

A.I.S. Class 11: Outline

- Group Projects
- Learning Objectives for Chapter 8
- Entity-Relationship Models
- Extended Entity-Relationship Models
- Data Flow Diagrams
- Group Work for Chapter 8 (1)
- Event-Oriented Models
- Resource-Event-Agent Models (REA)
- Group Work for Chapter 8 (2)

Group Projects

Stage	Date	Grade	Rework
1	10/16	20	50%
2	10/23	35	100%
3	11/1	35	100%
4	11/6	30	50%
5	11/27	20	50%
6	12/4	35	100%
Final	12/13	35	0%
Presentation	?	120	0%

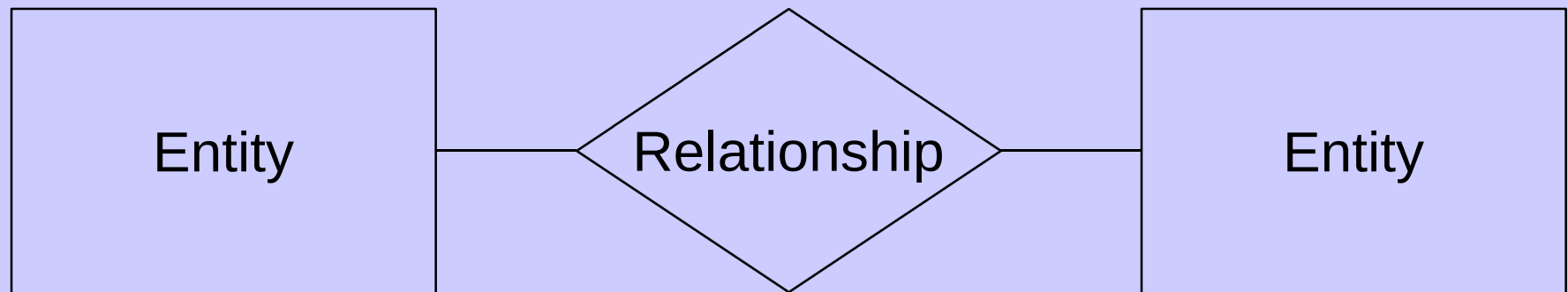
Learning Objectives for Chapter 8

- After studying this chapter you should be able to:
 - ◆ distinguish between logical and physical database models
 - ◆ describe the entity-relationship and extended entity-relationship logical modeling approaches
 - ◆ describe the elements of data-flow diagrams
 - ◆ distinguish between different levels of data-flow diagrams, such as context diagrams, Level 0, and Level 1 data flow diagrams

Learning Objectives for Chapter 8

- ◆ identify entities and relationships in a business environment using an event-oriented focus
- ◆ construct an extended entity relationship diagram based on a narrative description of a business scenario
- ◆ construct context diagrams and data-flow diagrams based on a description of a business process

Entity-Relationship Models



Extended E-R Models

■ Optionalities

- * optional or mandatory

■ Cardinalities

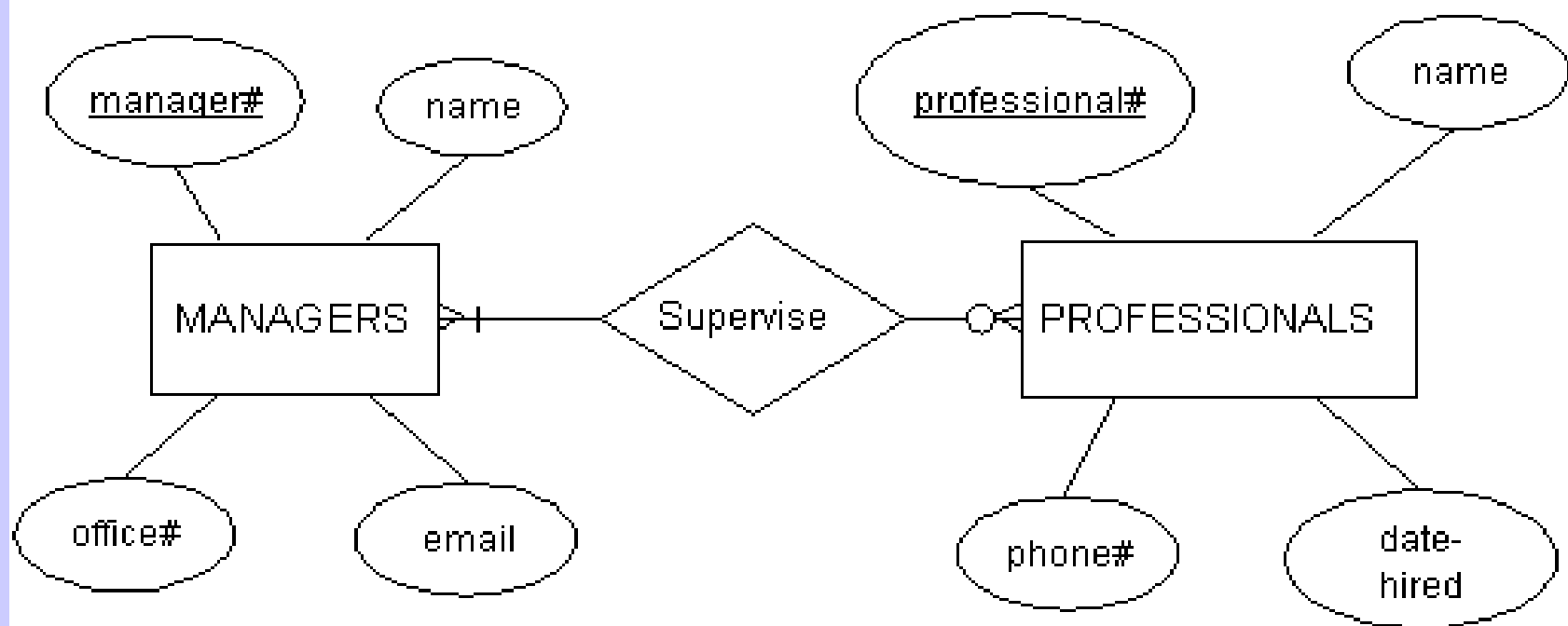
- * 1:1, 1:M, M:1, or M:M

■ Attributes

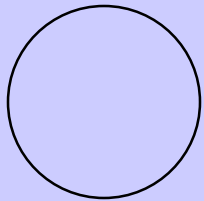
- * keys and non-key attributes

EER Models

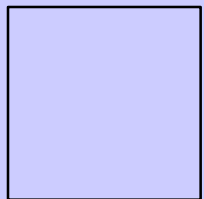
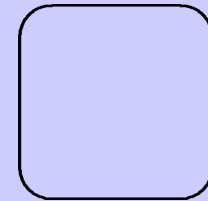
EER Figure 7



Data Flow Diagrams



Process



Data source / sink



Data flow



Data store



DFD Conventions

- A process must have at least one input flow and one output flow
- A data flow has at least one end connected to a process
- A data store must have at least one input and one output data flow
- Any single DFD should not have more than about seven processes

Data Flow Diagrams

■ Leveled DFDs

- * A series of DFDs used in a hierarchy

■ Balanced DFDs

- * The same sources, sinks and data flows appear at all levels

■ Labeling

- * Officially, all data flows should be labeled
- * Practically, we may sometimes omit labels from flows in and out of data stores

Group Work for Chapter 8 (1)

■ ER and EER Diagrams

* Problems 1, 2 & 6

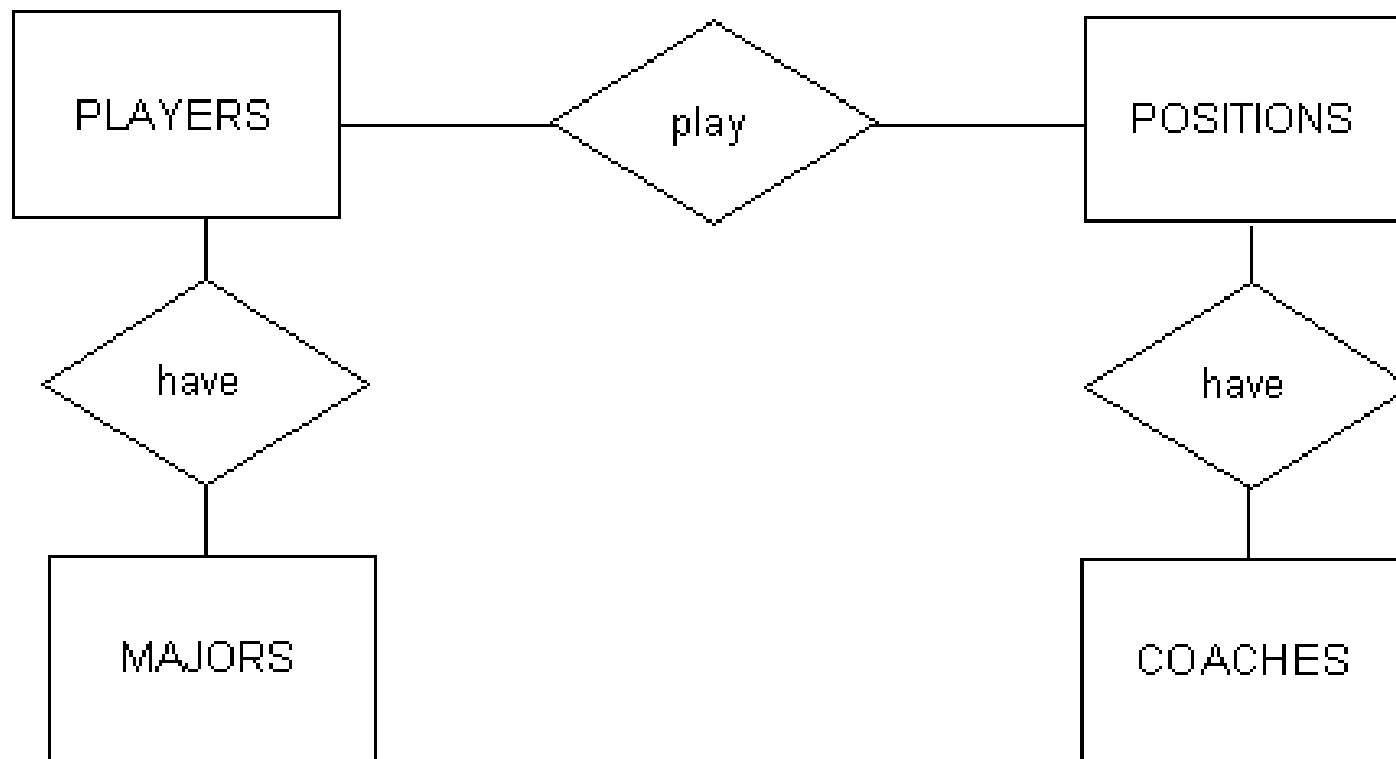
■ Data Flow Diagrams

* Problem 9

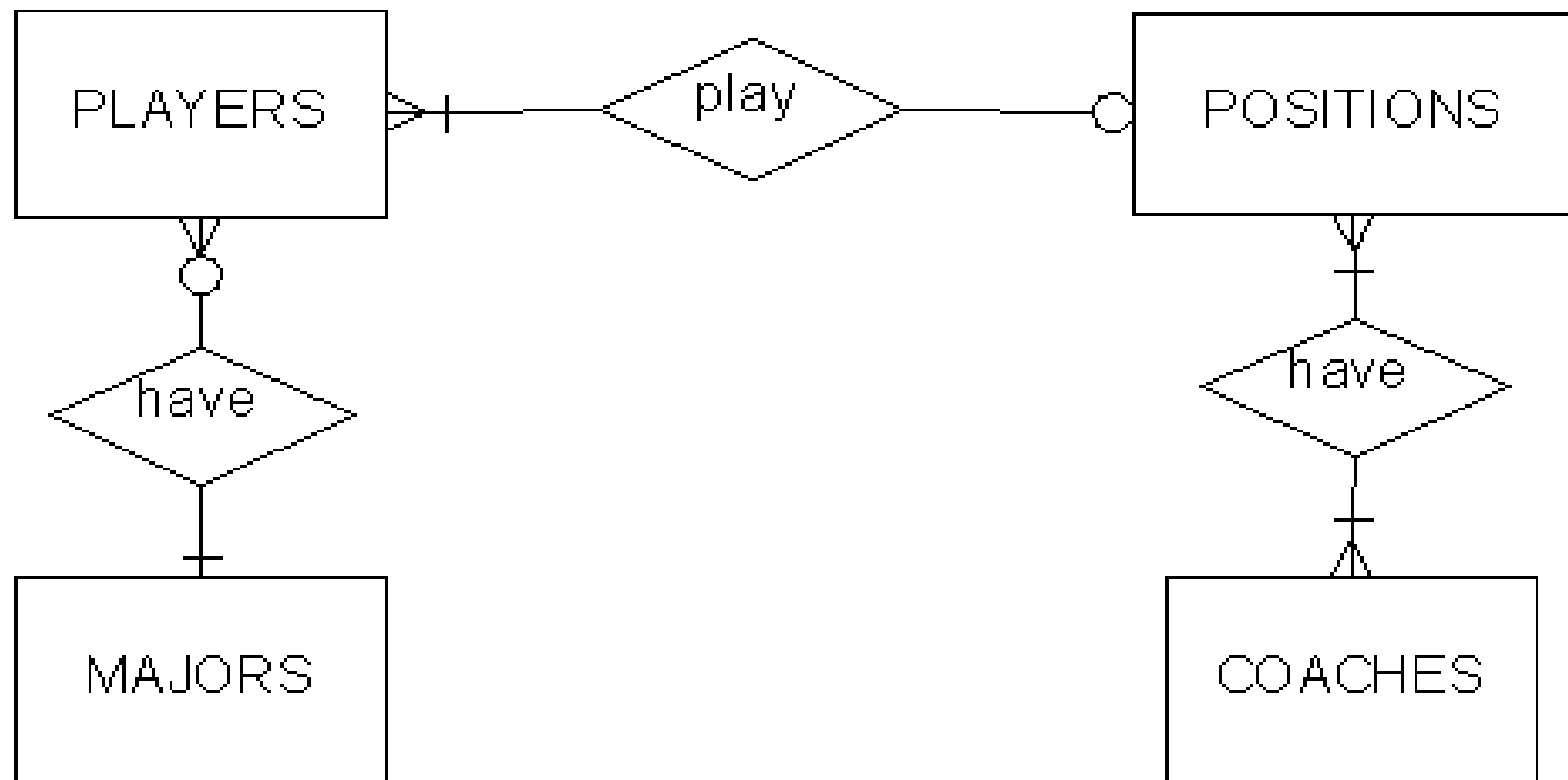
◆ Add the sentence:

“Videos are either picked up from the store shelves or at the front desk where the customer may have called in to reserve a newly released video in high demand”

Problem 1



Problem 2



Event-Oriented Models

■ We will discuss:

- * Three kinds of processes
 - ◆ Business processes
 - ◆ Information processes
 - ◆ Decision processes
- * REA and REAL models
- * A nine-step approach to REA(L) modeling

Business Processes and Events

- Organizations create value through managing their business and information processes
- Organizations typically have three main types of business processes (sometimes called business cycles):
 - * acquisition/expense/payment process
 - * conversion process
 - * sales/collection process

Business Processes and Events

■ What is a process?

* A process is a time-dependent sequence of steps governed by a rule called a process law. All processes have five common ingredients:

- ◆ the entities participating in the process
- ◆ the elements describing the steps in a process (called *events* in business processes)
- ◆ the relationships between these elements
- ◆ the links to other processes
- ◆ the resource characteristics of the elements

Business Processes and Events

- Business processes can be described at various levels of abstraction e.g.

- * Ship Merchandise

- * Receive Payment

or

- * Customer Places Order

- * Select, Inspect, and Package Merchandise

- * Ship Merchandise

- * Receive Customer Payment

Business Processes and Events

- We are interested in strategically significant events the organization wants to plan, execute and evaluate
- Significant business events can be classified as
 - * **core events that create distinctiveness**
 - ◆ e.g., for a restaurant business, cooking and providing meals are core events that create value for customers
 - * **support events that facilitate core events**
 - ◆ e.g., buying ingredients is a business event that does not itself create value, but without it meals could not be cooked

Business Processes and Events

■ Business events may also be classified as

* **Economic events**

◆ involving increases or decreases in resources

➔ e.g., making sales to customers

* **Non-economic events**

◆ having implications for future economic events

➔ e.g., contacting prospective customers

Business Processes and Events

■ Characteristics of Business Events

- * What happened?
- * When did it happen?
- * What roles are performed and by whom?
- * What resources were involved, and in what quantities?
- * Where did the event occur?

Business Processes and Events

- We distinguish business events forming parts of business processes from information processes
- Information processes
 - * record data about business events
 - * maintain data
 - * report useful information to decision makers

Business Processes and Events

■ Business events

- * selecting a supplier
- * transporting and distributing goods
- * providing services
- * receiving payment

■ Information processes

- * recording customer orders
- * issuing invoices
- * adding new suppliers to master files
- * printing customer statements

Business Processes and Events

- Business processes may be linked in two ways
 - * by sharing common resources
 - * by an event in one process triggering an event in another process
- Decision processes may trigger
 - * Business events
 - * Information processes

Event-Oriented Modeling

- Applies EER modeling specifically to accounting information systems
- Provides a way of identifying the relevant entities
- The entities (or objects) of interest are the business (economic and non-economic, core and support) events, and the resources, agents (and locations) involved

Event-Oriented Modeling

■ REA

* McCarthy

- ◆ Resources
- ◆ Events
- ◆ Agents
 - ➔ Internal
 - ➔ External

■ REAL

* Denna adds

- ◆ Locations

REA Modeling Steps

- 1 Identify the significant events
- 2 Identify the related resources
- 3 Identify the related internal and external agents
- 4 Identify relationships between entities
- 5 Specify the optionalities and cardinalities of the relationships
- 6 Identify the attributes of the REA entities
- 7 Identify the information processes
- 8 Design the data repository structure
- 9 Implement the design

REA Modeling

- We may sometimes omit the names of the relationships when our understanding would not thereby be impaired
- We may show optionalities and cardinalities in the alternative form (*optionality, cardinality*) e.g. (0,1) (0,*) (1,1) (1,*)
- We will use lists (data dictionaries) instead of balloons for attributes of entities
- Show primary keys underlined and foreign keys in []

Group Work for Chapter 8 (2)

■ Problem 10

- * Work through the 9 REA steps in sequence
- * Use simplified format for the EER