

Object-Oriented Design – An Example

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Outline

- An example on OOD
- Steps in OOD

Models from OOA

- Use case diagram
- Sequence diagram
- Activity diagram
- State machine diagram
- Class diagram

Architecture Design

- Steps
 1. Group objects into subsystems that can be implemented by individuals (单个的)
 2. Design an architecture (结构) for each subsystem
 3. Identify the persistent (永久) data

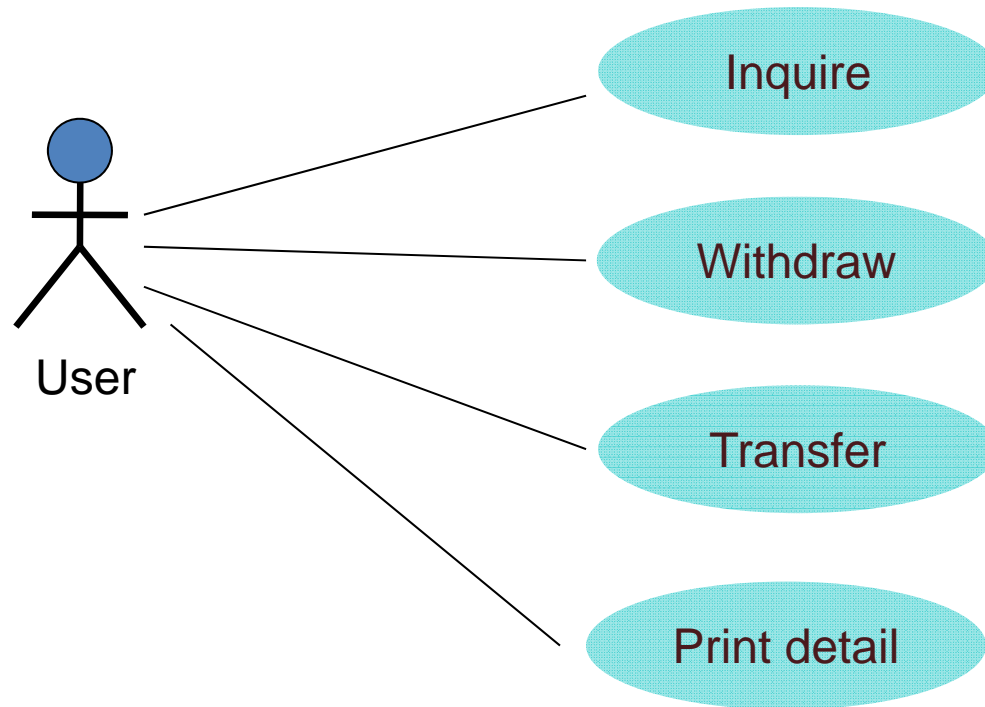
Grouping Objects into Subsystems

- Assign objects identified in **one use case** into **the same subsystem**
- Create **a dedicated (专用) subsystem** for objects used for moving data among subsystems
- **Minimize (减到最低)** the number of associations **crossing subsystem boundaries (边界)**
- All objects in the same subsystem should be functionally (功能上) related.

From Objects to Subsystems

- System decomposition （分解） can be revised （修改）
 - Several subsystems are **merged** （合并）
 - A complex subsystem is **split** （拆开） into parts
 - New subsystems can be **added**。

ATM - Use Cases



Select Architecture Style

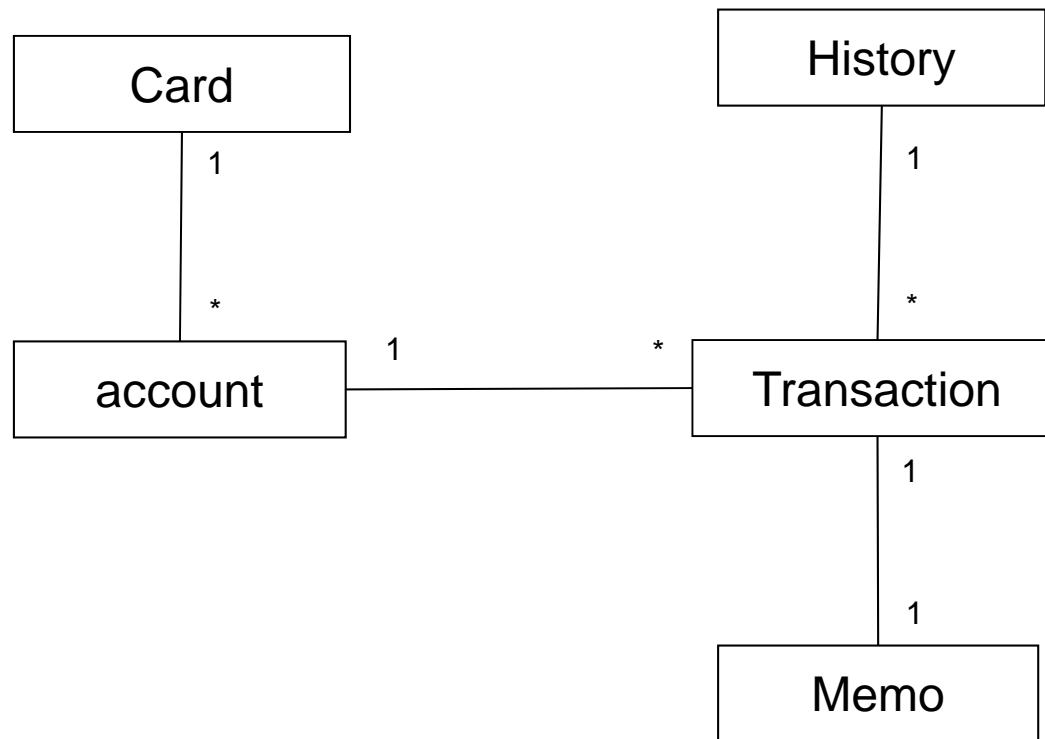
Inquire

Transfer

Withdraw

Print Detail

ATM – Association



Grouping Objects into Subsystems

Card

Account

Memo

Inquire

Transfer

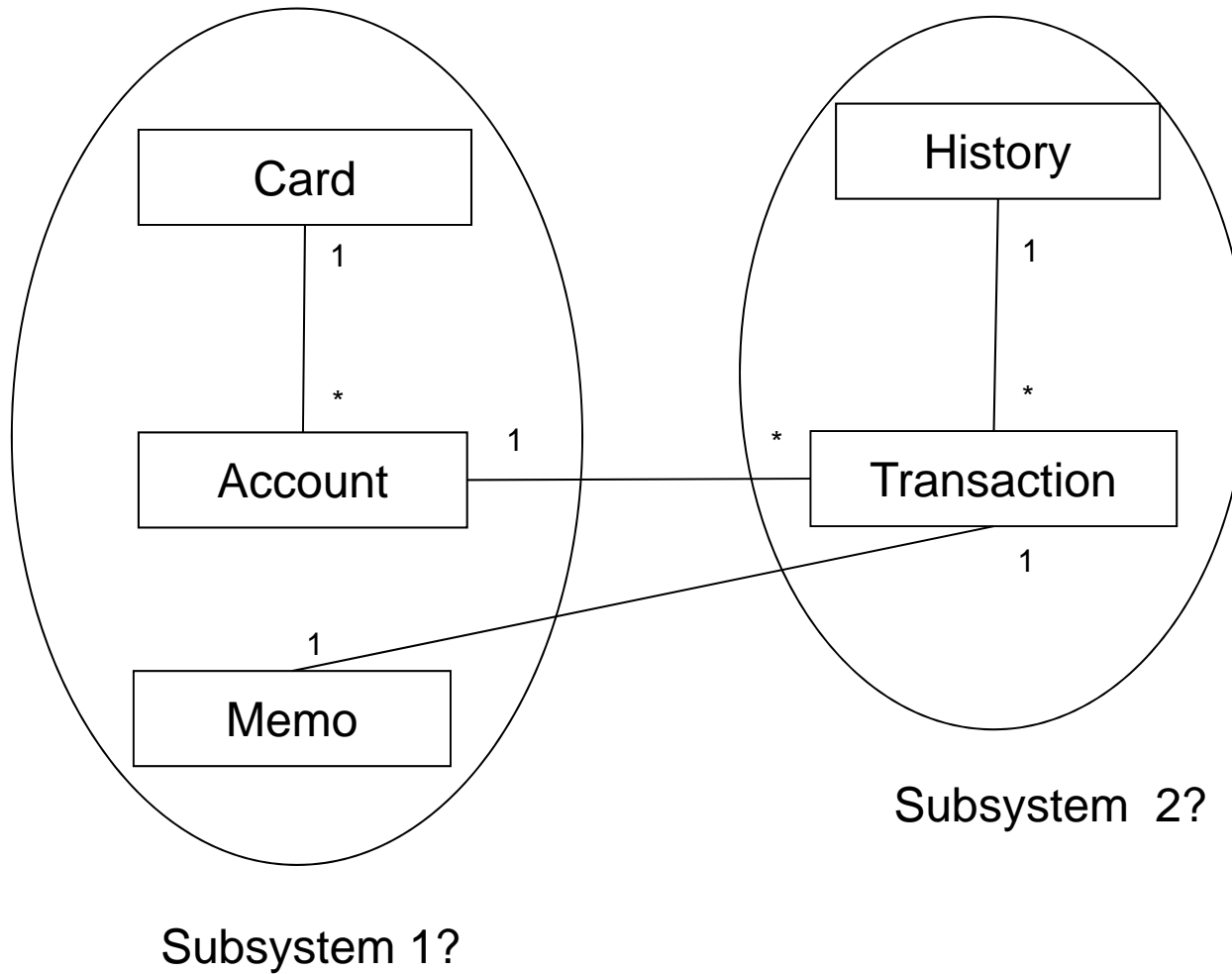
Withdraw

Print Detail

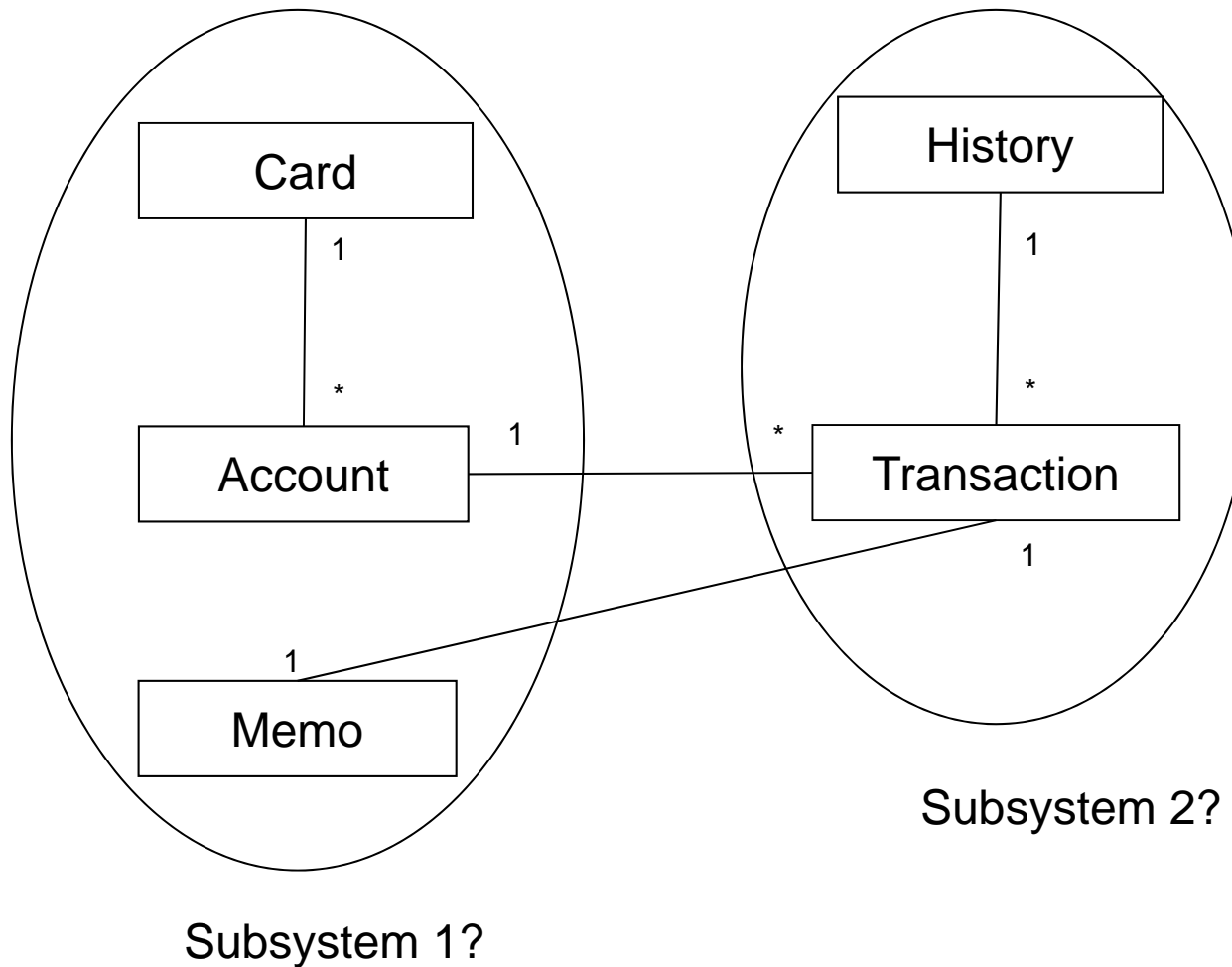
History

Transaction

Grouping Objects into Subsystems

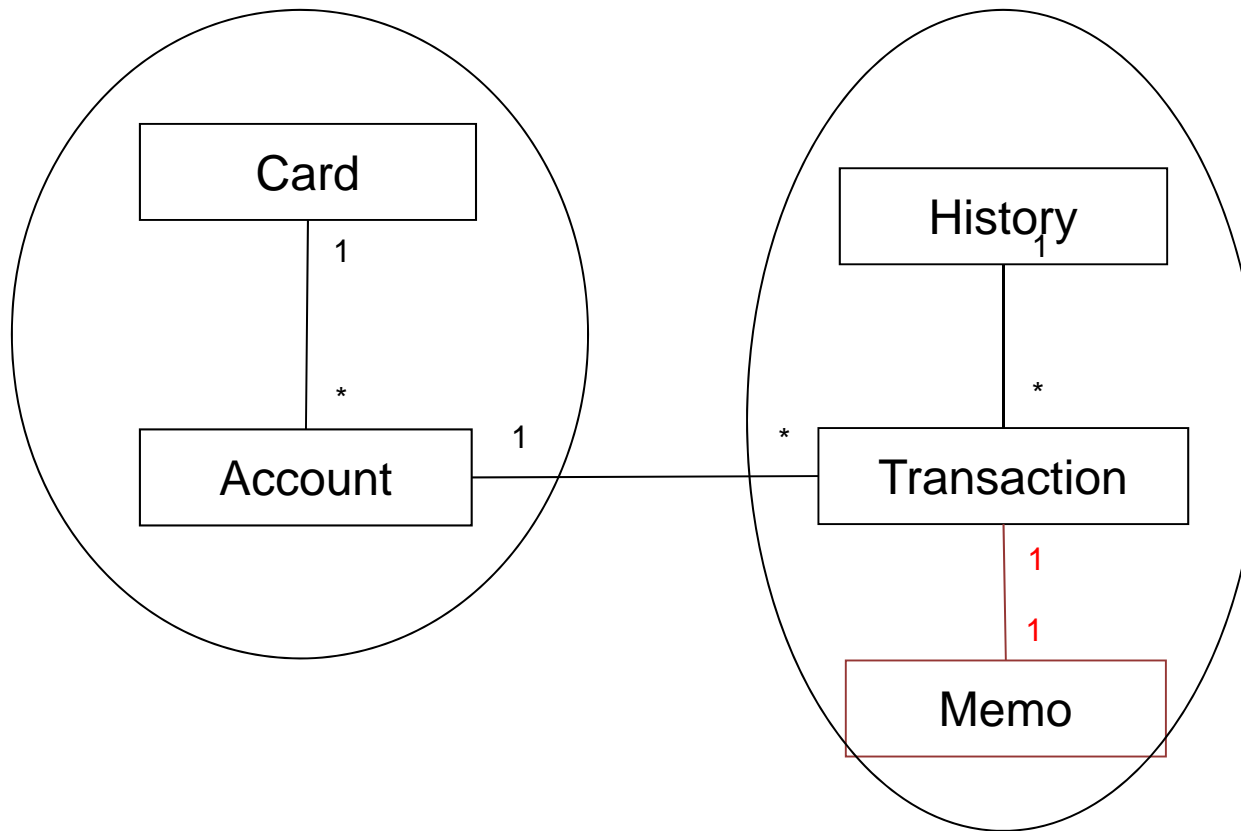


Grouping Objects into Subsystems



Coupling?
Cohesion?

Grouping Objects into Subsystems



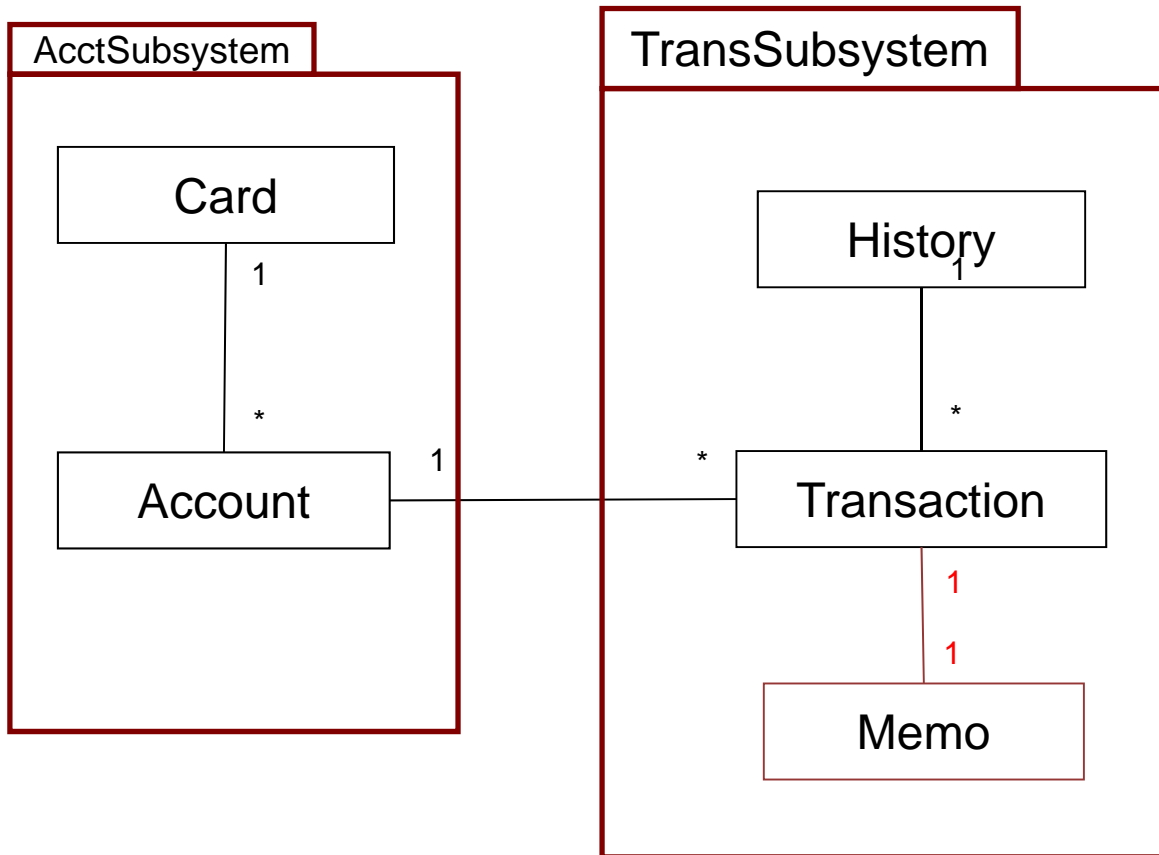
Subsystem 1?

Subsystem 2?

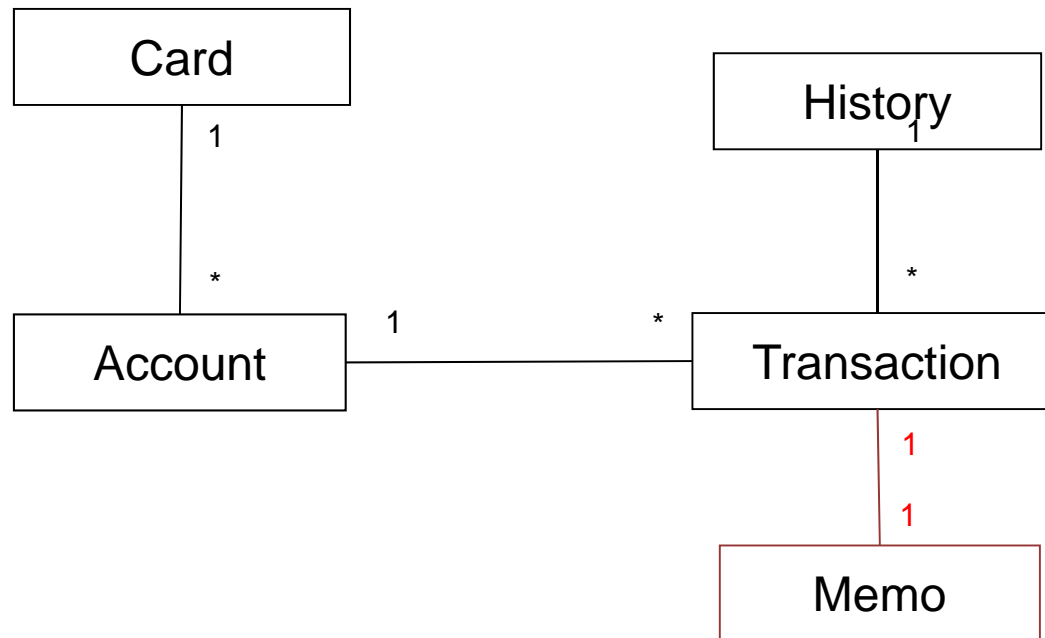
Decrease Coupling

Increase Cohesion

Grouping Objects into Subsystems

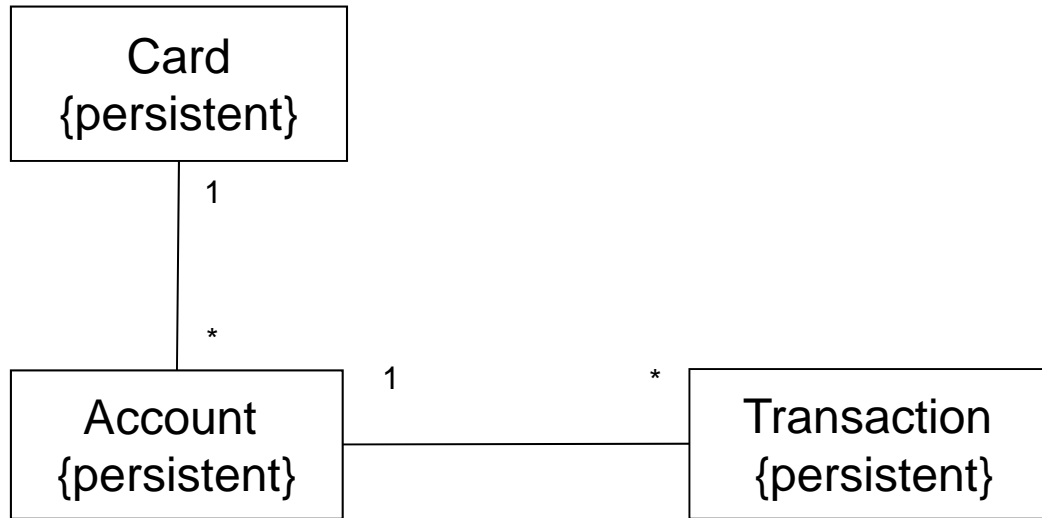


Identifying Persistent Data

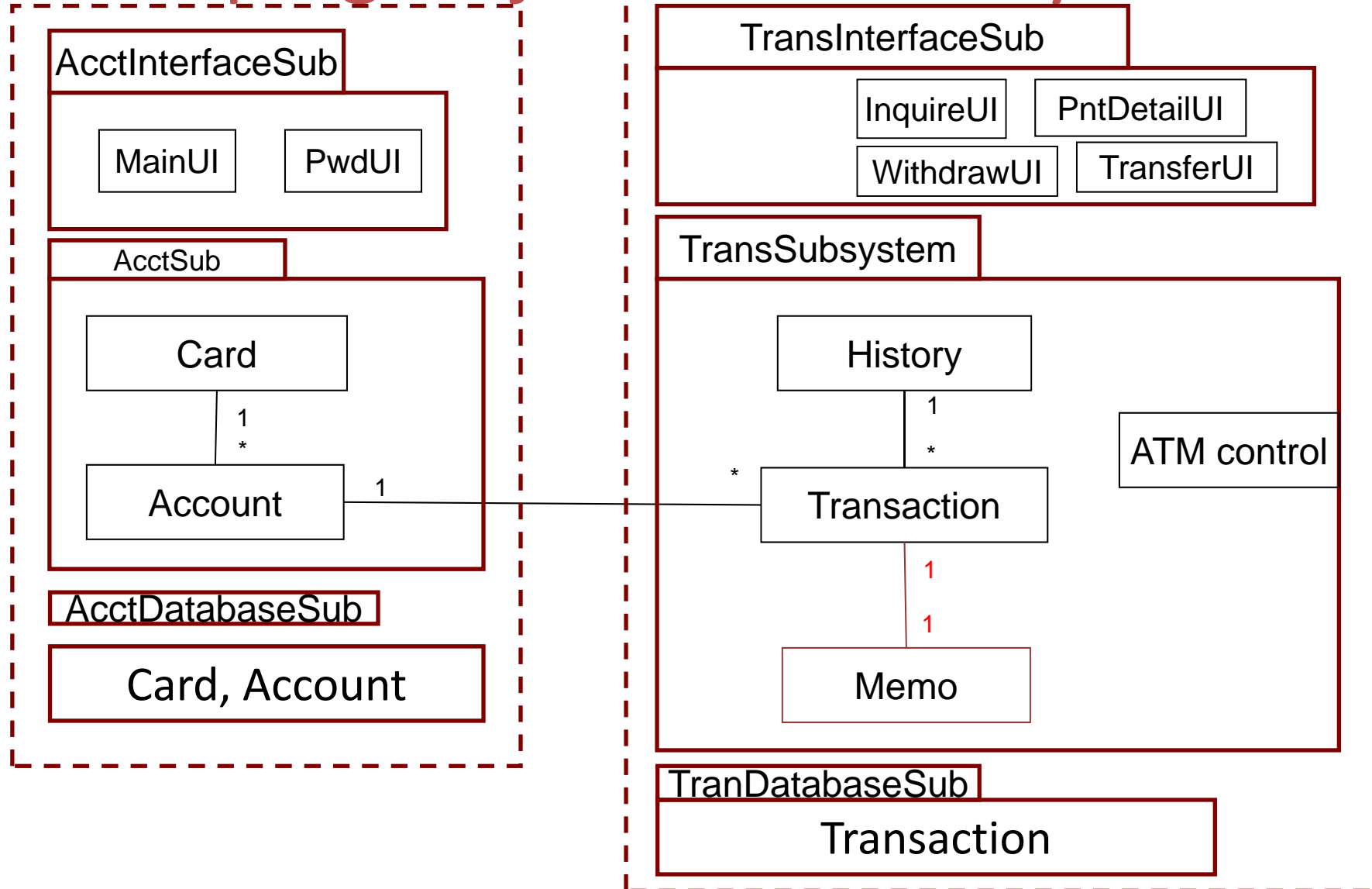


Which class is persistent (needs to be stored for a period)?

Identifying Persistent Data



Grouping Objects into Subsystems



Database Table

Card			
Card No.	Password	Name	Phone
1234567890	*****	David	2222222
1289034567	*****	Daren	2223332

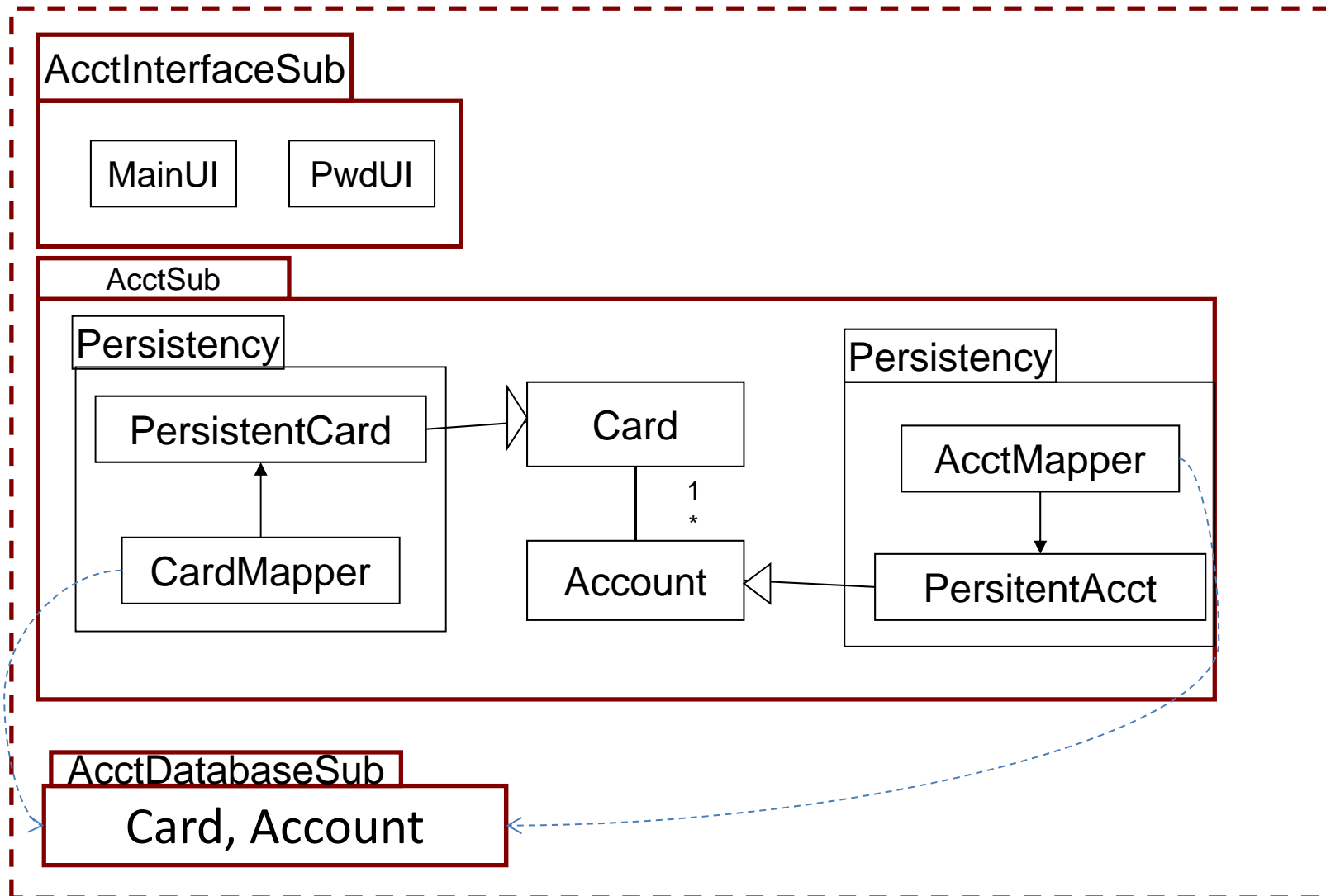
Account			
Name	Acct. No.	Balance	Card. No (for association)
David	333333333	1000	1234567890
David	555555555	2000	1234567890

Database Table

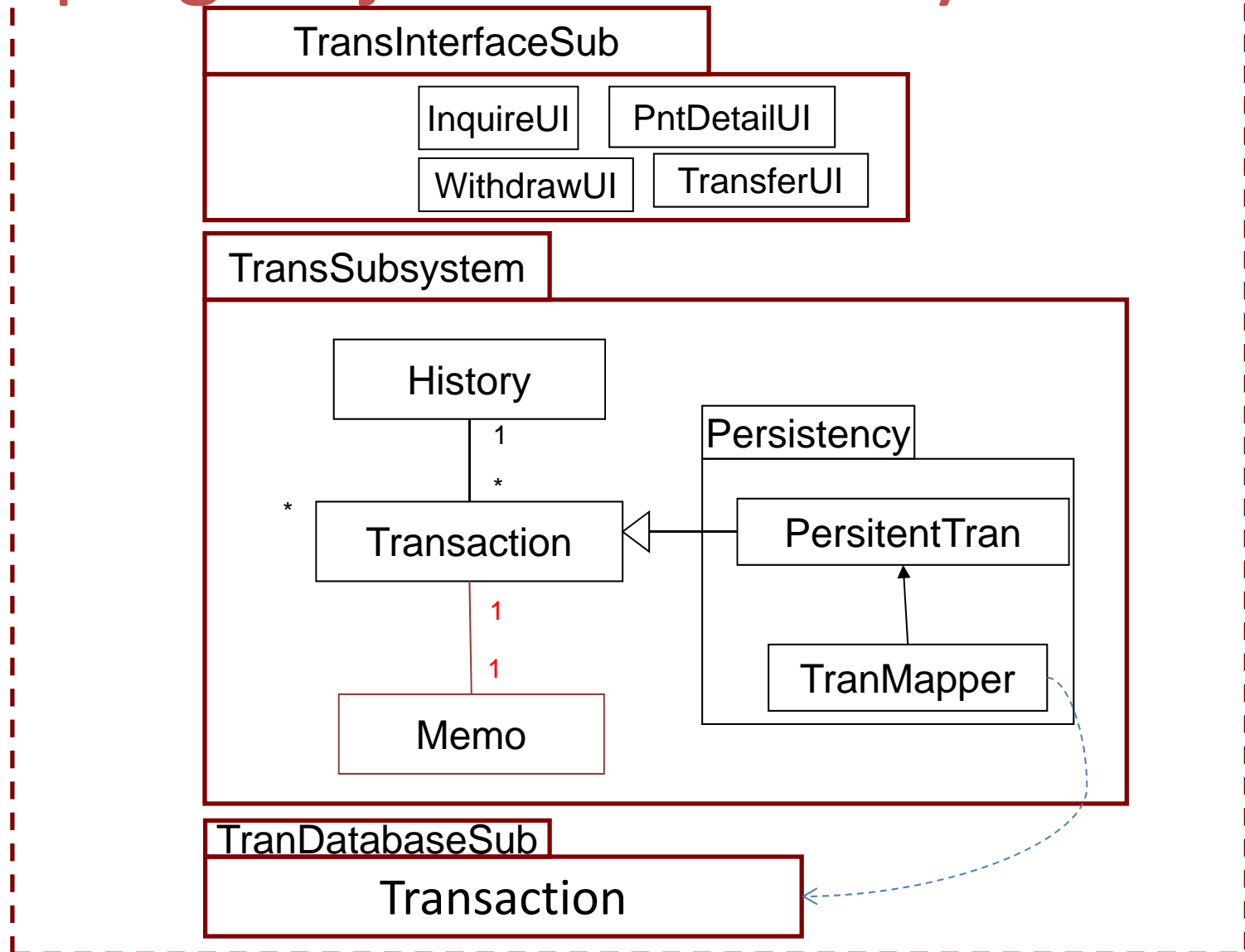
Account			
Name	Acct. No.	Balance	Card. No (for card association)
David	333333333	1000	1234567890
David	555555555	2000	1234567890

Transaction					
Reference No.	Date	Time	Type	Amount	Account No (for card association)

Grouping Objects into Subsystems



Grouping Objects into Subsystems



Summary

- We can group the objects into subsystems so that they can be developed by individuals.
- A system decomposition can be revised by merging, splitting, and add systems.
- For every subsystem, we can give the further architecture for it.
- The design fundamentals must be followed in the architecture design.