

SCD2613: System Analysis and Design

Topic 3: Design

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



Design

- Structure Chart
- Data Storage
- User Interface
- Logical Data Flow Diagram (DFD)
- Physical DFD

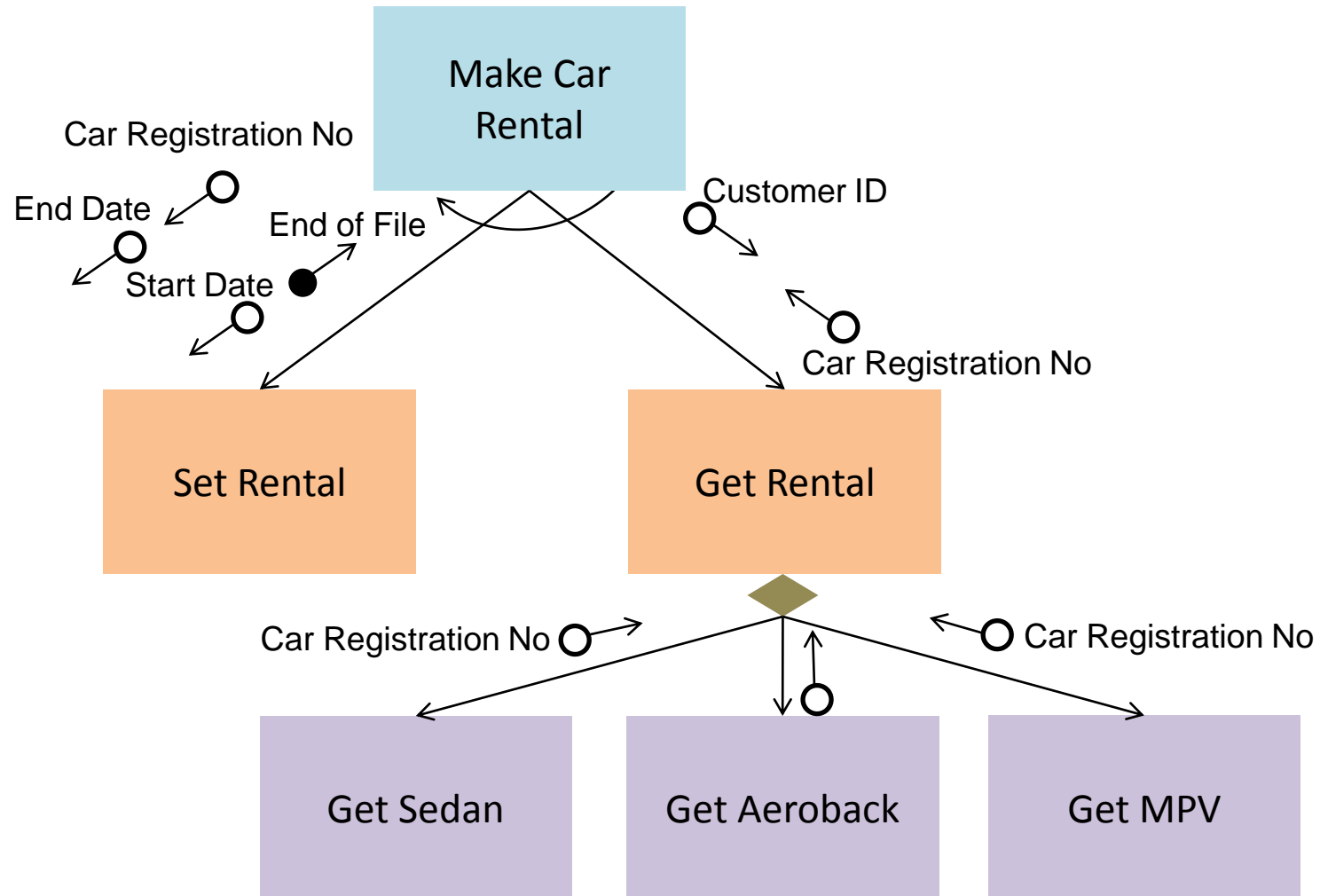
Structure Chart...

- Structure chart: top-down representation of business functions and processes as modules.
- Consists of 2 modules that are reusable:
 - Control: higher level module
 - Subordinate: lower level module – can be library module

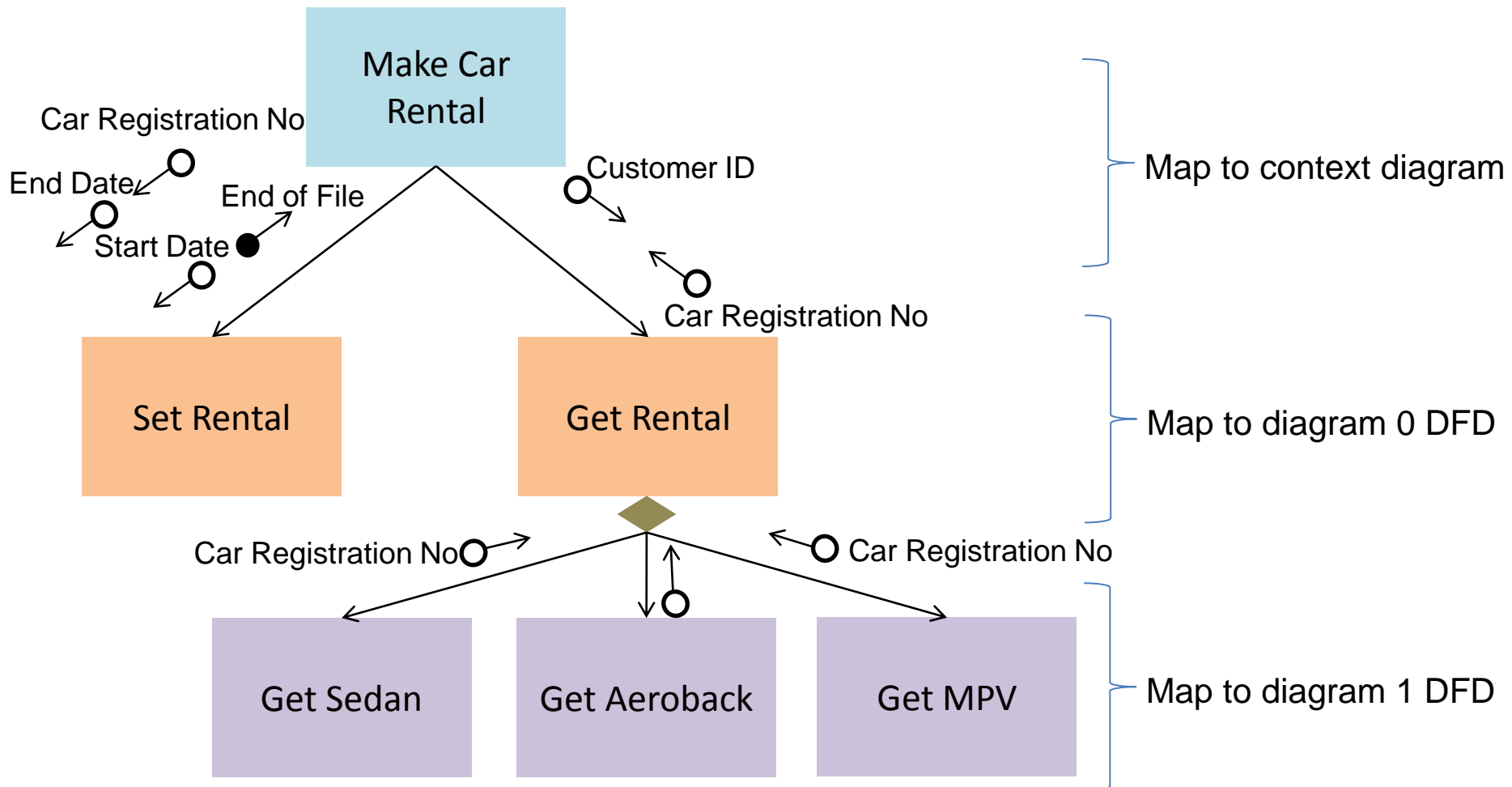
Structure Chart

- Consists of 2 couples:
 - Data: passing of data among modules 
 - Control: message/flag sent among modules 
- Condition: an action or state 
- Loop: repetition of module 

Example of Structure Chart

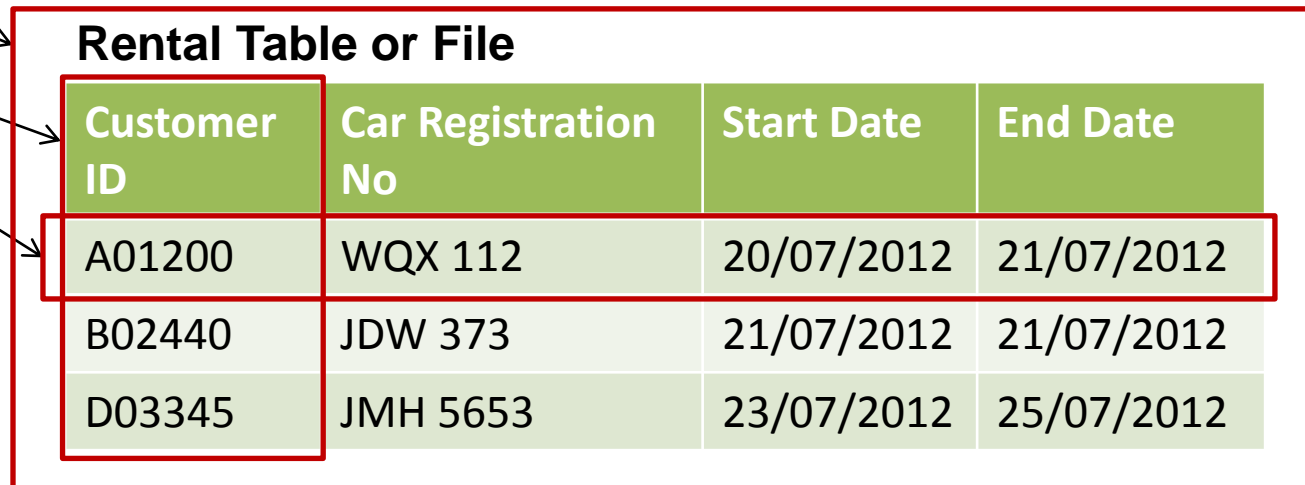


Structure Chart vs. DFD



Data Storage

- Data of a system can be retained in 2 ways:
 - File processing
 - Database management system (DBMS)
- Terminology:
 - Table or file
 - Field
 - Record



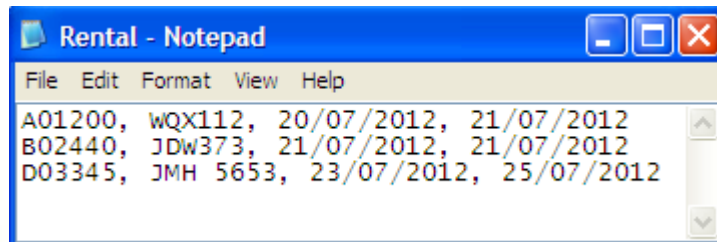
The diagram shows a table titled "Rental Table or File" with four columns: Customer ID, Car Registration No, Start Date, and End Date. The first row is highlighted in green. A red box highlights the first row, and a red box highlights the first column. Arrows point from the text "Field", "Record", and "Table or File" to the corresponding parts of the table.

Customer ID	Car Registration No	Start Date	End Date
A01200	WQX 112	20/07/2012	21/07/2012
B02440	JDW 373	21/07/2012	21/07/2012
D03345	JMH 5653	23/07/2012	25/07/2012

File Processing vs. DBMS

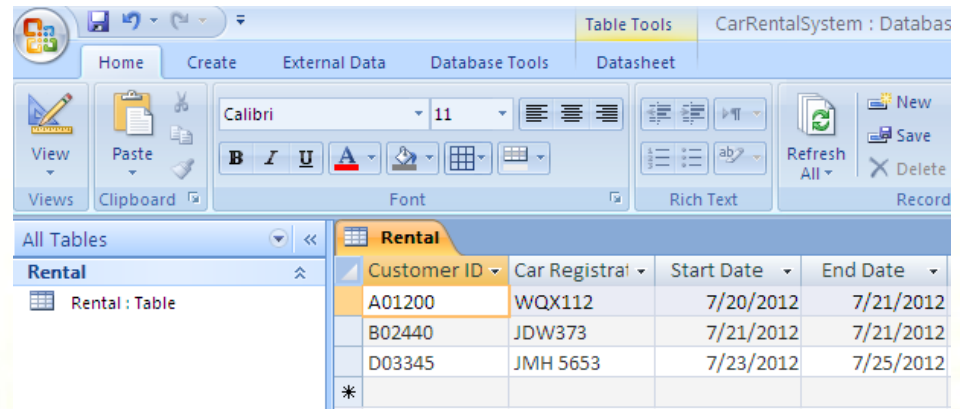
File Processing

- Flat file
- Cannot be sorted
- Difficult to manage
- No automatic referential integrity



DBMS

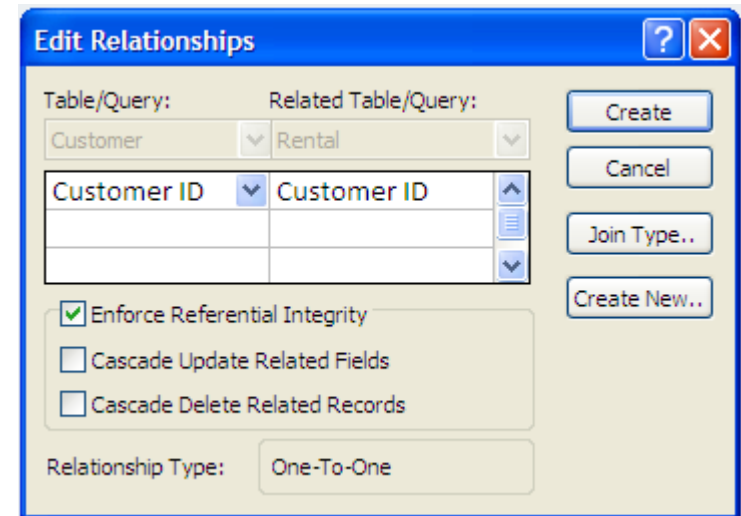
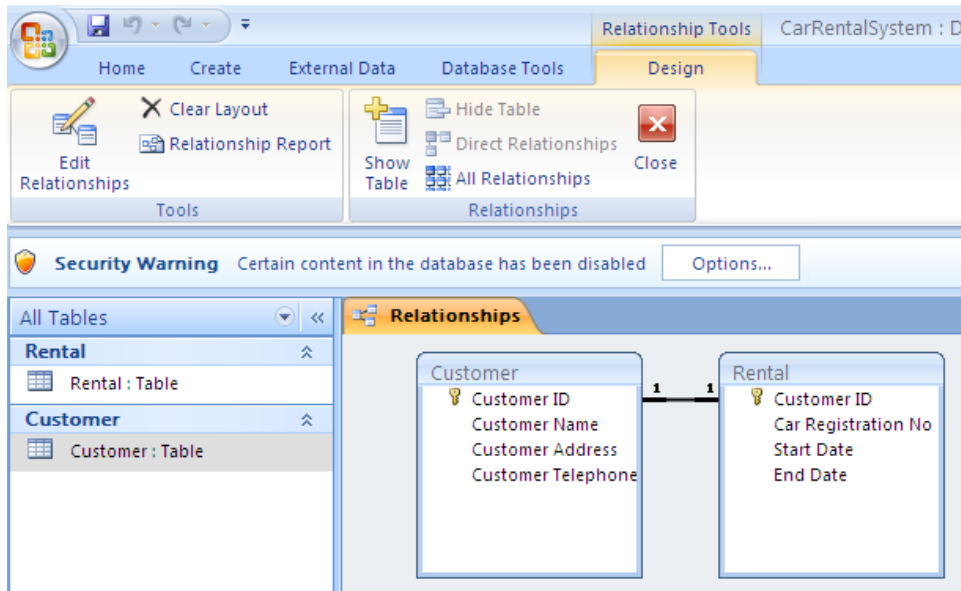
- Indexed file
- Can be indexed
- More organised
- Manage referential integrity



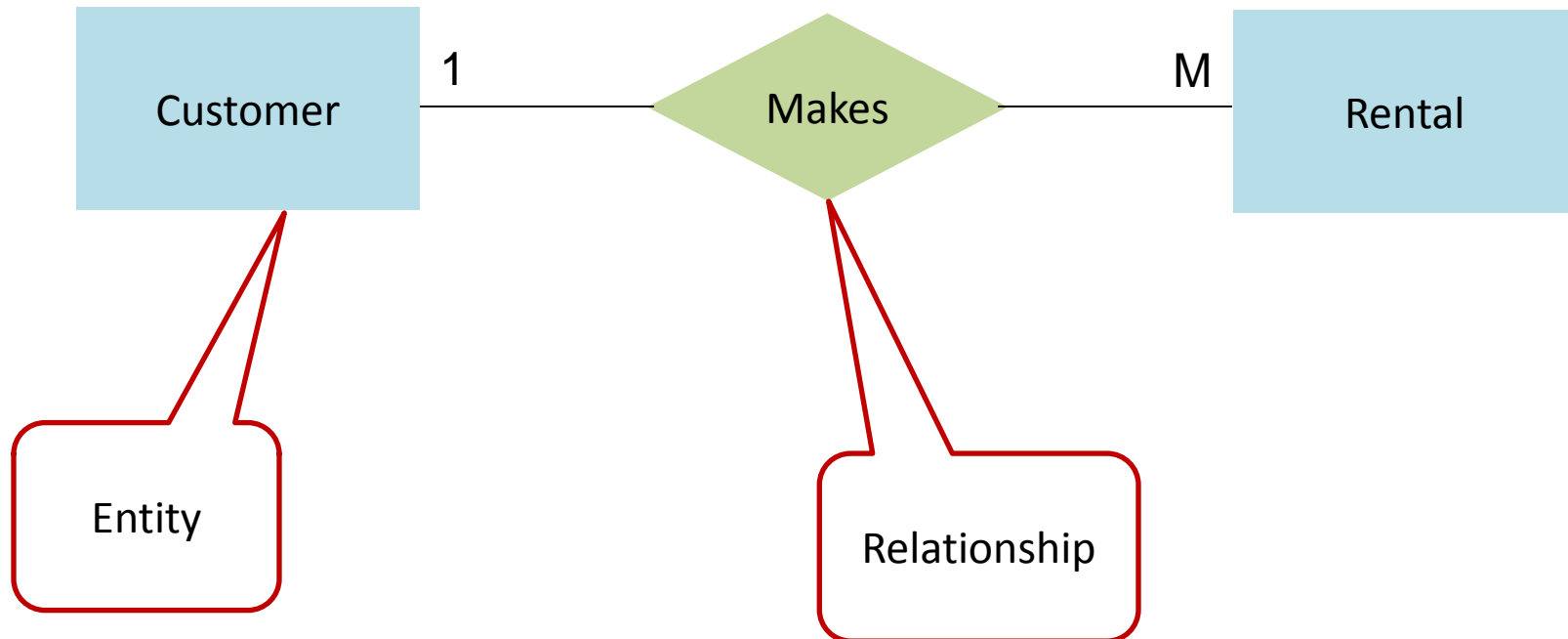
Customer ID	Car Registration	Start Date	End Date
A01200	WQX112	7/20/2012	7/21/2012
B02440	JDW373	7/21/2012	7/21/2012
D03345	JMH 5653	7/23/2012	7/25/2012

Referential Integrity

- Relational database enforces referential integrity that avoids input data error
- A foreign key value must correspond with a primary key value in a master file e.g. Customer



Entity-Relationship Diagram (ERD)



ERD

- 3 Types of relationships:
 - One-to-one relationship (1:1) e.g. 1 customer can only have 1 membership
 - One-to-many relationship (1:M) e.g. 1 customer can make a number of rentals
 - Many-to-many relationship (M:N) e.g. many customers have many rentals
- Refer to database course for the details

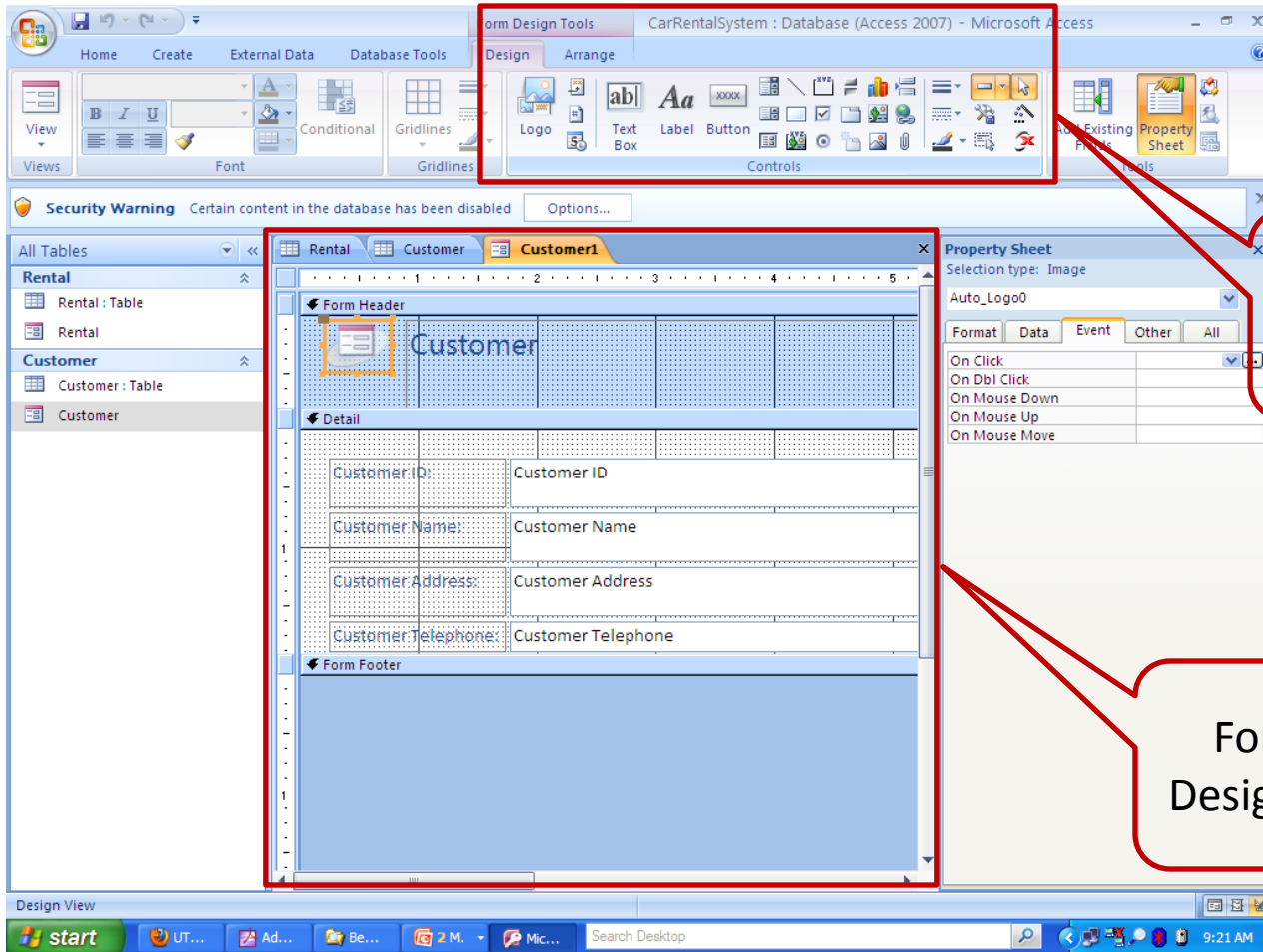
User Interface

- Users interact with systems through interface, thus vital to design an easy to use interface
- Human-Computer Interaction (HCI): a field that studies ways to improve user interface
- Graphical User Interface (GUI): use graphics such as icons that allow users' interaction
- Good interface design conforms to user-centred design

User-Centred Design (UCD)

- Relates to usability that covers:
 - Easy to use
 - Easy to learn
 - Easy to understand
 - Easy to complete task (e.g. data entry)
 - Easy to get support (e.g. online help)
- Use controls wisely to avoid input errors
- E.g. use radio button for gender (male/female) instead of asking users to type

Designing Forms Using Access



The screenshot displays the Microsoft Access 2007 interface for designing a form. The 'Form Design Tools' ribbon is active, showing various controls like Logo, Text Box, Label, and Button. The 'Customer1' form is in Design View, with a 'Control Tab' highlighted on the form header. The 'Property Sheet' is open on the right, showing the 'Event' tab. The form structure includes a Form Header, Detail section with fields for Customer ID, Name, Address, and Telephone, and a Form Footer.

Control Tab

Form in Design View

Logical vs. Physical DFD

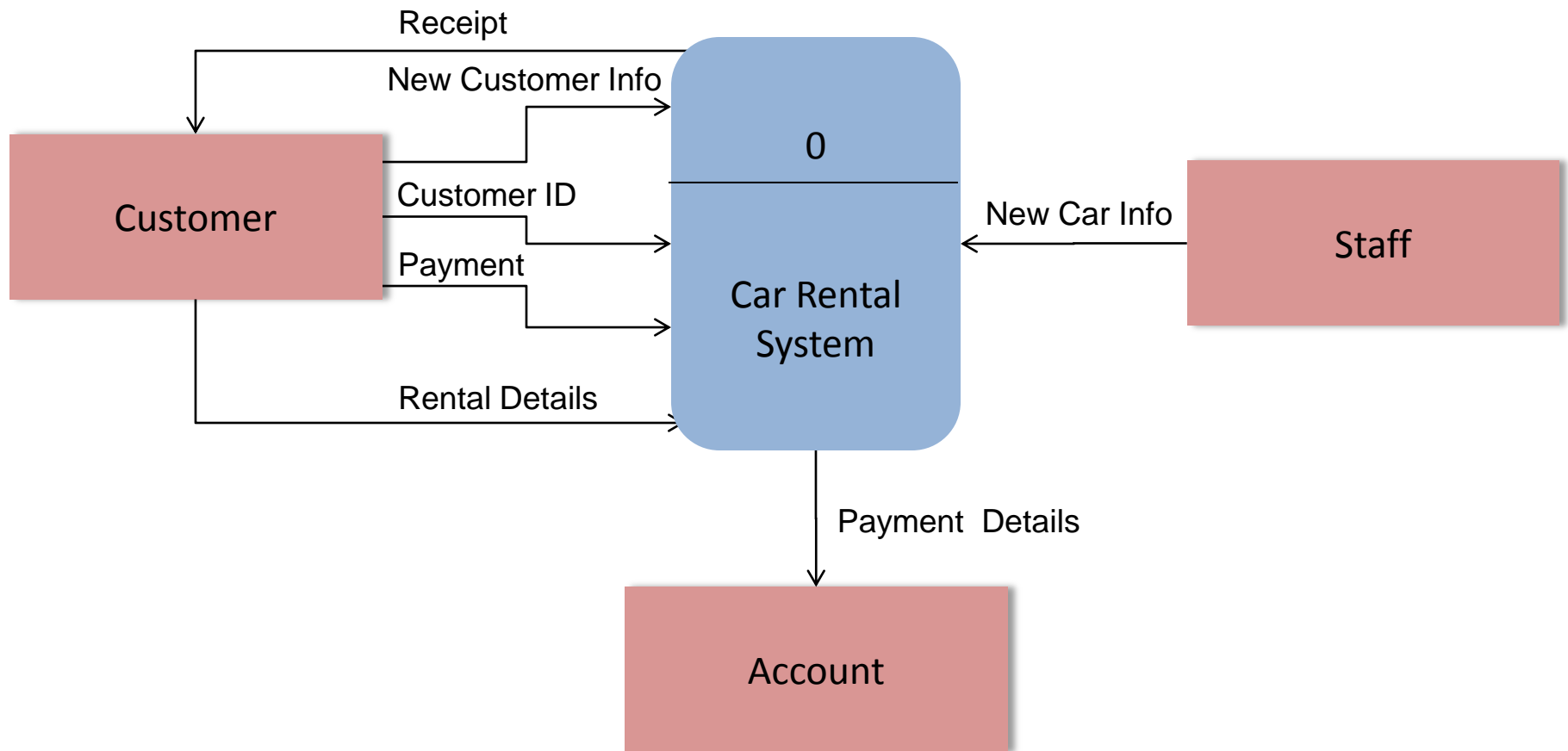
Logical DFD

- Focuses on logical view
- Do not consider implementation
- Includes master files only

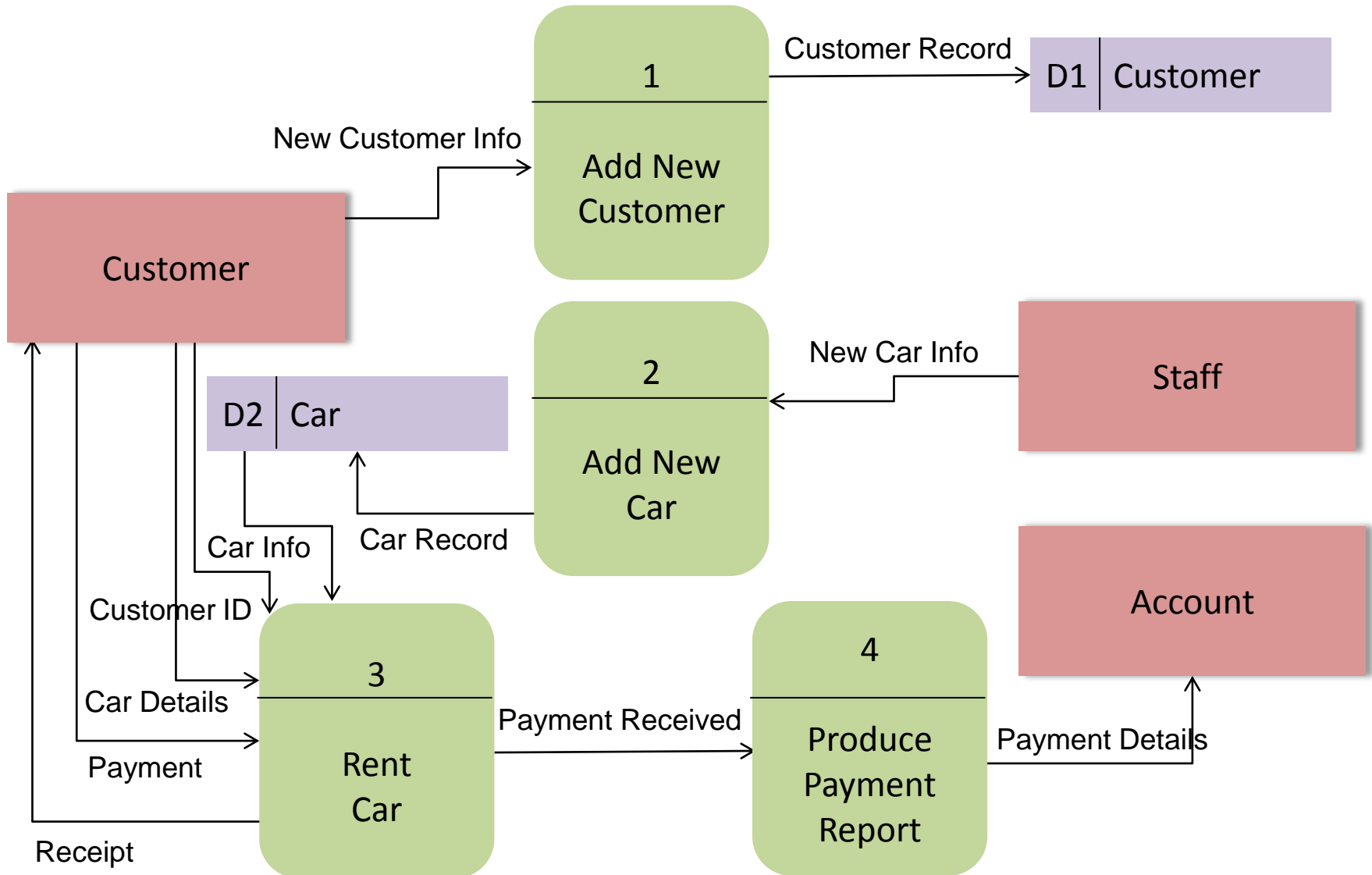
Physical DFD

- Focuses on physical view
- Considers implementation aspect e.g. bar code, form
- Also includes transaction files

Car Rental System: Context Diagram



Logical DFD: Diagram 0



Physical DFD: Diagram 0

