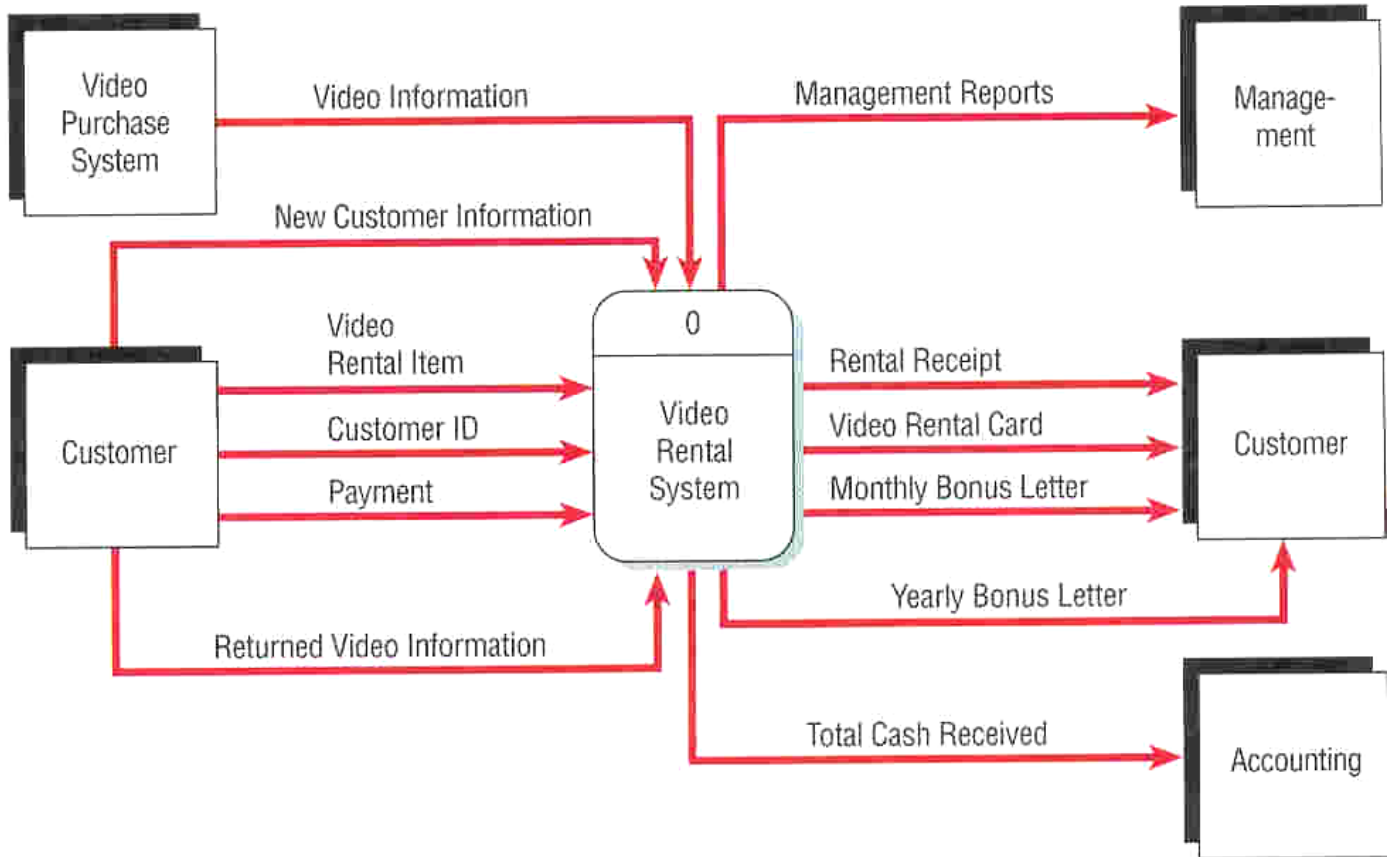
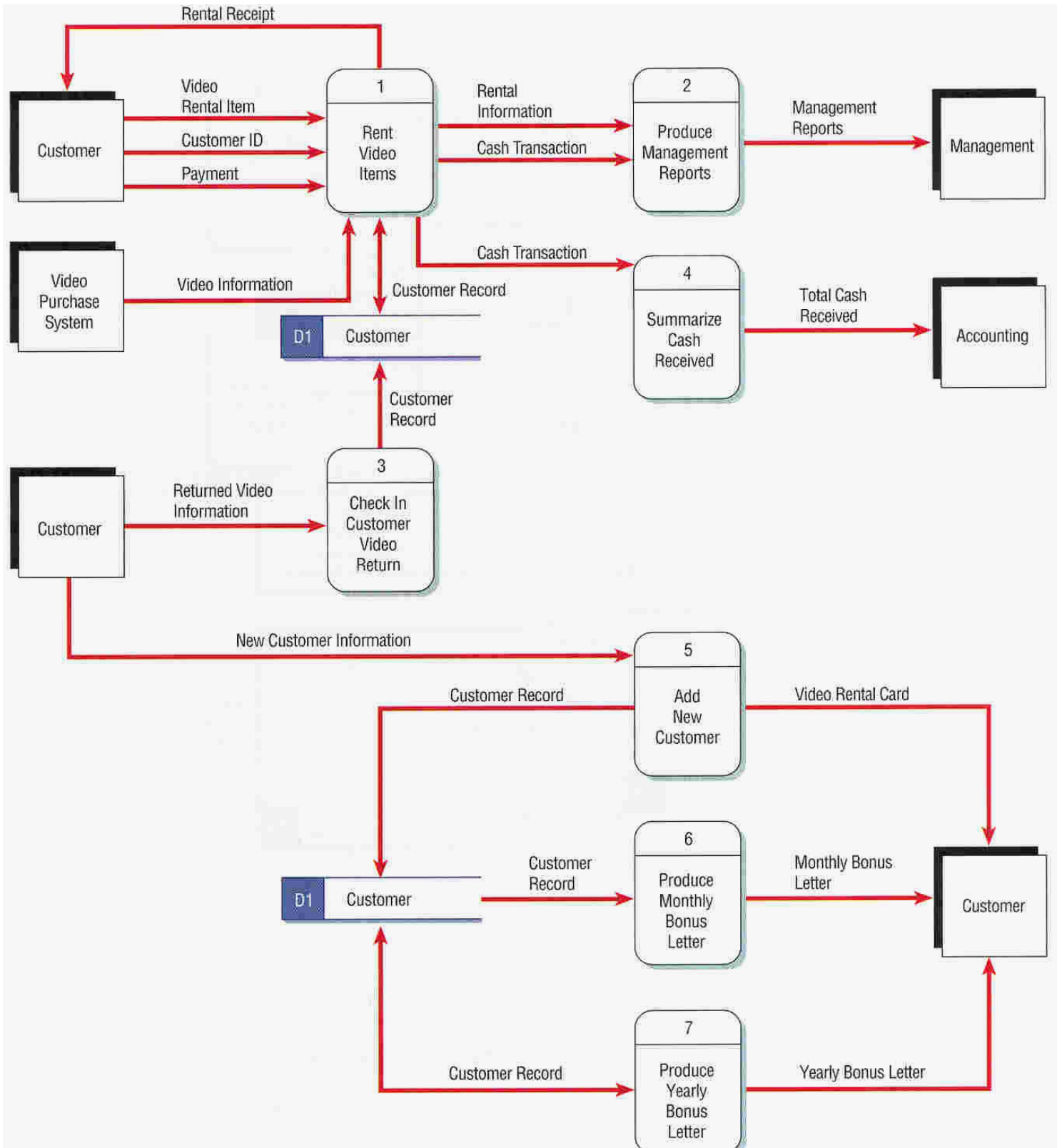


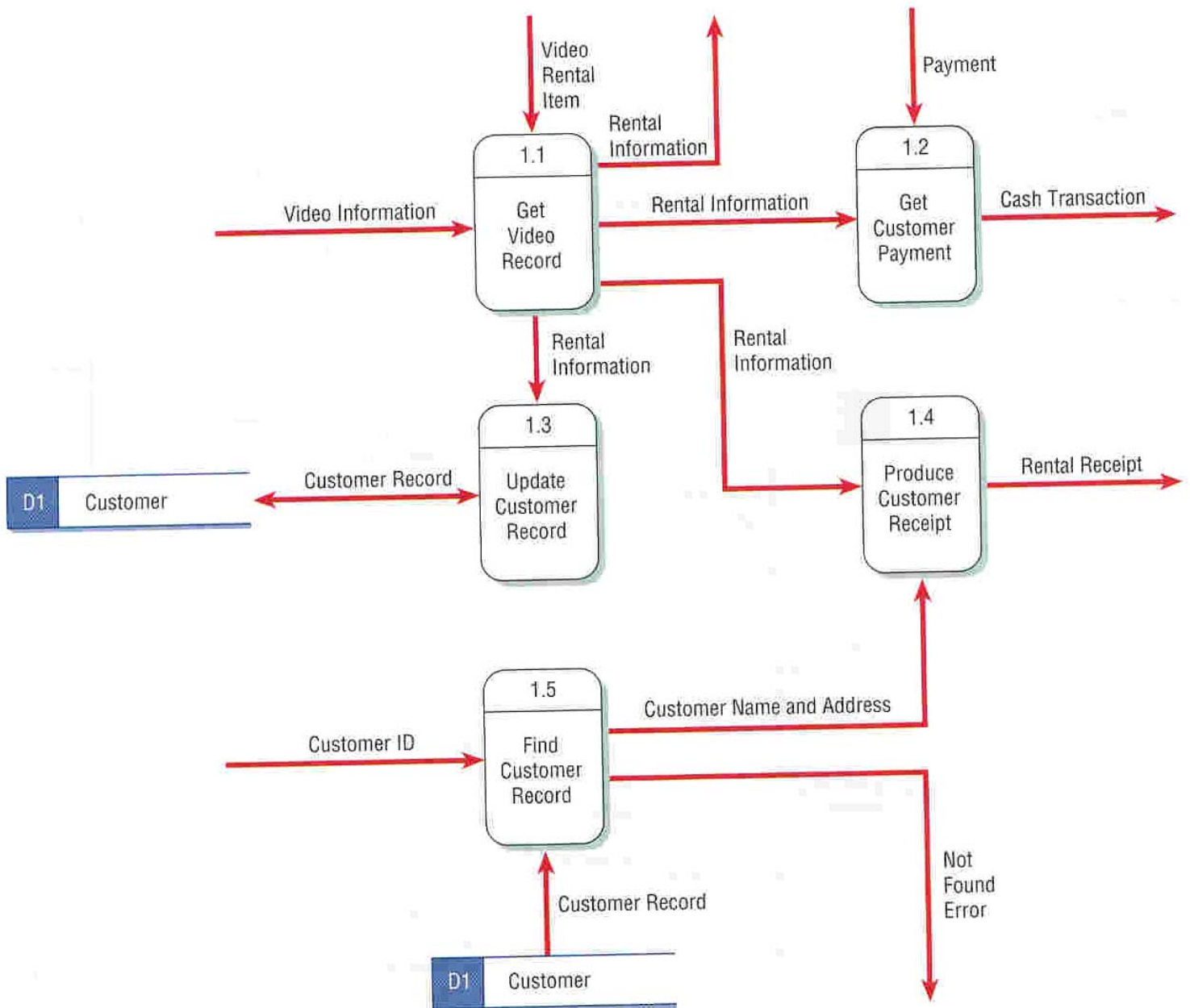
Context Diagram



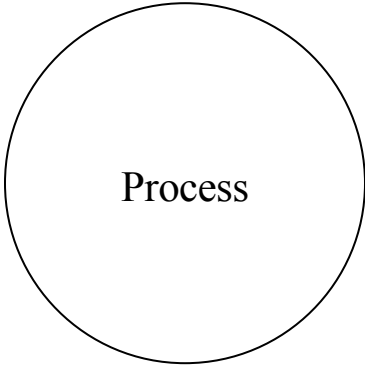
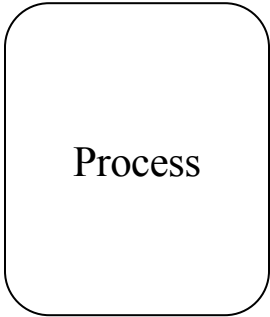
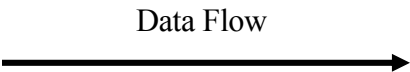
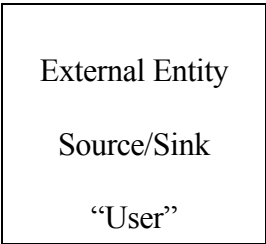
Level 1 Diagram



Level 2 Diagram



DFD Symbols



DFD Concepts

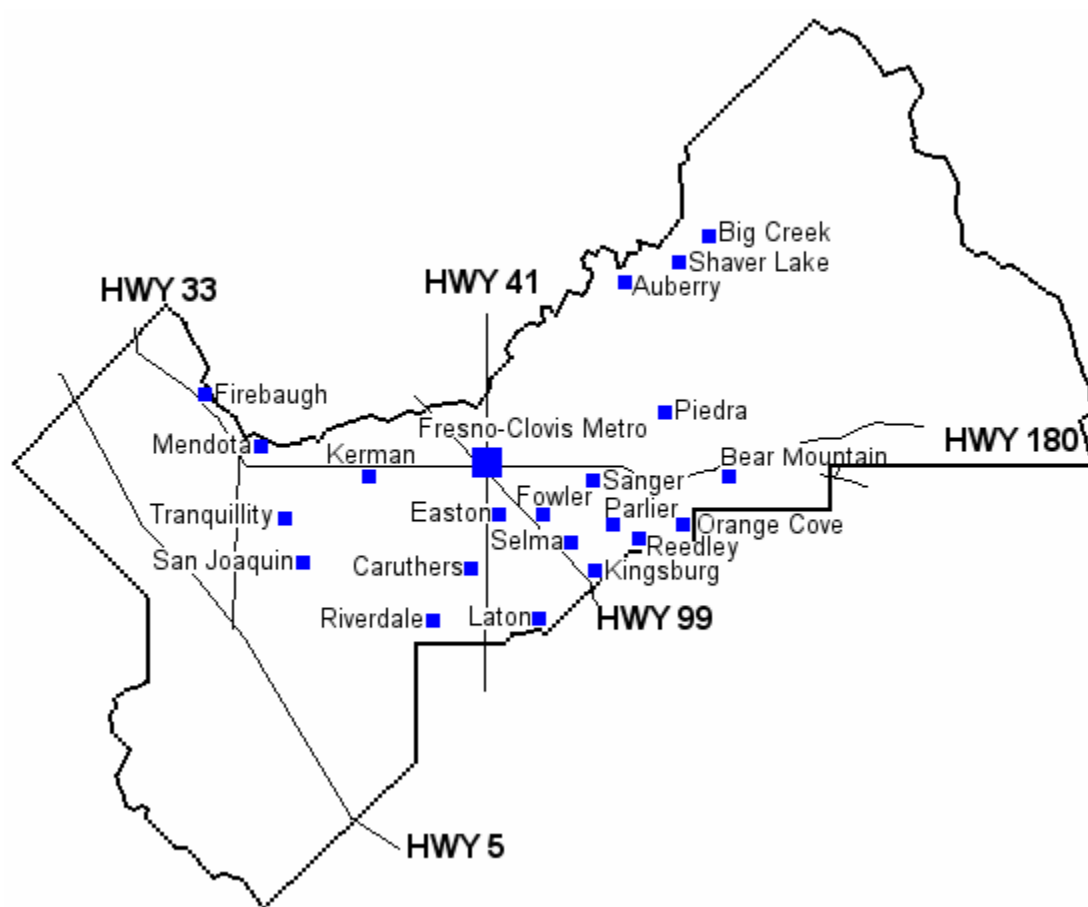
Leveling/Exploding:

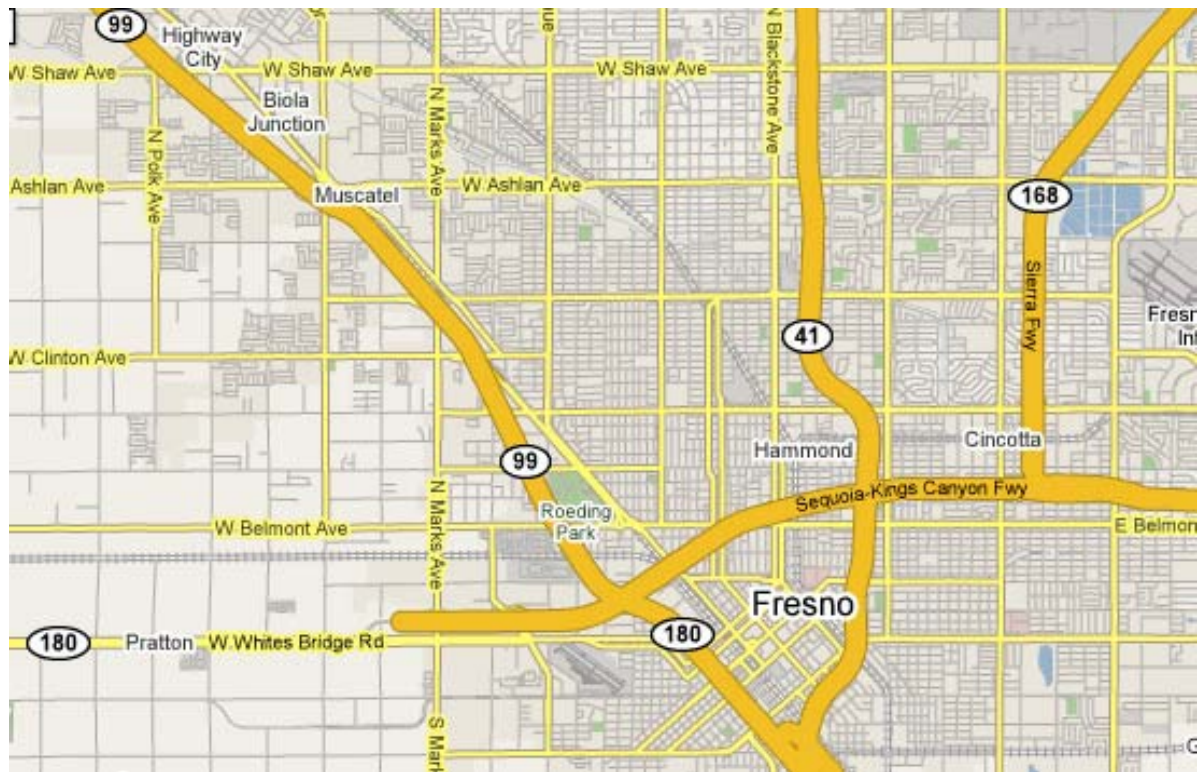
Showing the details of a higher-level process in a lower-level diagram

Balancing:

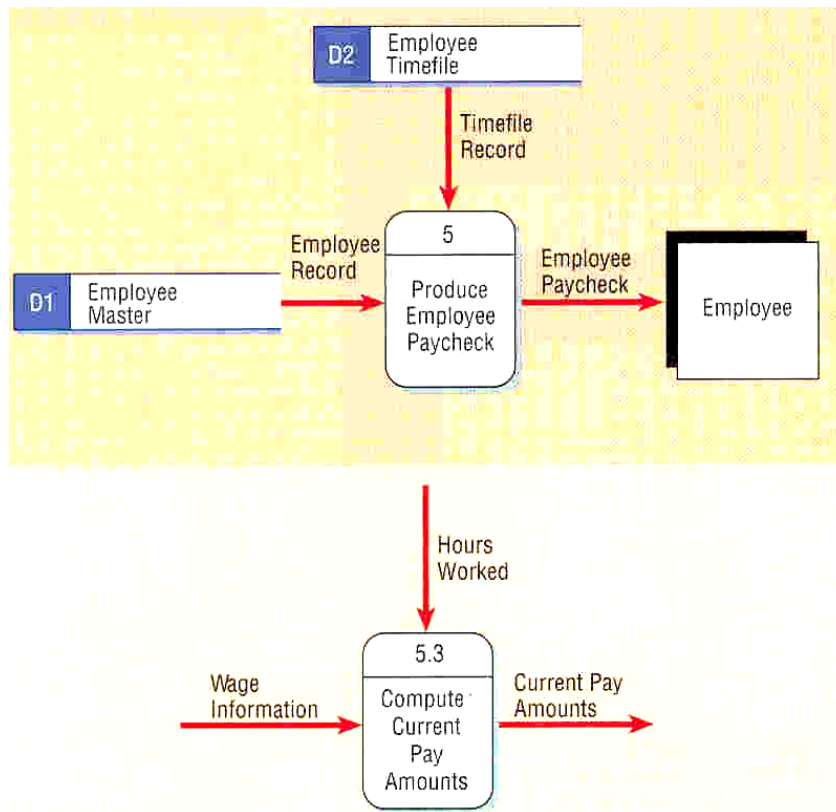
Consistency between diagrams on two levels in terms of input/output

- Each higher input is shown on the lower diagram
- Each higher output is shown on the lower diagram
- Each lower input is shown on the higher diagram
- Each lower output is shown on the higher diagram





Data Dictionary Keyed to Data Flow Diagram



Data Structure

Employee Record = Employee Number +
Personal Information +
Wage Information +
Current Pay Information +
Year-to-Date Information

Timefile Record = Employee Number +
Employee Name +
Hours Worked

Employee Paycheck = Employee Number +
Employee Name +
Address +
Current Pay Amounts +
Year-to-Date Figures

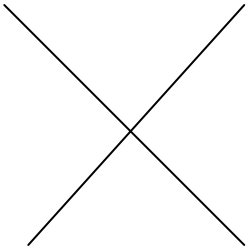
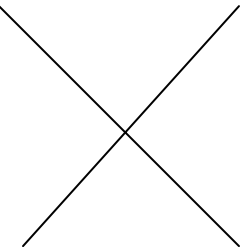

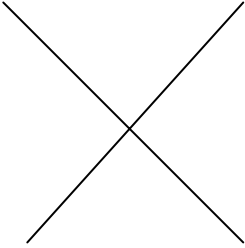
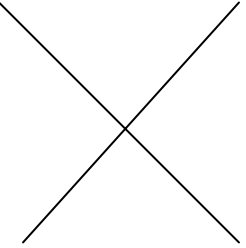
Wage Information = Rate of Pay +
Number of Dependents

Current Pay Amounts = Gross Pay +
Federal Withholding +
State Withholding +
Social Security Withholding +
Net Pay

Permissible DFD Flows

	External Entity	Process	Data Store
External Entity			
Process			
Data Store			

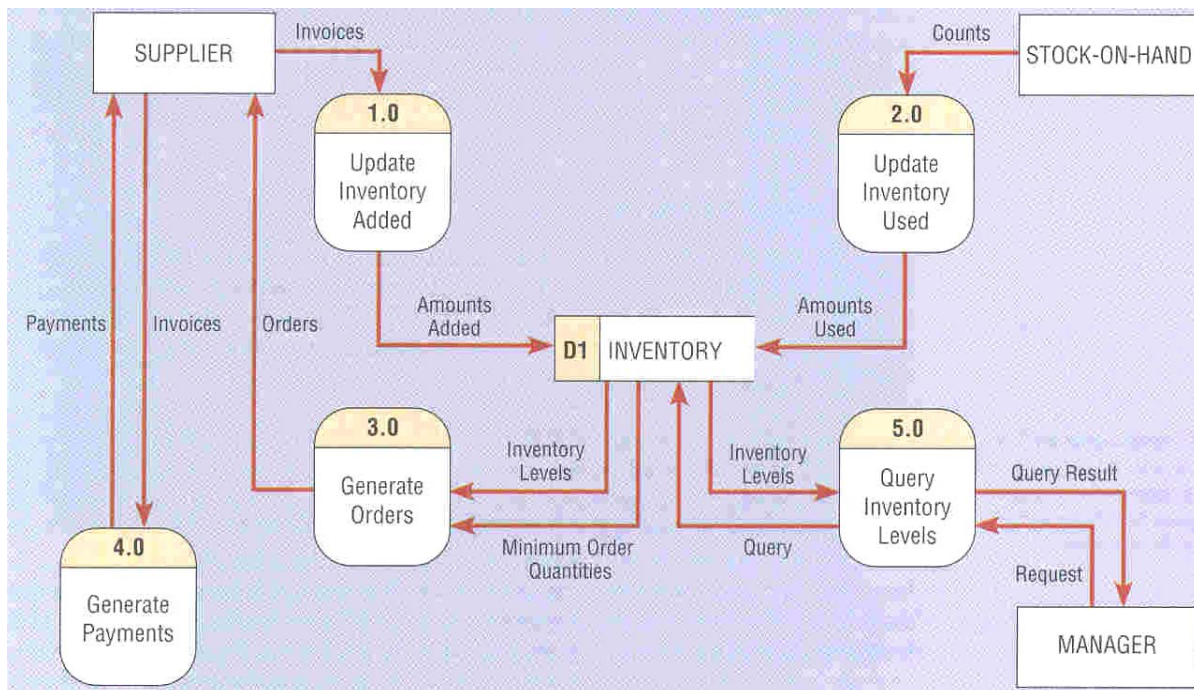
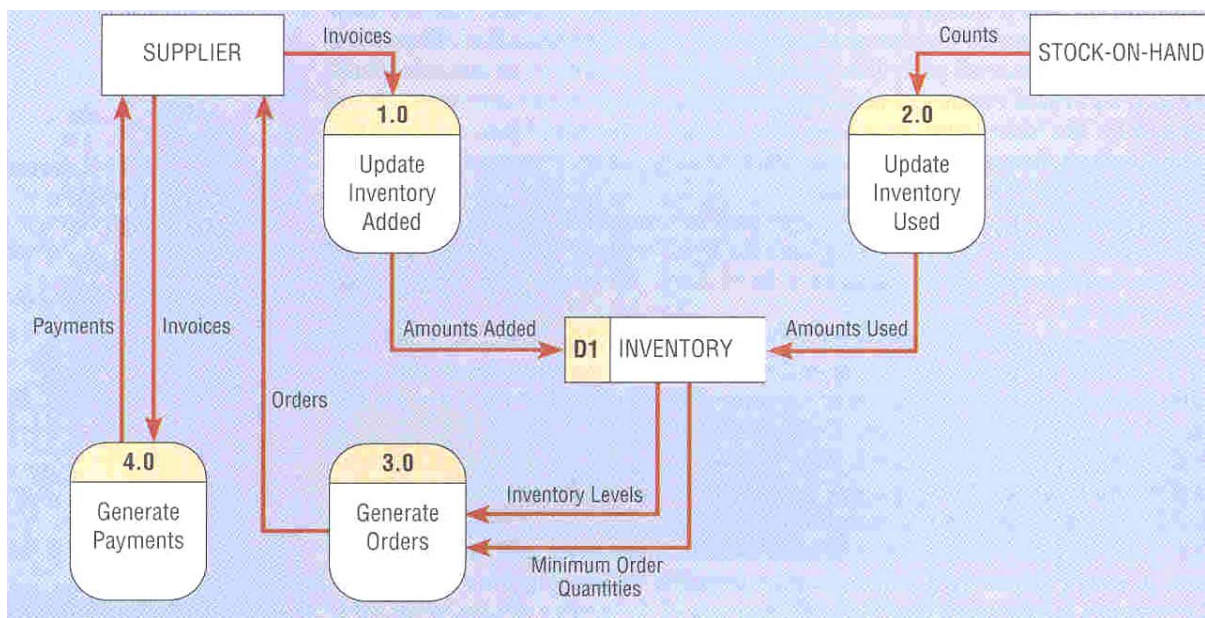
Permissible DFD Flows

	External Entity	Process	Data Store
External Entity		Input	
Process	Output	 But not recommended	Update (Write)
Data Store		Retrieve (Read)	

Data Flow Diagramming: From Existing to Required System

The 12 pure ways in which an existing DFD can be modified to yield the required one:

	External Entity	Process	Data Store	Data Flow
Add				
Change				
Delete				



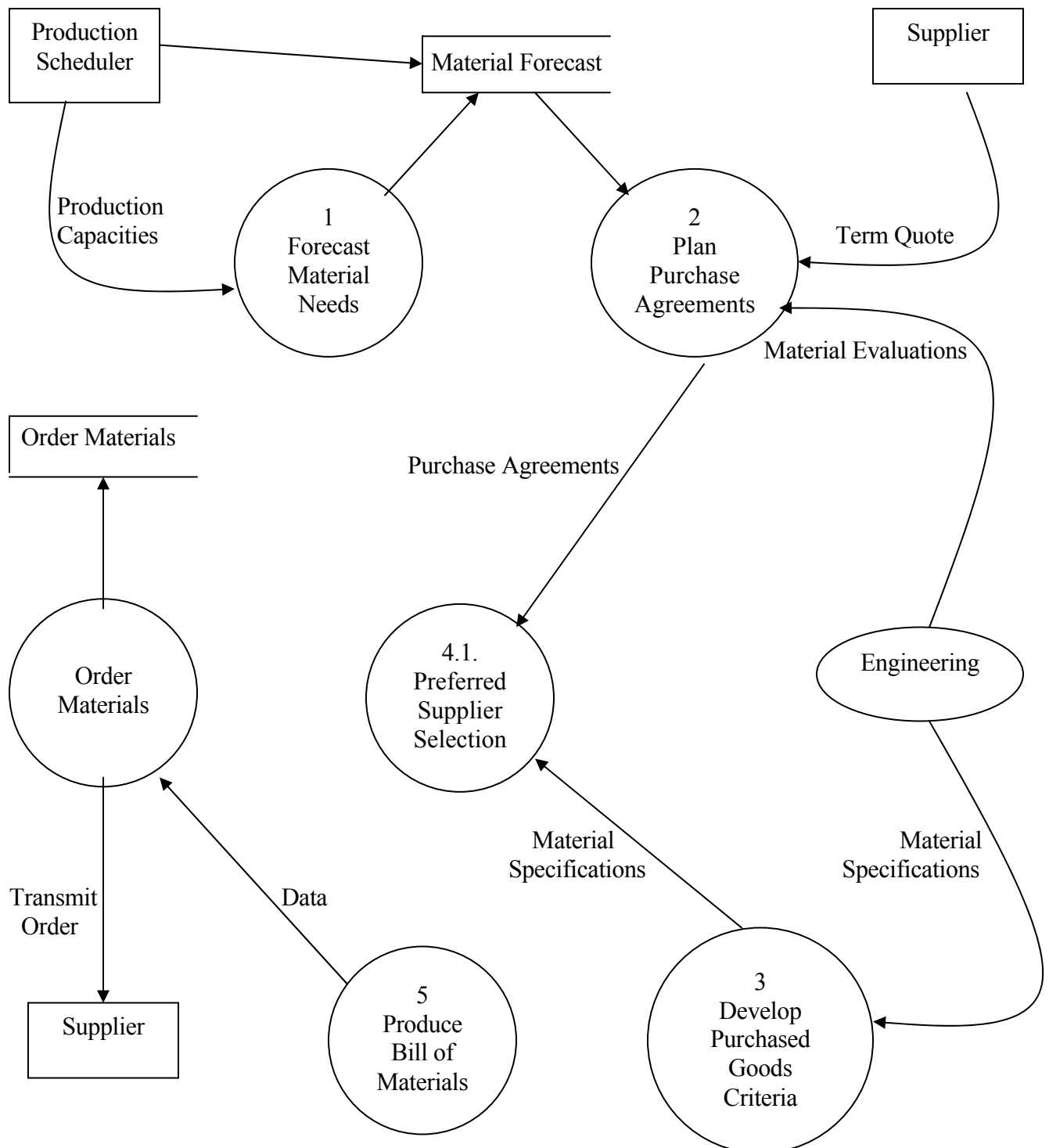
Assignment: DFD for Paying Telephone Bills

Draw a data flow diagram for the following accounts payable system.

When billing details are received from the telephone company, they are validated against a telephone usage file. For each call made, this file tracks usage details (date, time, duration, and phone number). Payment is then processed (this process reads balance from the payment file to assure it is sufficient) and sent to the phone company, and payment details (payment number, date, pay-to, amount, notes) are entered into the payment file.

Assignment: **Don'ts** → **Do's**

Identify and correct all the errors in the following diagram.



Data Flow Diagrams: A Quality Control Checklist

SOURCES/SINKS (EXTERNAL ENTITIES)

- ☐ Are shown on the context diagram.
- ☐ Are shown on all the other diagrams where there is an interaction with the outside.
- ☐ Are represented by squares/rectangles.
- ☐ Are named by nouns representing a type of person, a group of people, or another system.
- ☐ Are not linked directly to any other external entity.
- ☐ Are not linked directly to any data store.

DATA FLOWS

- ☐ Are represented by arrows.
- ☐ Carry **ONLY** data (not physical). If the label is physical, the data dictionary will specify that it is DATA ABOUT that physical object.
- ☐ Are named using **ONLY** nouns.
- ☐ The names are specific; "data", "information", and other vague terms are avoided.
- ☐ Error paths are not shown. Only normal processing paths are shown.

PROCESSES

- ☐ Have both inputs and outputs.
- ☐ Are represented by circles (or some other standard symbol).
- ☐ Perform data (not physical) transformations.
- ☐ Are named using specific verbs (usually followed by specific nouns), except on the context diagram. Vague names (such as "update data", "produce information") are avoided.
- ☐ Names are implementation-independent; they do not reveal whether a person or a machine is performing the task.
- ☐ No process has identical inputs and outputs.
- ☐ Each high-level process is decomposed into lower-level processes, until elementary (primitive) processes are reached. ("Leveling")
- ☐ All processes are numbered hierarchically.
- ☐ The inputs/outputs on the parent diagrams are completely consistent with the input/outputs on the children diagrams. ("Balancing")
- ☐ For each process, each input to it is necessary for performing that process; there are no idle inputs.
- ☐ For each process, all the inputs together are sufficient for performing that process; there are no missing inputs.

DATA STORES

- ☐ Are represented by open-ended rectangles.
- ☐ They store only data (not physical).
- ☐ All those internal to the system have both inputs and outputs; external ones may have only input or output.
- ☐ Are named using singular nouns, without unnecessary words added (such as "data", "data store", "information", "file").
- ☐ Names are implementation-independent.
- ☐ Are not linked directly to other data stores.
- ☐ Request for data is not shown.