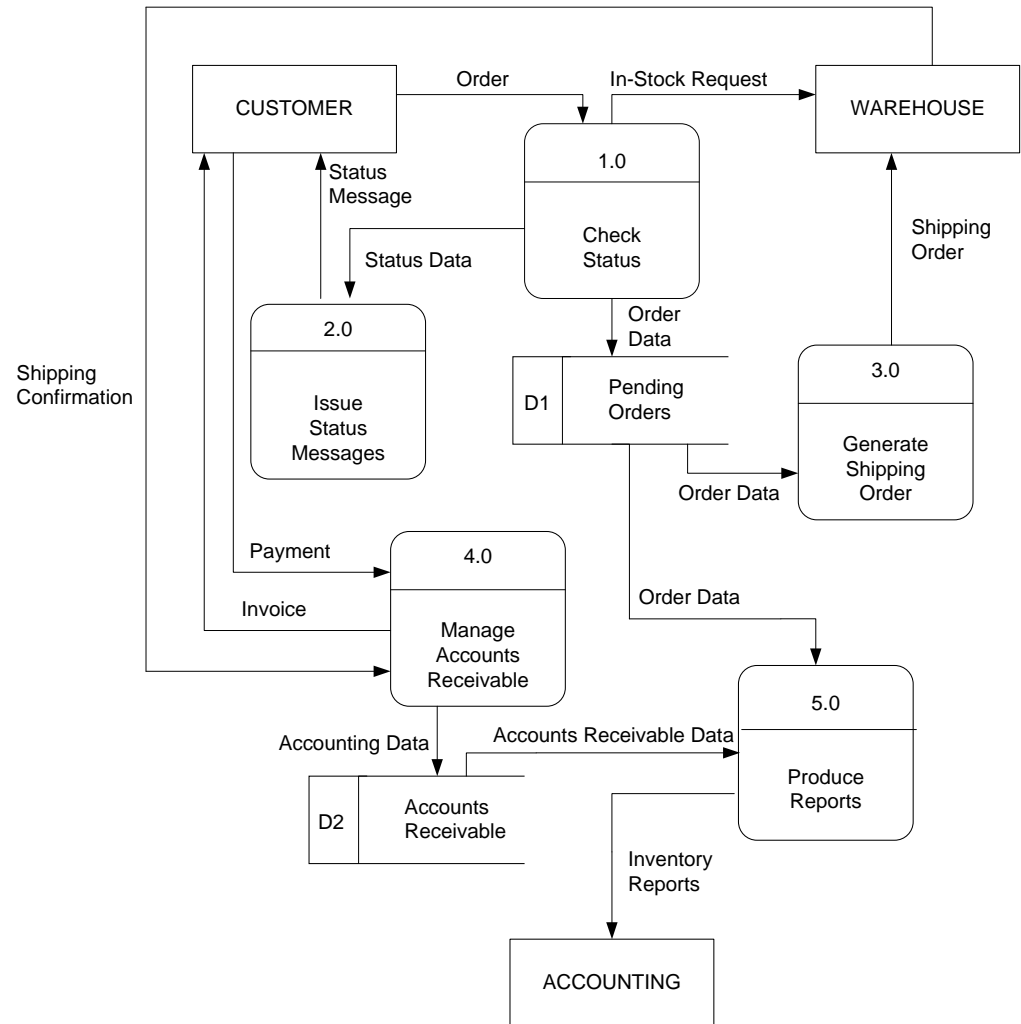




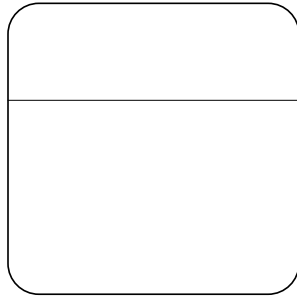
# Data Flow Diagrams (DFDs)

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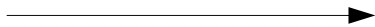
- Data flow diagram (DFD) is a picture of the movement of data between external entities and the processes and data stores within a system



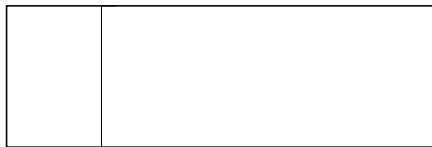
# DFD Symbols (Gane & Sarson)



Process



Data Flow

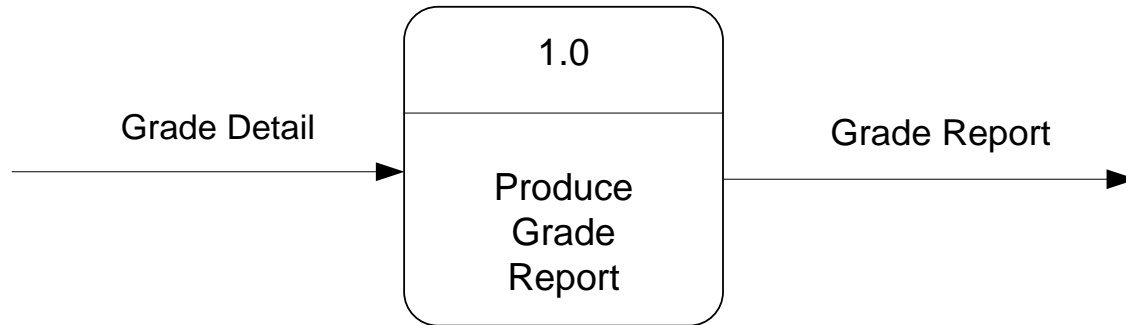


Data Store



Source/Sink (External Entity)

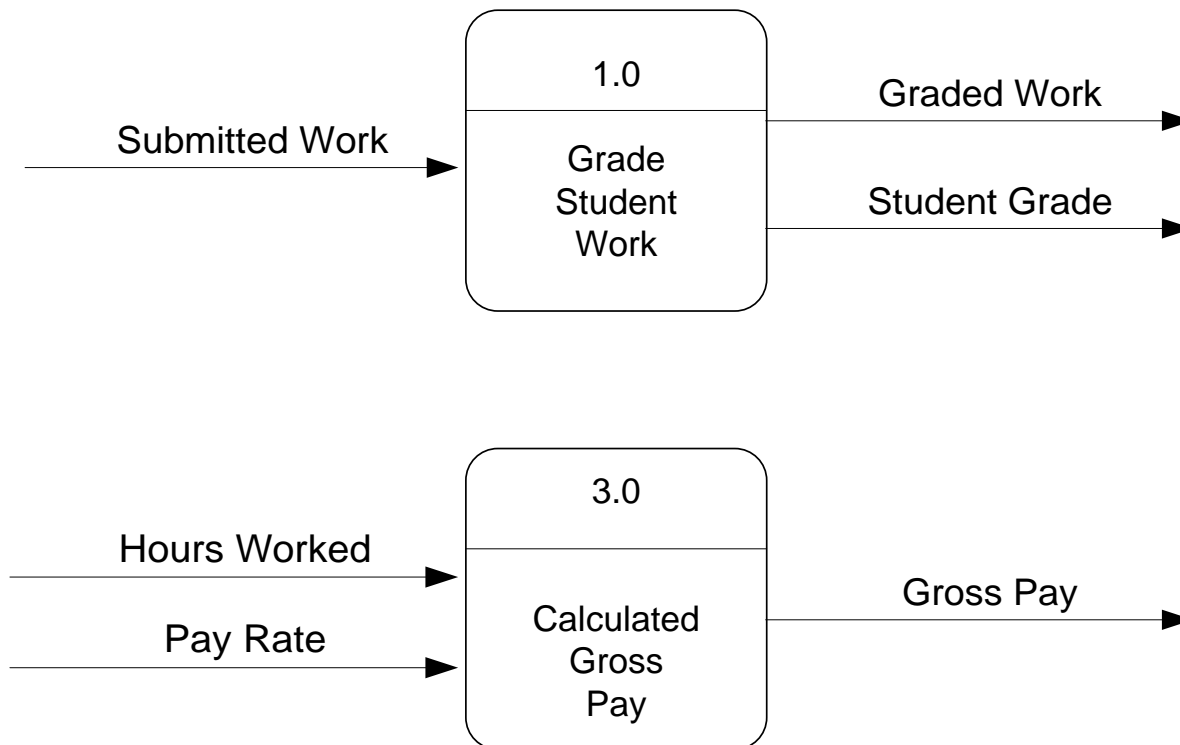
# Process



- Work or actions performed on data (inside the system)
- Labels should be verb phrases
- Receives input data and produces output

# Rule 1: Process

- Can have more than one outgoing data flow or more than one incoming data flow

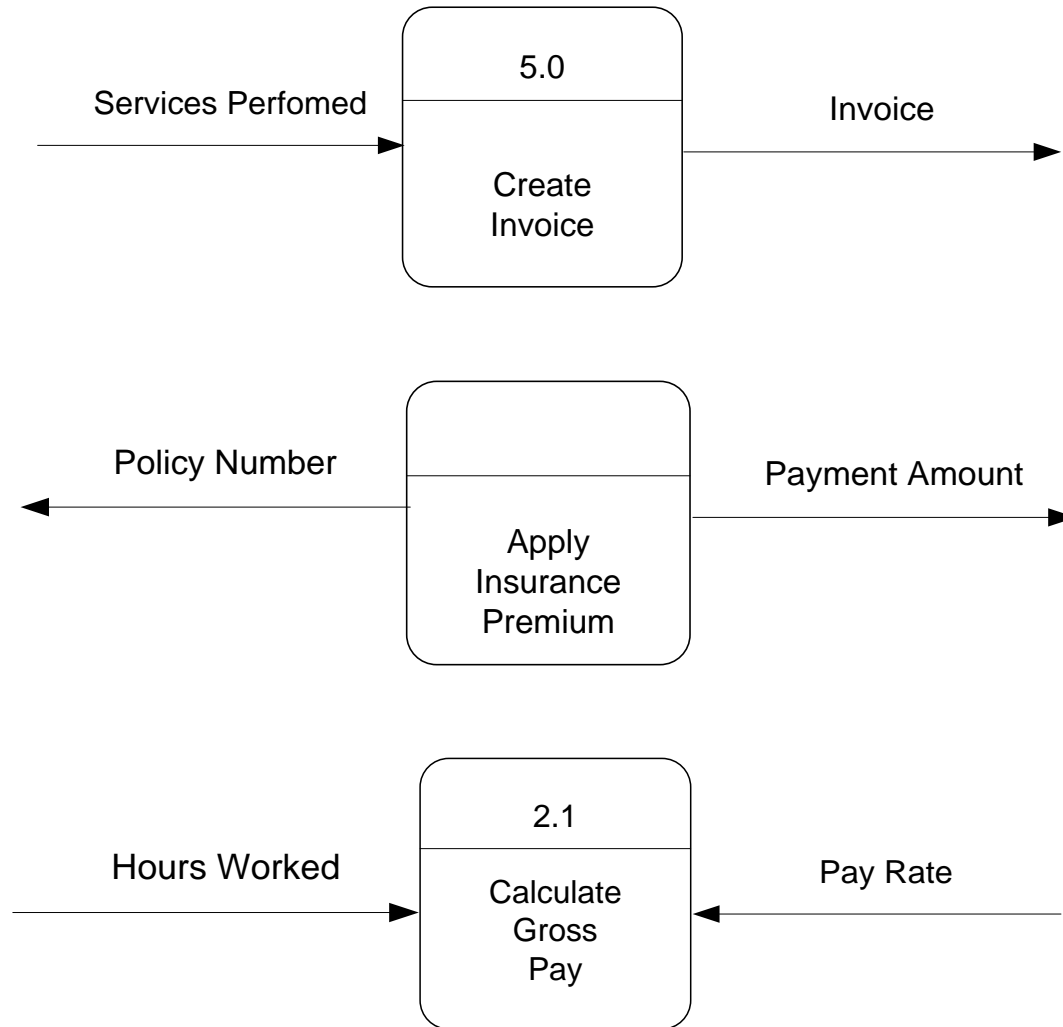


# Rule 2: Process

- Can connect to any other symbol (including another process symbol)



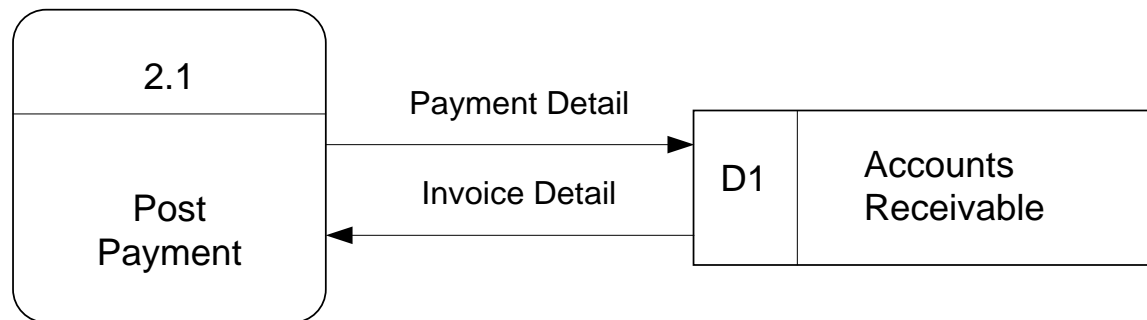
# Process: Correct/Incorrect?



# Data Flow

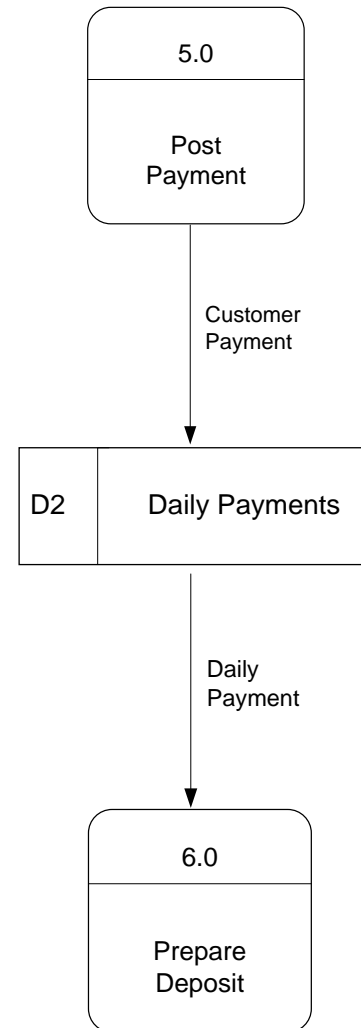
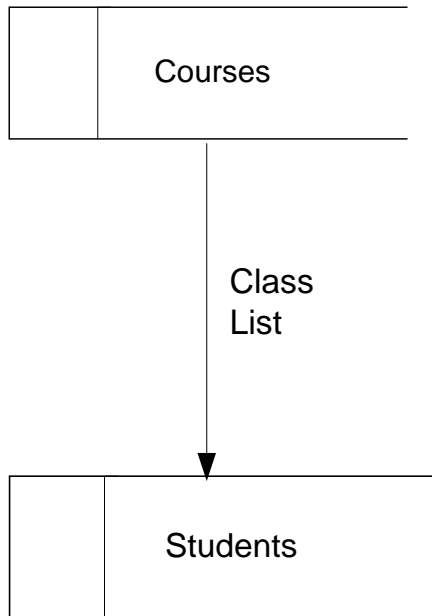


- Is a path for data to move from one part of the IS to another
- Arrows depicting movement of data
- Can represent flow between process and data store by two separate arrows

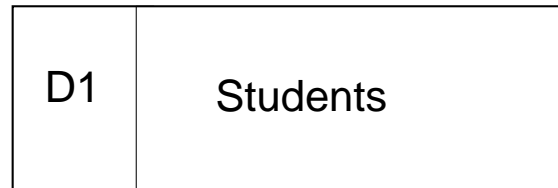




# Data Flow: Correct/Incorrect?



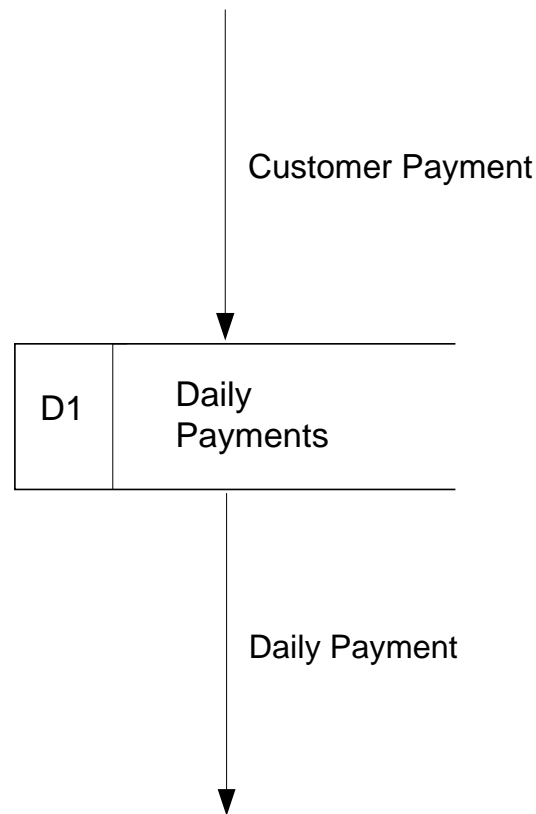
# Data Store



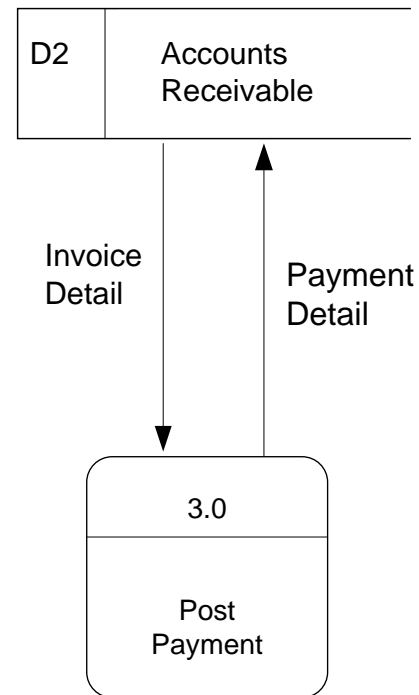
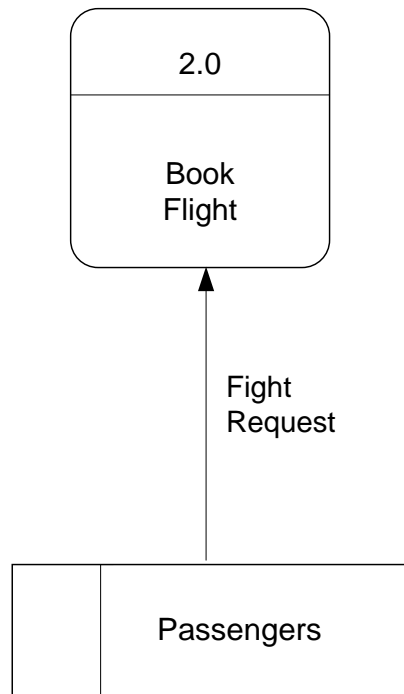
- Is used in a DFD to represent data that the system stores
- Labels should be noun phrases

# Rule: Data Store

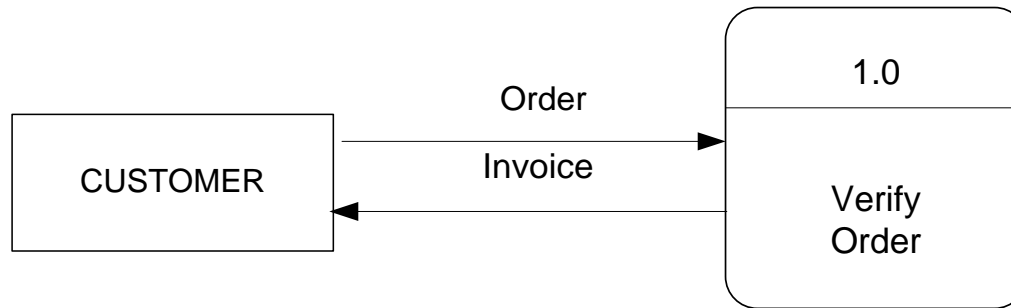
- Must have at least one incoming and one outgoing data flow



# Data Store: Correct/Incorrect?



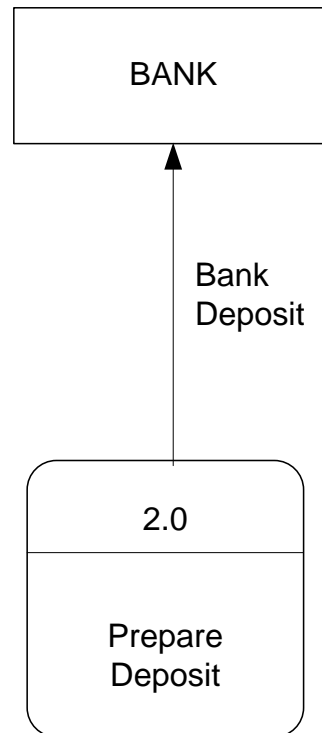
# Source/Sink (External Entity)



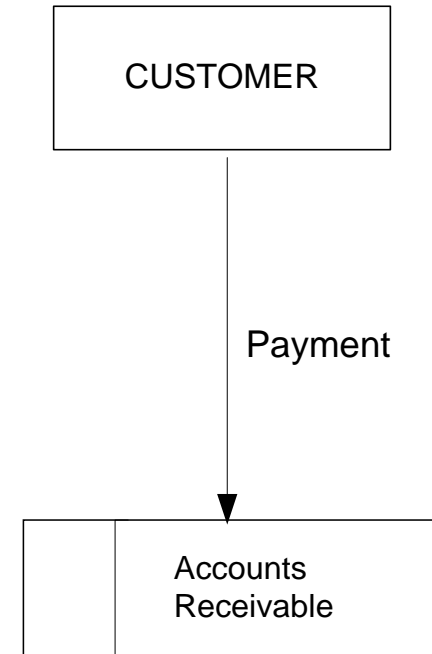
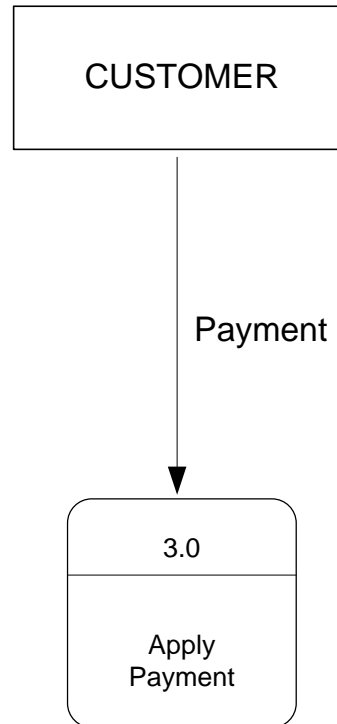
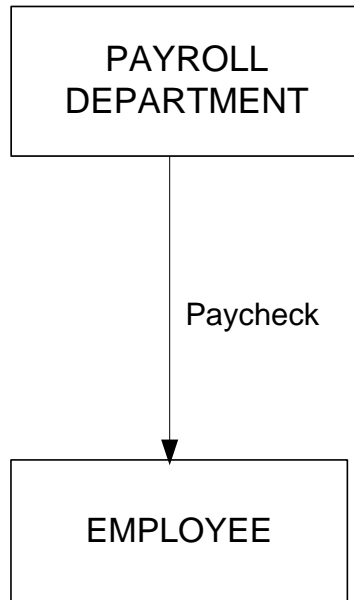
- External entity that is origin or destination of data (outside the system)
- Is the singular form of a department, outside organisation, other IS, or person
- Labels should be noun phrases
- Source – Entity that supplies data to the system
- Sink – Entity that receives data from the system

# Rule: Source/Sink

- Must be connected to a process by a data flow



# Source/Sink: Correct/Incorrect?



# Rules for Using DFD Symbols

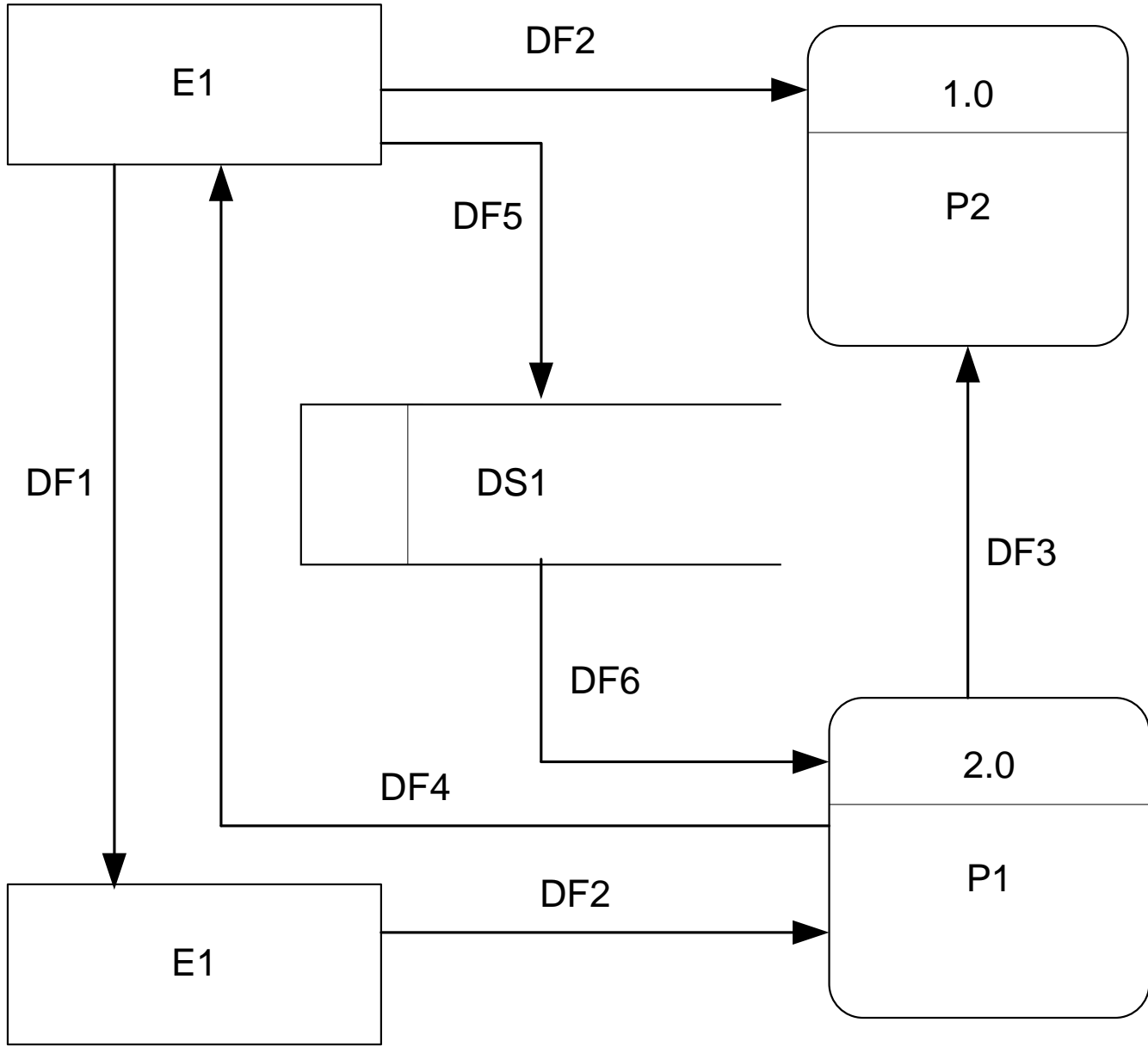
## ■ Data Flow That Connects

	YES	NO
<b>A process to another process</b>	✓	
<b>A process to an external entity</b>	✓	
<b>A process to a data store</b>	✓	
<b>An external entity to another external entity</b>		✓
<b>An external entity to a data store</b>		✓
<b>A data store to another data store</b>		✓





List the errors of this DFD



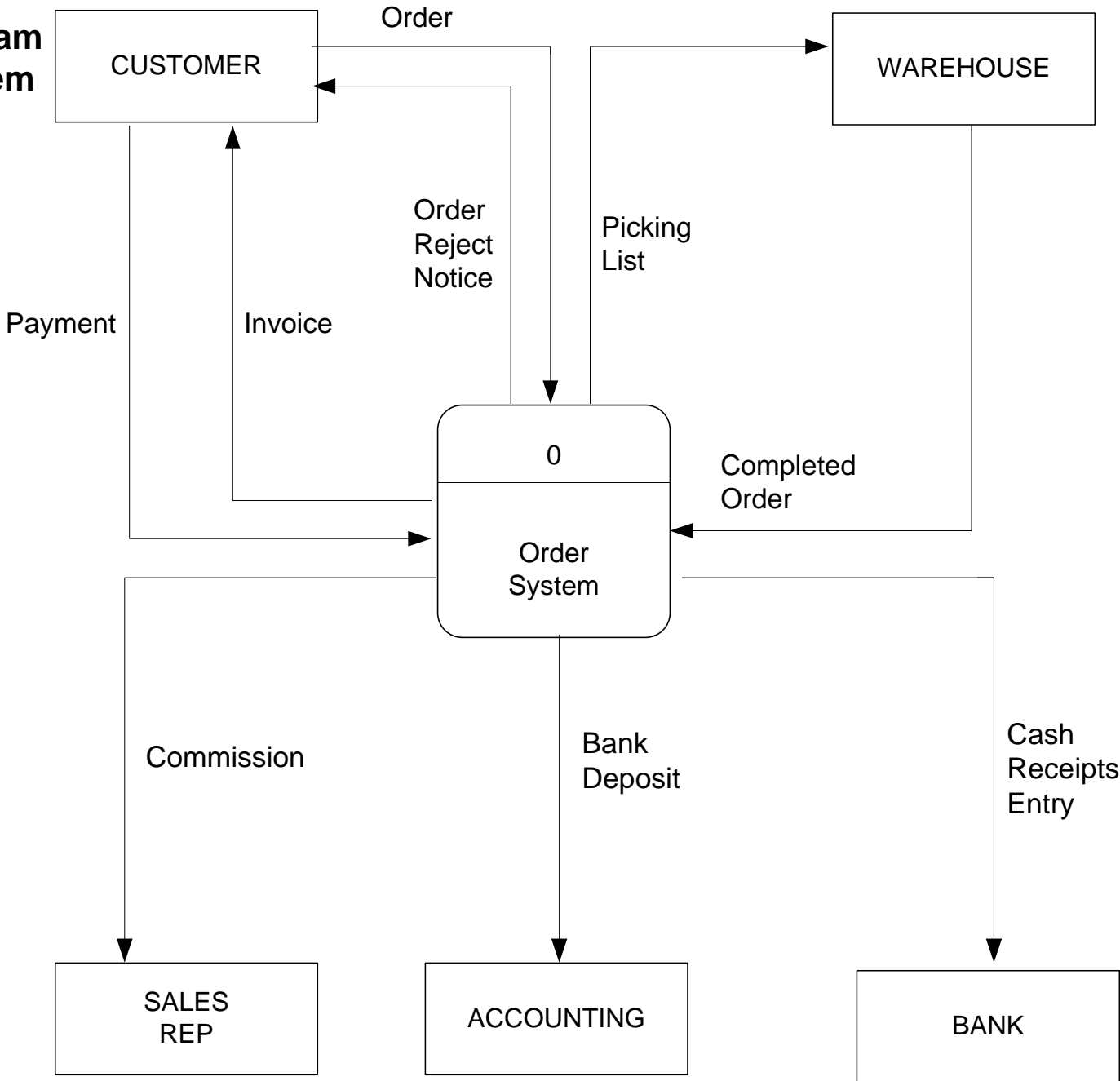


# Context Diagram

- Top-level view of IS
- Shows the system boundaries, external entities that interact with the system, and major information flows between entities and the system.
- Example: Order system that a company uses to enter orders and apply payments against a customer's balance



**Context Diagram  
of Order System**

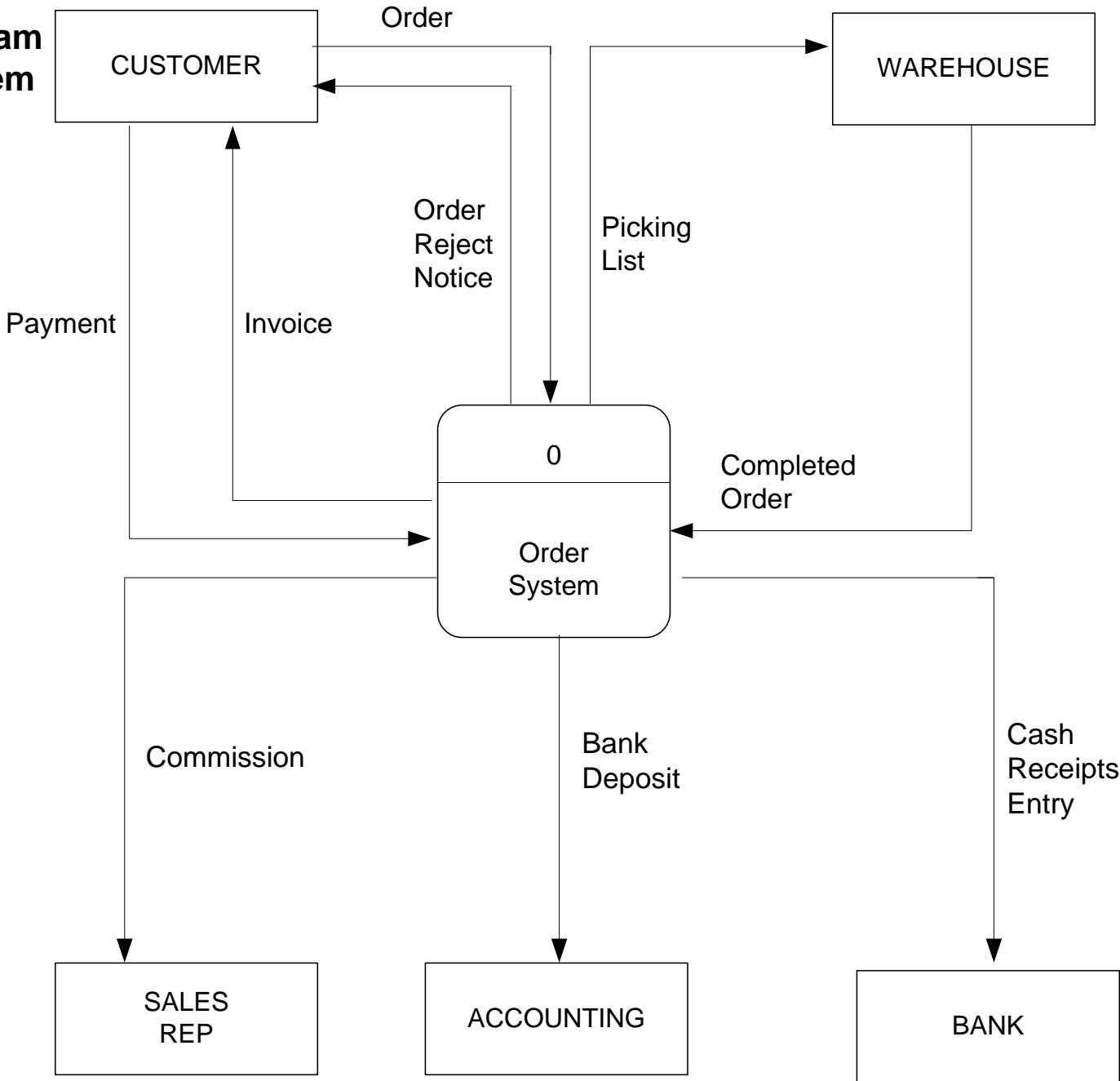


# Level-0 DFD

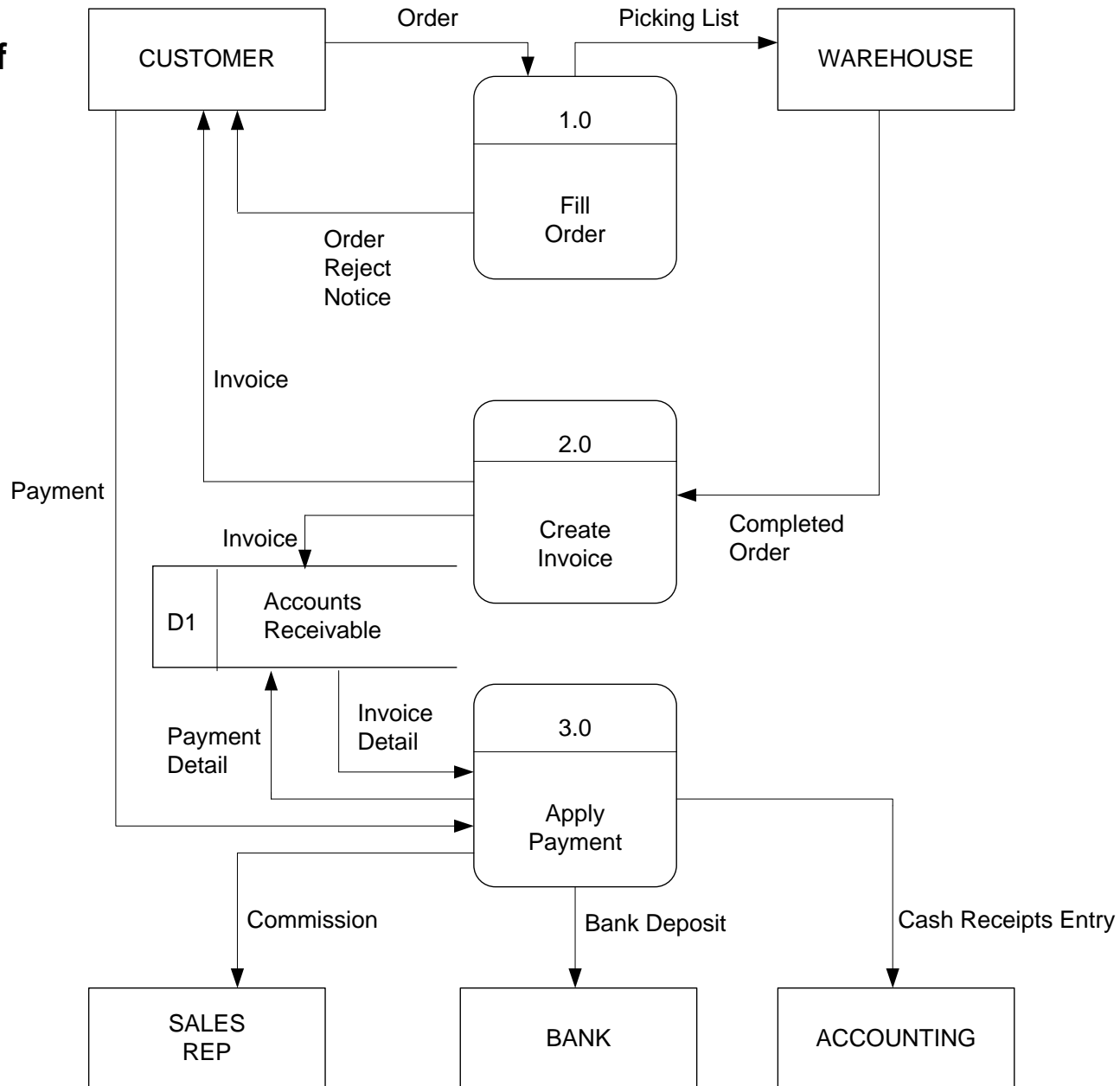
- Shows the system's major processes, data flows, and data stores at a high level of abstraction
- When the Context Diagram is expanded into DFD level-0, all the connections that flow into and out of process 0 needs to be retained.



**Context Diagram  
of Order System**



## Level-0 DFD of Order System





# Lower-Level Diagrams

## ■ Functional Decomposition

- An iterative process of breaking a system description down into finer and finer detail
- Uses a series of increasingly detailed DFDs to describe an IS

## ■ Balancing

- The conservation of inputs and outputs to a data flow process when that process is decomposed to a lower level
- Ensures that the input and output data flows of the parent DFD are maintained on the child DFD



# Strategies for Developing DFDs

## ■ Top-down strategy

- Create the high-level diagrams (Context Diagram), then low-level diagrams (Level-0 diagram), and so on

## ■ Bottom-up strategy

- Create the low-level diagrams, then higher-level diagrams





## Exercise:

Precision Tools sells a line of high-quality woodworking tools. When customers place orders on the company's Web site, the system checks to see if the items are in stock, issues a status message to the customer, and generates a shipping order to the warehouse, which fills the order. When the order is shipped, the customer is billed. The system also produces various reports.

- Draw a context diagram for the order system
- Draw DFD diagram 0 for the order system

# Identify Entities, Process, Data Stores & Data Flow

## ■ Entities

- ☐ Customer
- ☐ Warehouse
- ☐ Accounting

## ■ Processes

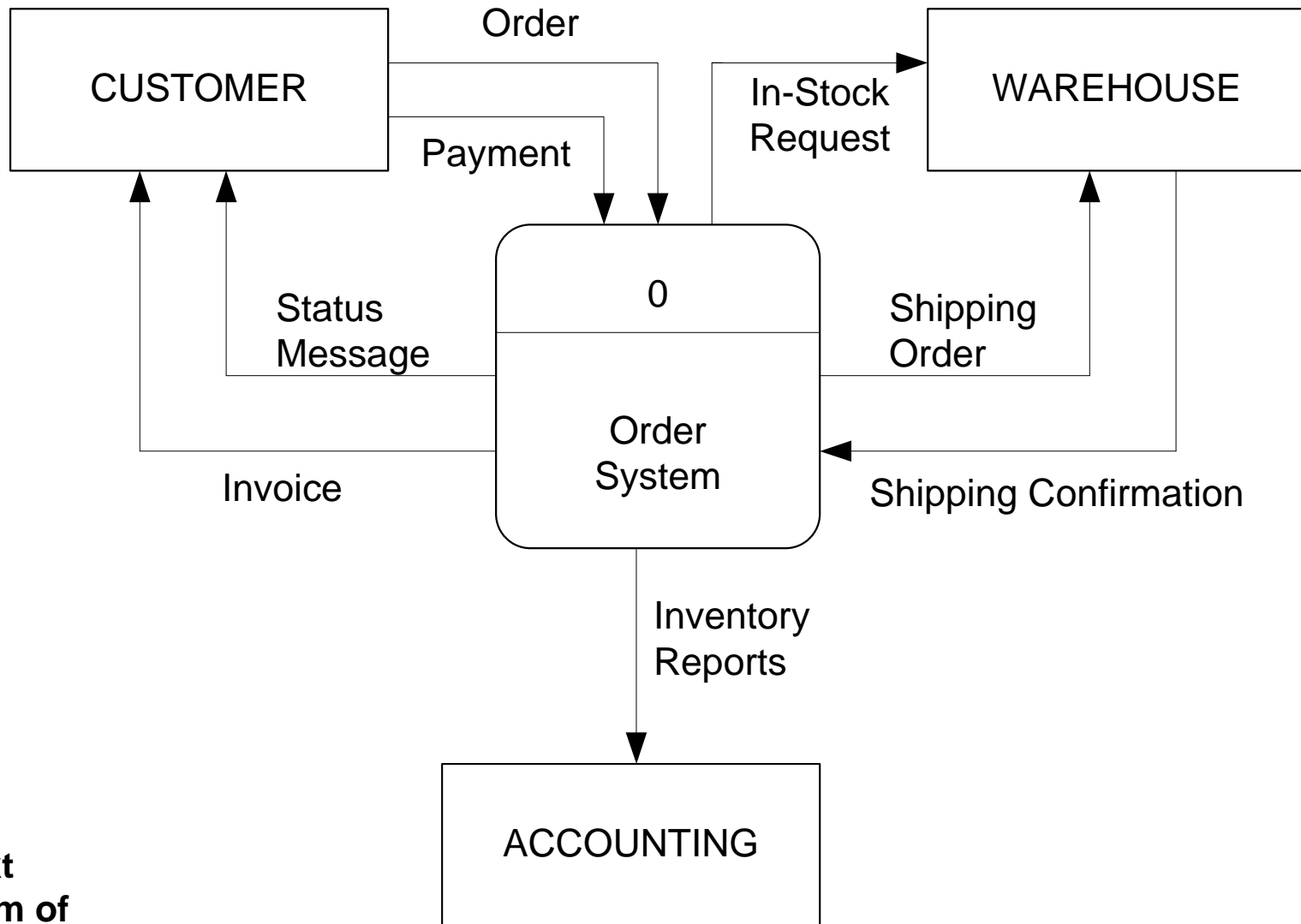
- ☐ 1.0 Check Status
- ☐ 2.0 Issue Status Messages
- ☐ 3.0 Generate Shipping Order
- ☐ 4.0 Manage Accounts Receivable
- ☐ 5.0 Produce Reports

## ■ Data Stores

- ☐ D1 Pending Orders
- ☐ D2 Accounts Receivable

## ■ Data Flows

- ☐ Order
  - ☐ In-Stock Request
  - ☐ Order Data
  - ☐ Status Data
  - ☐ Status Message
  - ☐ Shipping Order
  - ☐ Order Data
  - ☐ Invoice
  - ☐ Shipping Confirmation
  - ☐ Payment
  - ☐ Accounting Data
  - ☐ Accounts Receivable Data
  - ☐ Order Data
  - ☐ Inventory Reports
- 1.0
- 2.0
- 3.0
- 4.0
- 5.0



**Context  
Diagram of  
Order  
System**

