"Entity Beans" Table Interfaces or Software Components?

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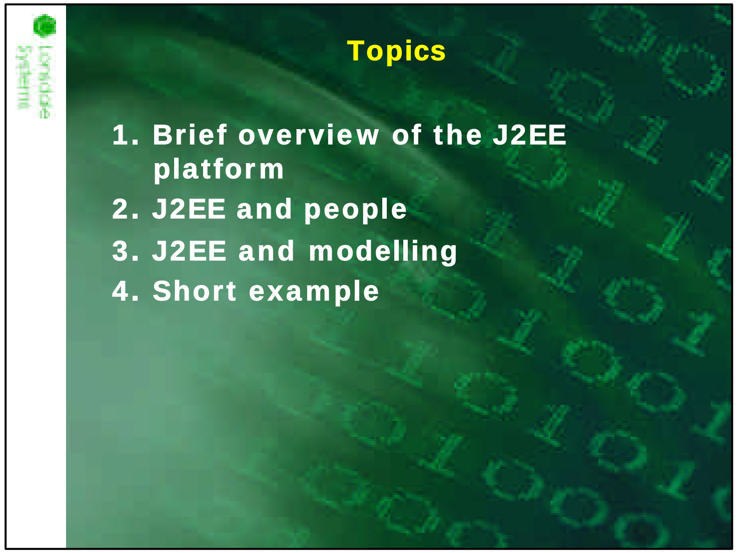


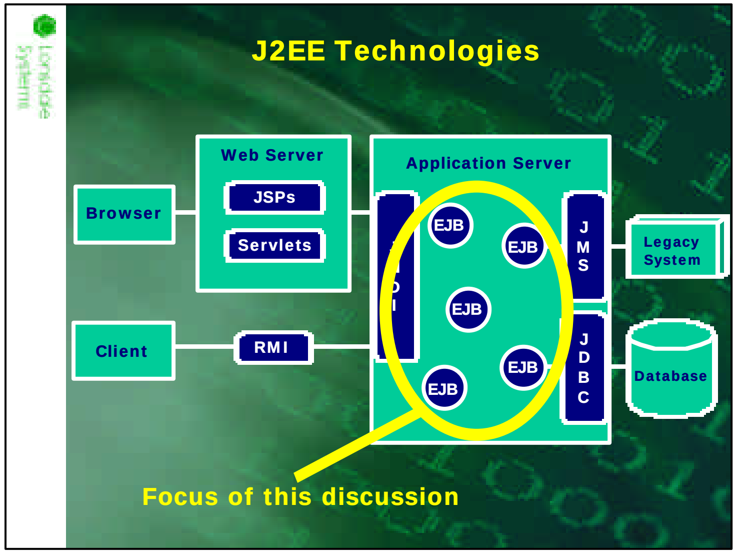
Topics

1. Brief overview of the J2EE platform
2. J2EE and people
3. J2EE and modelling
4. Short example

1. Brief overview of the J2EE platform

Java 2 Platform Enterprise Edition (J2EE)

- Java originally promoted as client-side technology
- "Re-invented" as a server-side programming language
- J2EE firmly targeted at information systems development
  - Built on standard Java 2 platform
  - Adds APIs, standards, protocols



J2EE Technologies

Browser

Web Server

JSPs

Servlets

Client

RMI

Application Server

D
I

EJB

EJB

EJB

EJB

EJB

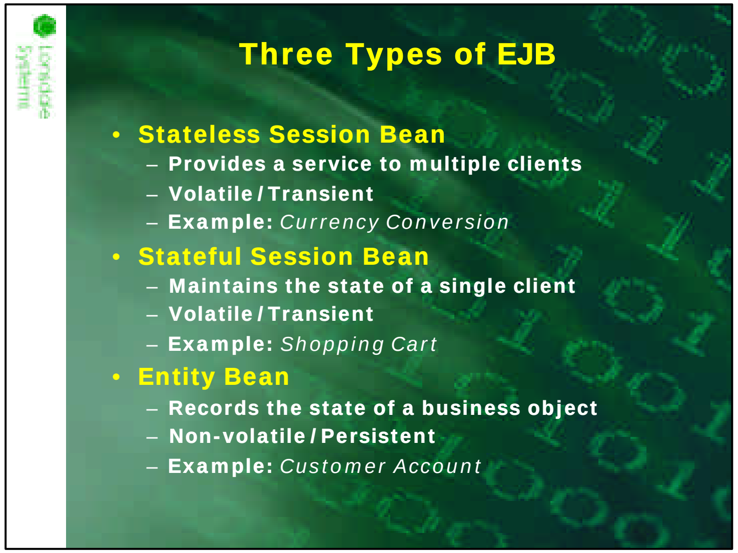
J
M
S

J
D
B
C

Legacy System

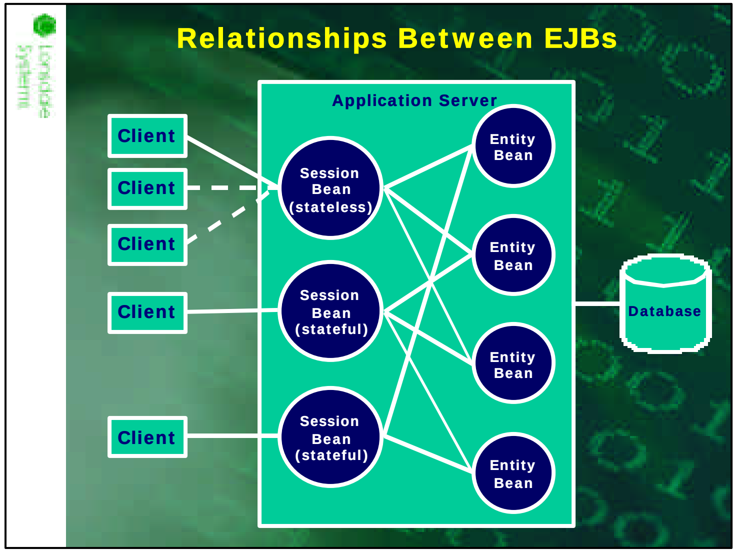
Database

Focus of this discussion



Three Types of EJB

- Stateless Session Bean
  - Provides a service to multiple clients
  - Volatile / Transient
  - Example: *Currency Conversion*
- Stateful Session Bean
  - Maintains the state of a single client
  - Volatile / Transient
  - Example: *Shopping Cart*
- Entity Bean
  - Records the state of a business object
  - Non-volatile / Persistent
  - Example: *Customer Account*



Relationships Between EJBs

Application Server

Client

Client

Client

Client

Client

Session Bean (stateless)

Session Bean (stateful)

Session Bean (stateful)

Entity Bean

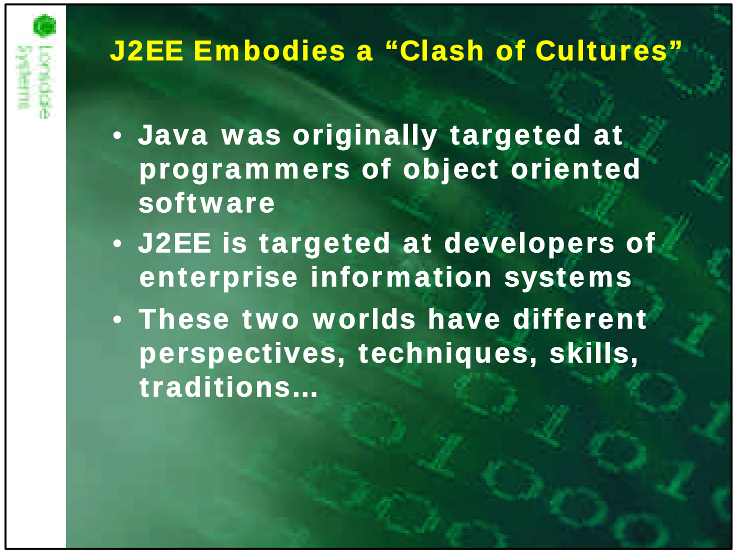
Entity Bean

Entity Bean

Entity Bean

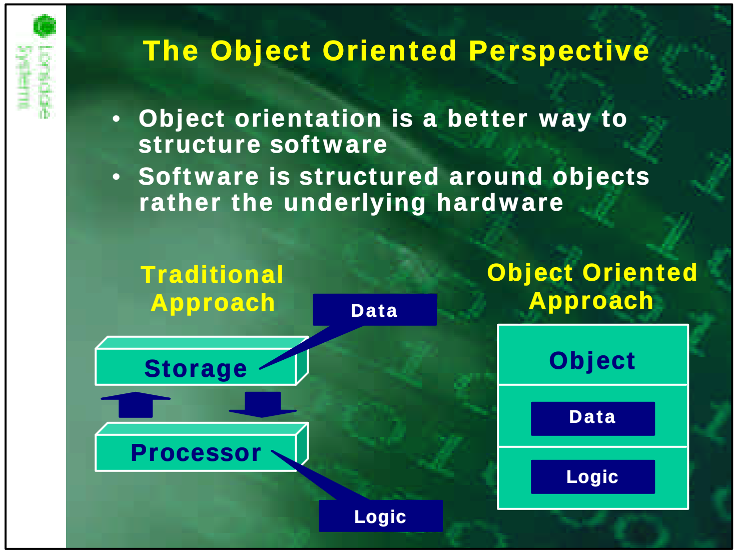
Database

2. J2EE and people



J2EE Embodies a "Clash of Cultures"

- Java was originally targeted at programmers of object oriented software
- J2EE is targeted at developers of enterprise information systems
- These two worlds have different perspectives, techniques, skills, traditions...



The Object Oriented Perspective

- Object orientation is a better way to structure software
- Software is structured around objects rather the underlying hardware

Traditional Approach

Data

Storage

Processor

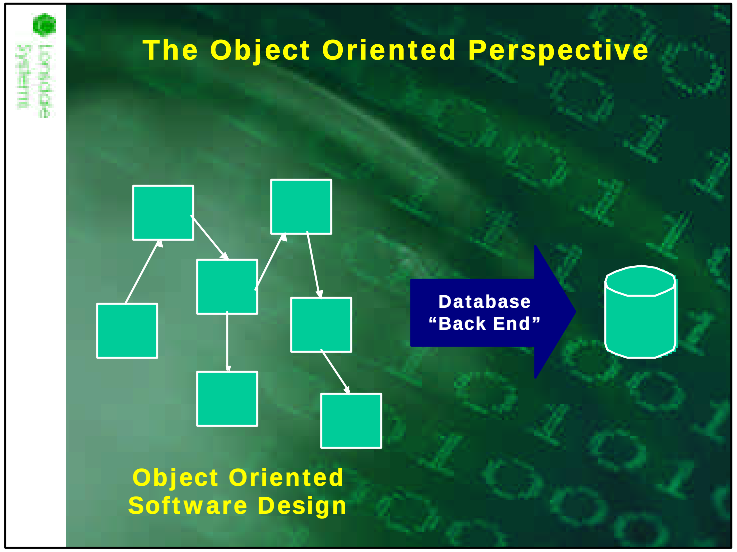
Logic

Object Oriented Approach

Object

Data

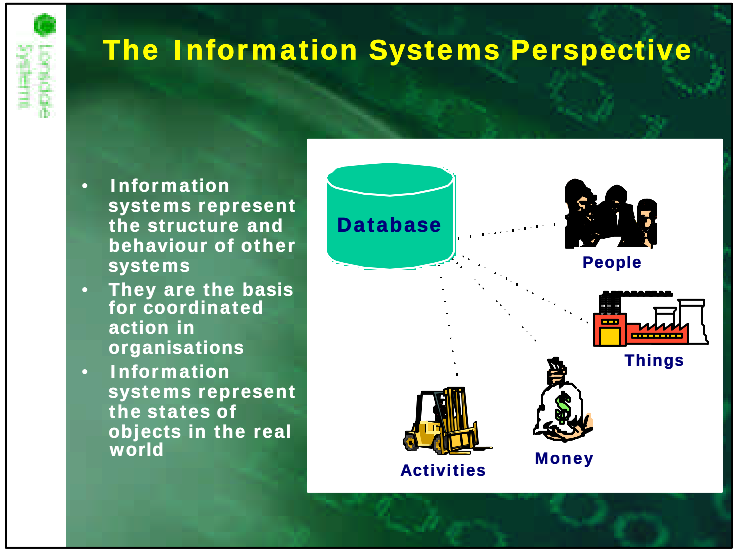
Logic



The Object Oriented Perspective

Database "Back End"

Object Oriented Software Design



The Information Systems Perspective

- Information systems represent the structure and behaviour of other systems
- They are the basis for coordinated action in organisations
- Information systems represent the states of objects in the real world

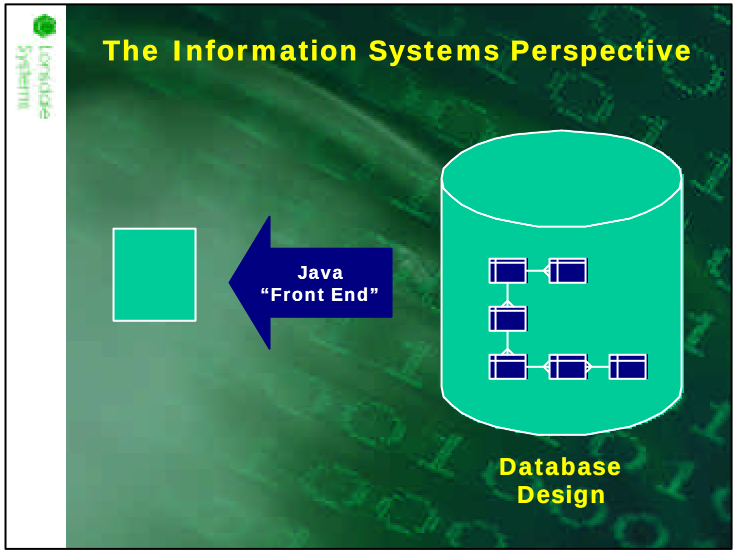
Database

People

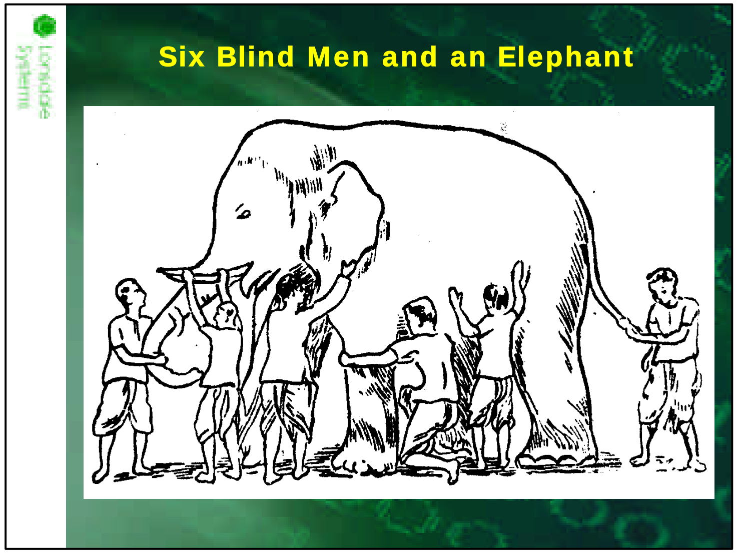
Things

Activities

Money

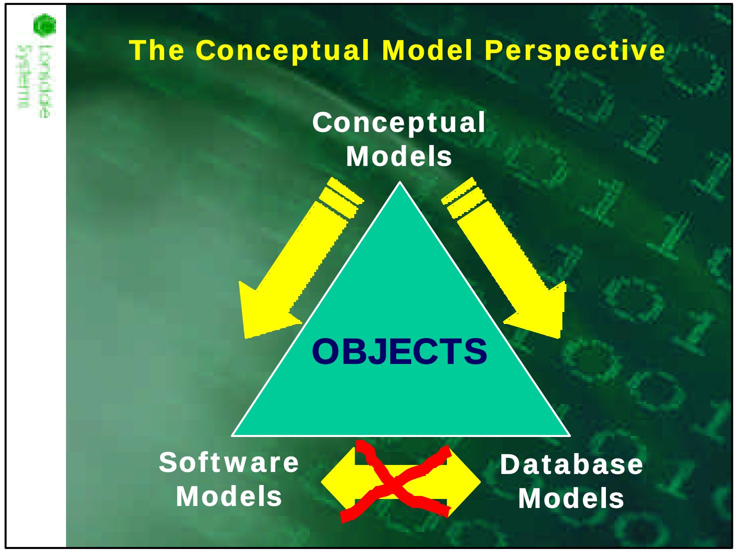


The Information Systems Perspective

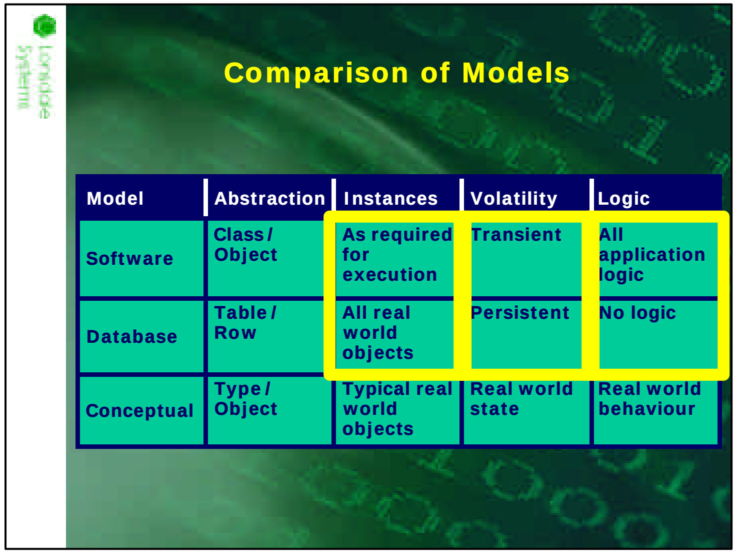


Six Blind Men and an Elephant

3. J2EE and modelling



The Conceptual Model Perspective

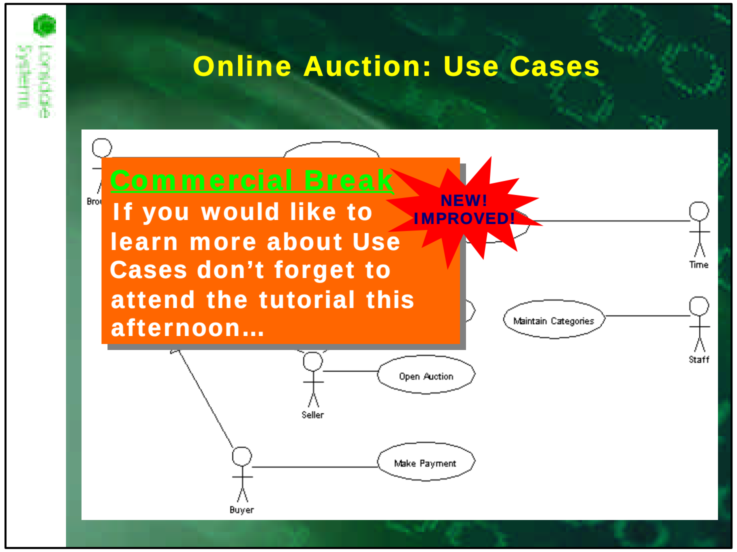


Comparison of Models

Model	Abstraction	Instances	Volatility	Logic
Software	Class / Object	As required for execution	Transient	All application logic
Database	Table / Row	All real world objects	Persistent	No logic
Conceptual	Type / Object	Typical real world objects	Real world state	Real world behaviour

4. Short example

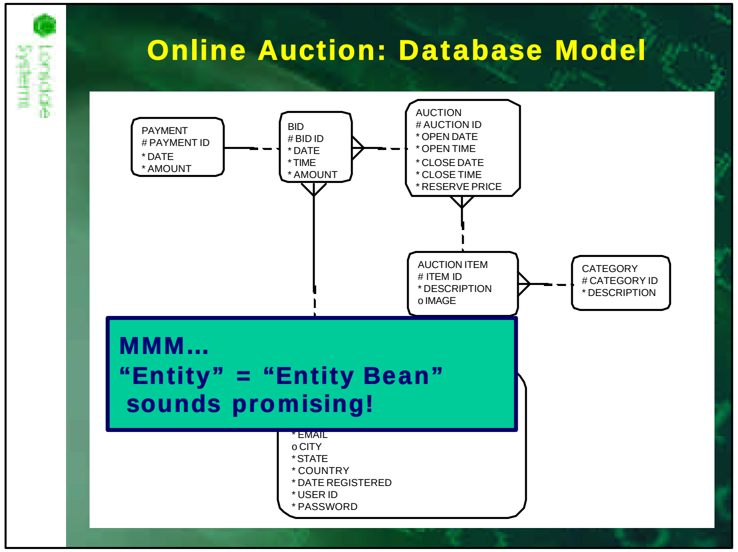
Online Auction Web Site



Online Auction: Use Cases

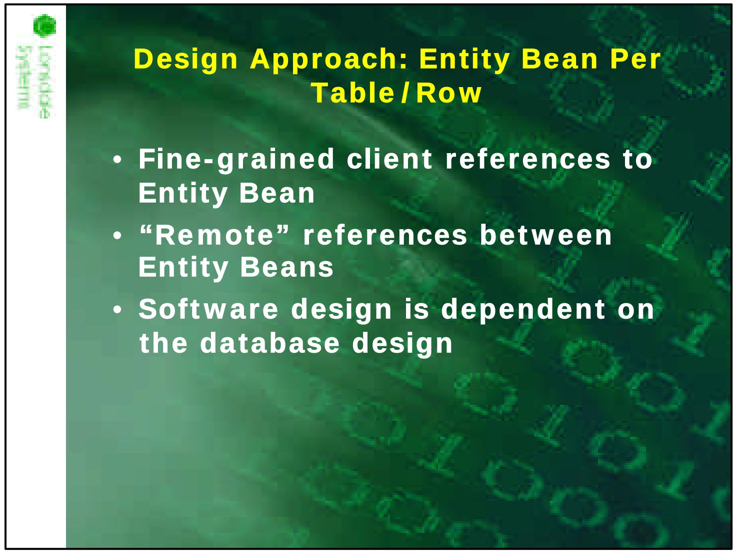
Commercial Break

If you would like to learn more about Use Cases don’t forget to attend the tutorial this afternoon…



Online Auction: Database Model

MMM…
“Entity” = “Entity Bean” sounds promising!

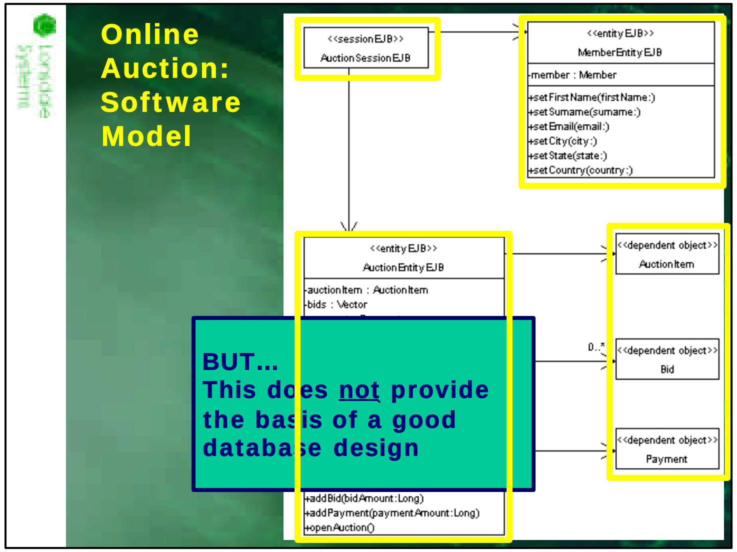


Design Approach: Entity Bean Per Table / Row

- Fine-grained client references to Entity Bean
- “Remote” references between Entity Beans
- Software design is dependent on the database design

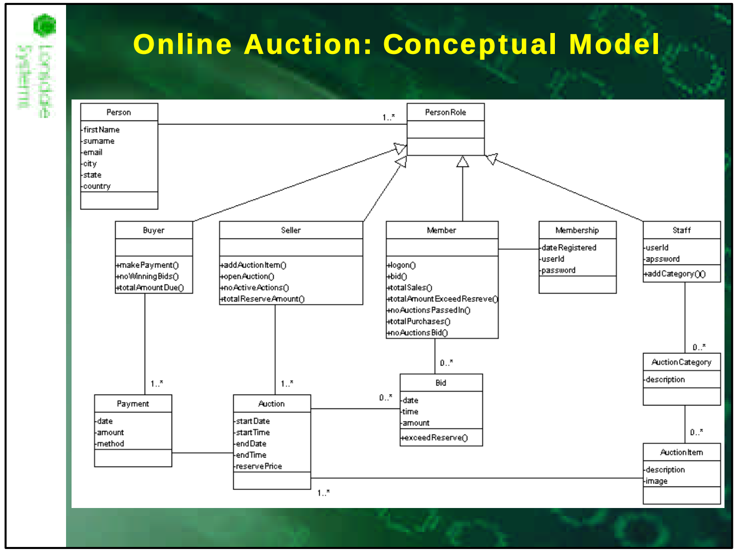
Design Approach: Coarse-Grained Business Component

- Encapsulates the business and data access logic
- Provides a “business-oriented” interface to the database



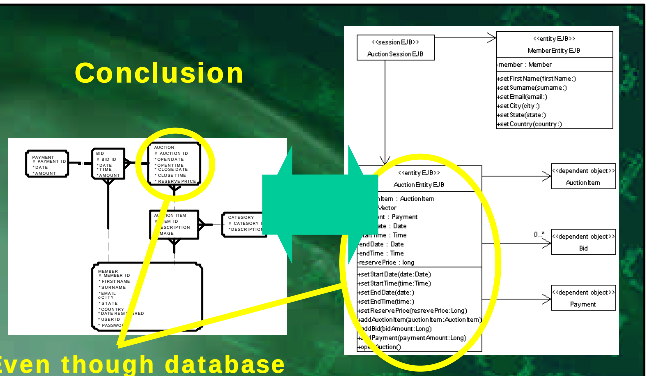
Online Auction: Software Model

BUT…
This does not provide the basis of a good database design



Online Auction: Conceptual Model

Conclusion



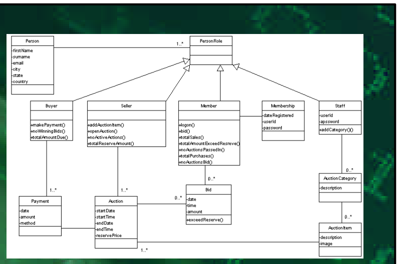
Even though database tables and software objects can seem very similar!

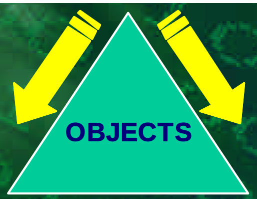
A database model does not provide the basis of a good software design

A software model does not provide the basis of a good database design

Conclusion

- Conceptual Model
  - Total picture
  - Shared understanding
  - Aid communication
  - Reconcile OO and IS perspectives
  - Better description of requirements





Software Models

Database Models

Questions?

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