Chapter 6,
DATABASE SYSTEMS Thomas Connolly et al.,

Enhanced Entity-Relationship Modeling

Transparencies

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Chapter 6 - Objectives

- **Limitations of basic concepts of the ER model and requirements to represent more complex applications using additional data modeling concepts.**
- **Most useful additional data modeling concepts of Enhanced ER (EER) model called:**
  - **specialization/generalization;**
  - **aggregation;**
  - **composition.**

Chapter 12 - Objectives

- **A diagrammatic technique for displaying specialization/generalization, aggregation, and composition in an EER diagram using UML.**

Enhanced Entity-Relationship Model

- **Since 1980s there has been an increase in emergence of new database applications with more demanding requirements.**
- **Basic concepts of ER modeling are not sufficient to represent requirements of newer, more complex applications.**
- **Response is development of additional ‘semantic’ modeling concepts.**

The Enhanced Entity-Relationship Model

- **Semantic concepts are incorporated into the original ER model and called the Enhanced Entity-Relationship (EER) model.**

- **Examples of additional concepts of EER model are:**
  - **specialization / generalization;**
  - **aggregation;**
  - **composition.**

Specialization / Generalization

- **Superclass**
  - **An entity type that includes one or more distinct subgroupings of its occurrences.**
- **Subclass**
  - **A distinct subgrouping of occurrences of an entity type.**

Specialization / Generalization

- **Superclass/subclass relationship is one-to-one (1:1).**
- **Superclass may contain overlapping or distinct subclasses.**
- **Not all members of a superclass need be a member of a subclass.**

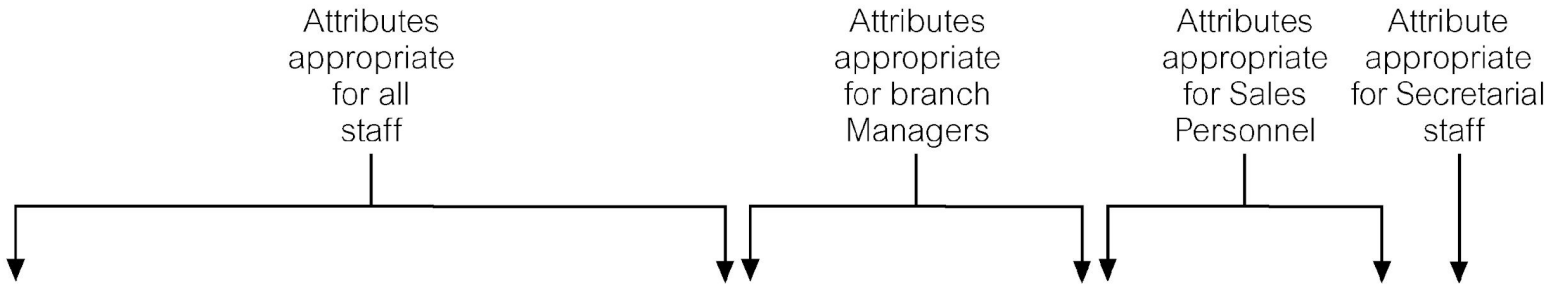
Specialization / Generalization

- **Attribute Inheritance**
  - **An entity in a subclass represents same ‘real world’ object as in superclass, and may possess subclass-specific attributes, as well as those associated with the superclass.**

Specialization / Generalization

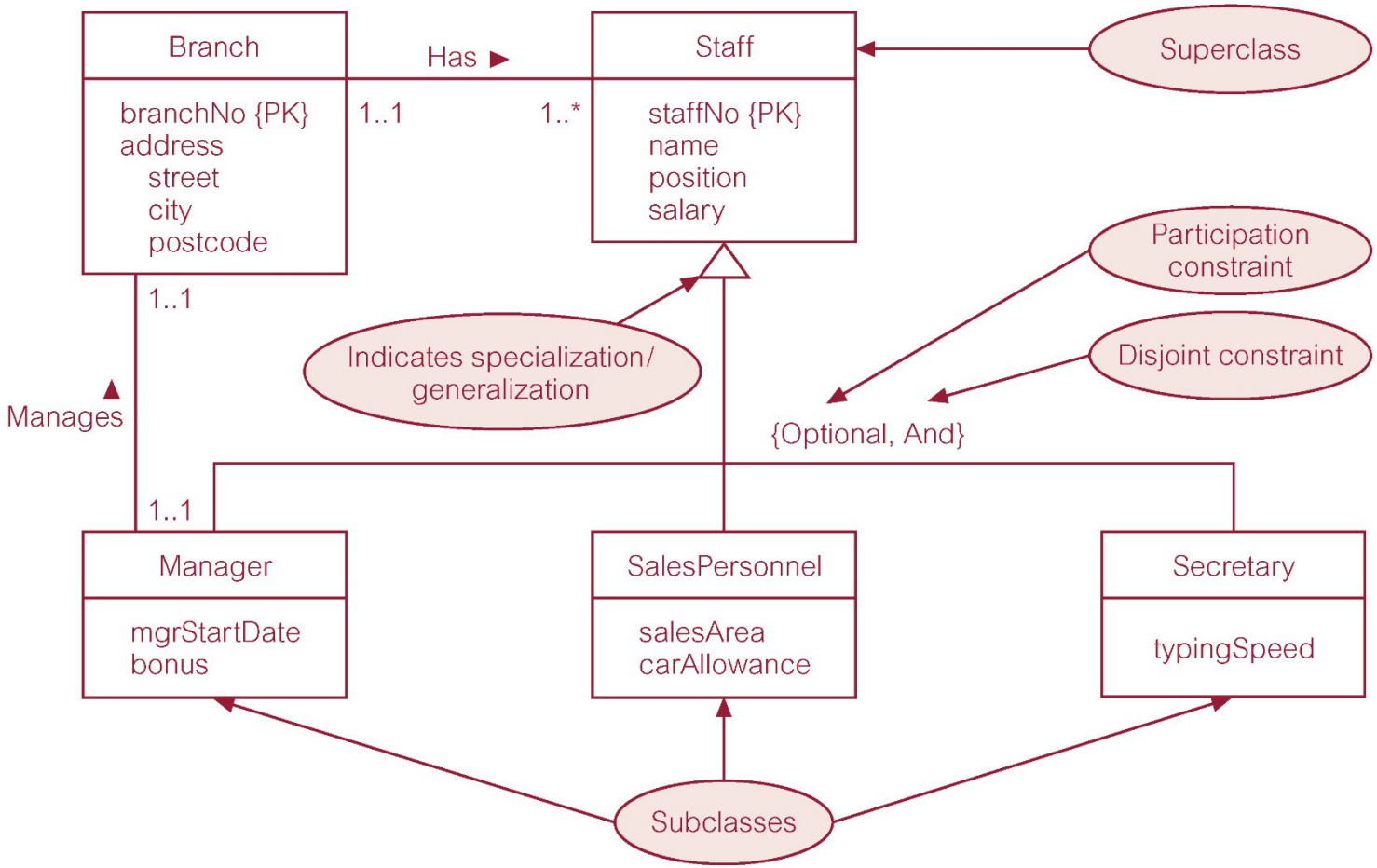
- **Specialization**
  - **Process of maximizing differences between members of an entity by identifying their distinguishing characteristics.**
- **Generalization**
  - **Process of minimizing differences between entities by identifying their common characteristics.**

AllStaff Relation Holding Details of all Staff

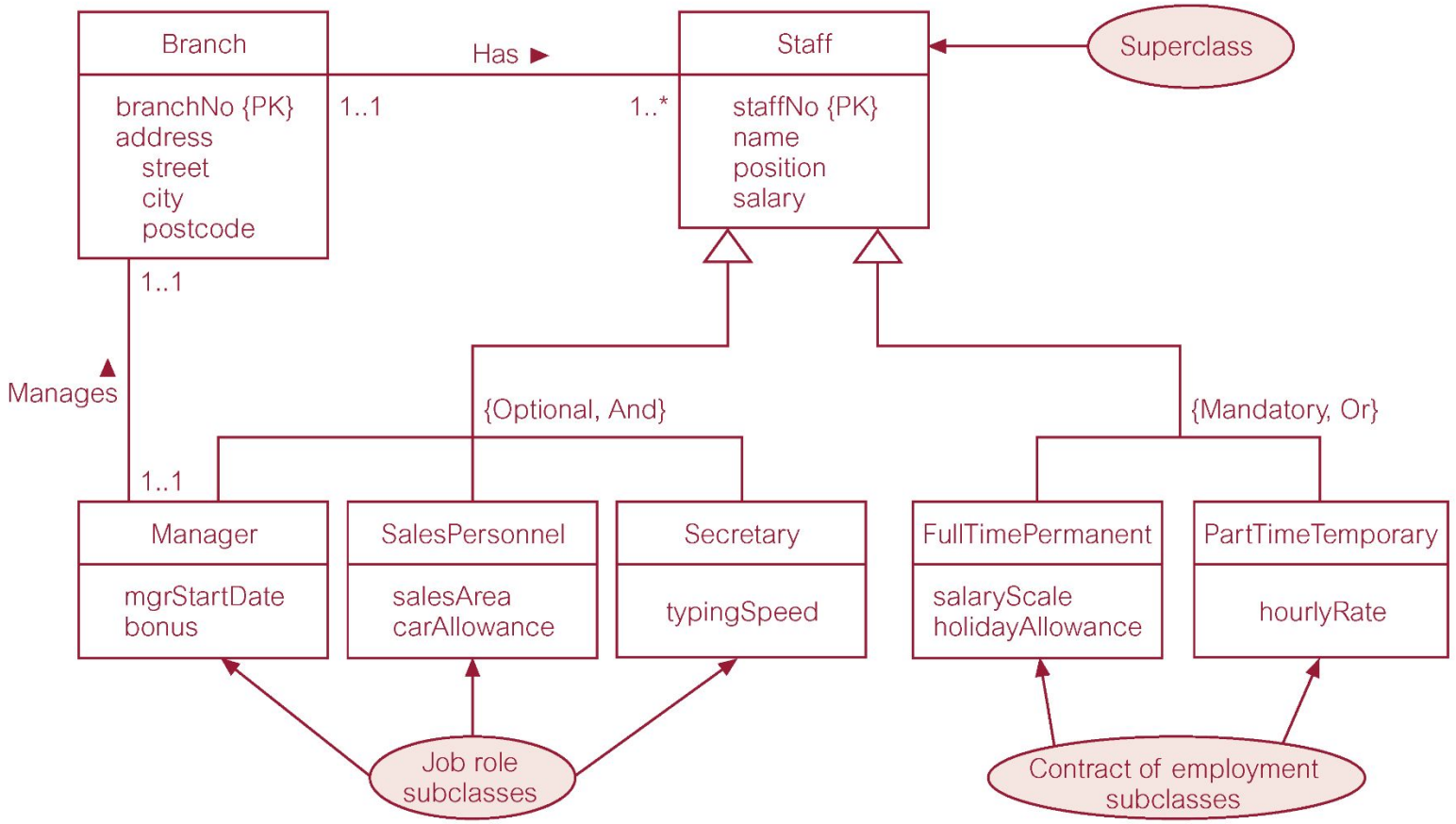


staffNo	name	position	salary	mgrStartDate	bonus	sales Area	car Allowance	typing Speed
SL21	John White	Manager	30000	01/02/95	2000			
SG37	Ann Beech	Assistant	12000					
SG66	Mary Martinez	Sales Manager	27000			SA1A	5000	
SA9	Mary Howe	Assistant	9000					
SL89	Stuart Stern	Secretary	8500					100
SL31	Robert Chin	Snr Sales Asst	17000			SA2B	3700	
SG5	Susan Brand	Manager	24000	01/06/91	2350			

Specialization/Generalization of Staff Entity into Subclasses Representing Job Roles



Specialization/Generalization of Staff Entity into Job Roles and Contracts of Employment



EER Diagram with Shared Subclass and Subclass with its own Subclass