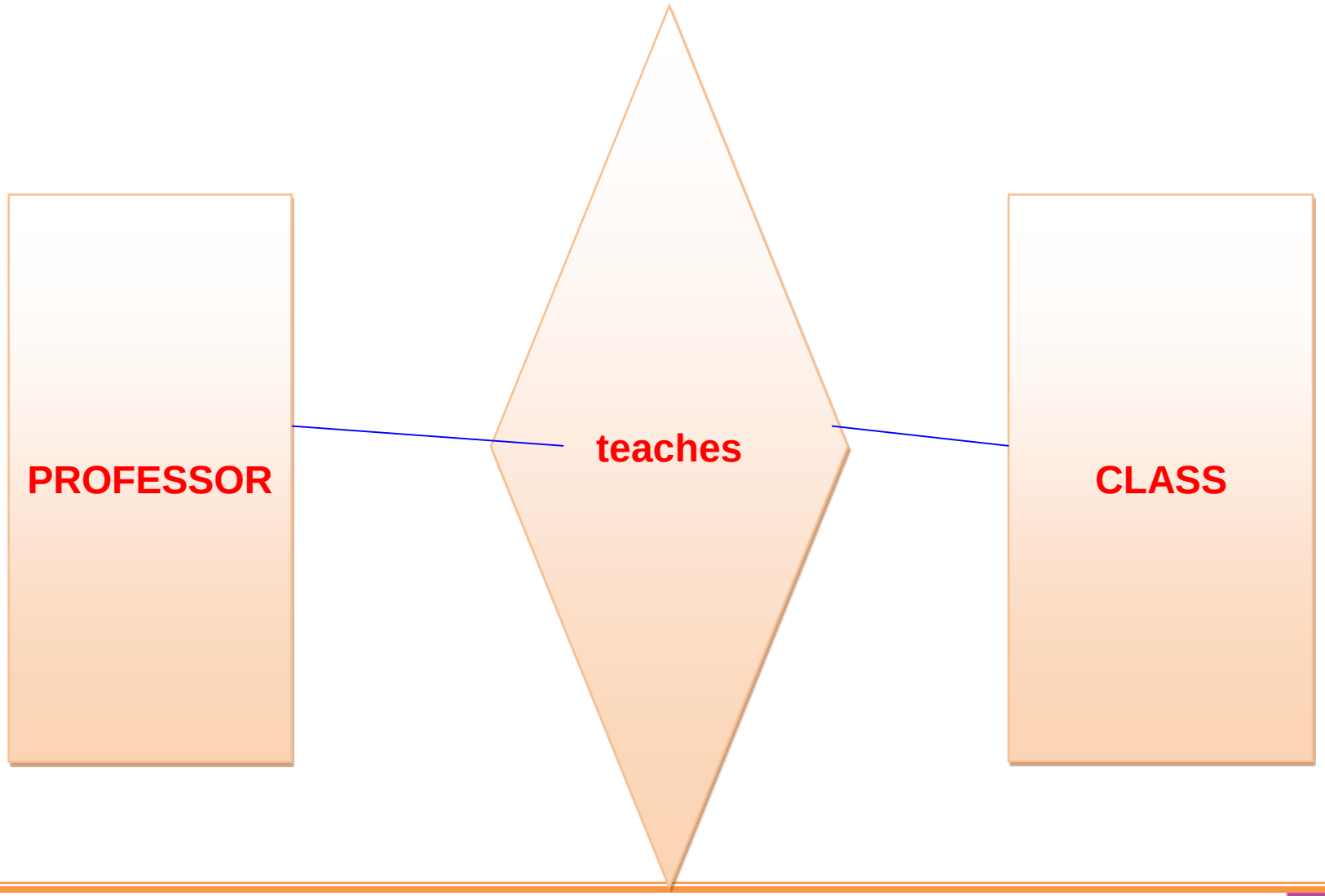
COMPONENTS OF E-R MODEL

- **Entities**
  - Corresponds to a table
  - Entity Occurrence or instance
  - Specific table row
- **Attributes**
  - Domain or attribute set of possible values
- **Primary Key**
  - An Attribute that is a unique identifier of a record


Stud_FName
Stud_LName
Stud_Initial
STUDENT

RELATIONSHIPS

ASSOCIATION BETWEEN ENTITIES
ACTIVE VERB USED TO INDICATE CONNECTION


PROFESSOR
teaches
CLASS

COMPONENTS OF RELATIONSHIP

1. DEGREE
2. CONNECTIVITY
3. CARDINALITY

DEGREE

Indicate no. of associated entities or participants

I. Unary Relationship
II. Binary Relationship
III. Ternary Relationship

CONNECTIVITY

Describes relationship association

I. ONE IS TO ONE
II. ONE IS TO MANY
III. MANY IS TO ONE
IV. MANY TO MANY

CARDINALITY

A specific no. of entity occurrences associated with one occurrence of the related entity.

RELATIONSHIP PARTICIPATION

Optional

- If one entity occurrence does not require a corresponding entity occurrence in a particular relationship
- Refers to condition in which other participating entity may not be associated with occurrence of optional entity

Mandatory

- Which one participating entity must be associated with one or more occurrences of other participating entity