MODULE 5

DATA FLOW DIAGRAMS

Learning Units

5.1 Developing Data Flow Diagrams(DFD)

- **a) What are DFDs?**
- **b) Symbols used in DFD**
- **c) Rules of data flow**
- **d) Good style in drawing DFD**

5.2 Describing systems with DFD & Levelling DFDs

5.3 Logical & Physical DFDs

LEARNING GOALS

In this module we will learn

1. What are Data Flow Diagrams (DFDs)?
2. Why they are useful?
3. How are they developed?
4. How to level DFDs?
5. Good style conventions in developing DFDs
6. Difference between Logical and Physical DFDs
7. Tools available to draw DFDs

MOTIVATION

WHY DFD ?

Provides an overview of

-What data a system processes

-What transformations are performed

-What data are stored

-What results are produced and where they flow

MOTIVATION

WHY DFD ?

Graphical nature makes it a good communication tool between

- -User and analyst
- -Analyst and System designer

Structure of DFD allows starting from a broad overview and expand it to a hierarchy of detailed diagrams

DATA FLOW DIAGRAMS

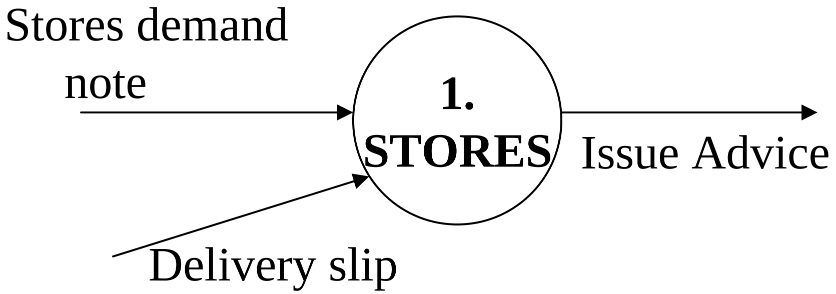
WHAT ARE DATA FLOW DIAGRAMS?

DFDs models the system by depicting

- External entities from which the data flows and where results terminate
- Processes which transform data flows
- Data stores from which the data are read or into which data are written by the processes.

SYMBOLS USED IN DFD

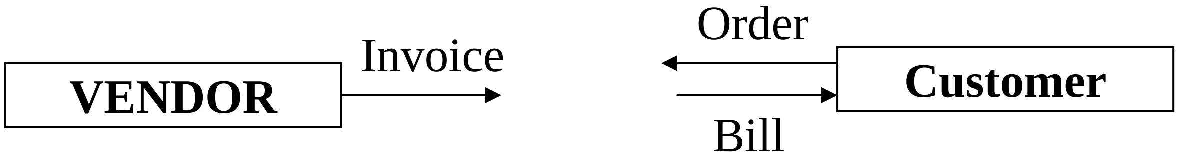
PROCESS



- A circle represents a process
- Straight lines with incoming arrows are input data flows
- Straight lines with outgoing arrows are output data flows
- Processes are given serial numbers for easy reference
- Labels are assigned to Data flow.These aid documentation

SYMBOLS USED IN DFD

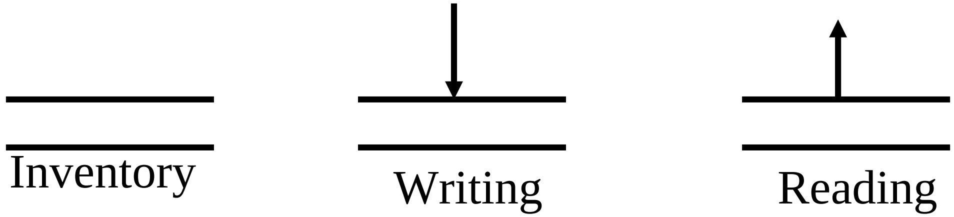
EXTERNAL ENTITIES



- A Rectangle represents an external entity
- They either supply data or receive data
- They do not process data

SYMBOLS USED IN DFD

DATA STORES



- A Data Store is a repository of data
- Data can be written into the data store

  This is depicted by an incoming arrow
- Data can be read from a data store

  This is depicted by an outgoing arrow
- External entity cannot read or write to the data store
- Two data stores cannot be connected by a data flow

RULES OF DATA FLOW

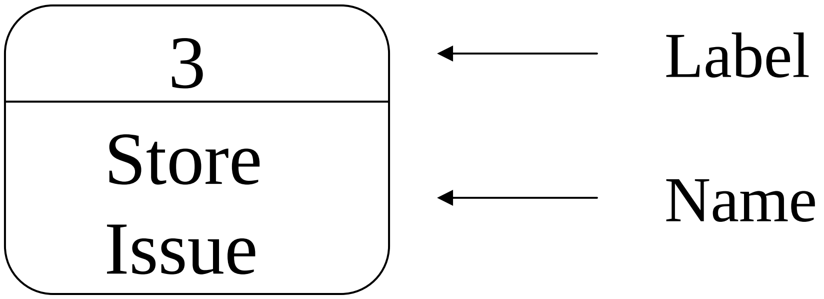
- Data can flow from
  - -external entity to process
  - -process to external entity
  - -process to store and back
  - -process to process

- Data cannot flow from
  - -external entity to external entity
  - -external entity to store
  - -store to external entity
  - -store to store

DATA FLOW DIAGRAMS

An alternate notation is often used

A Process



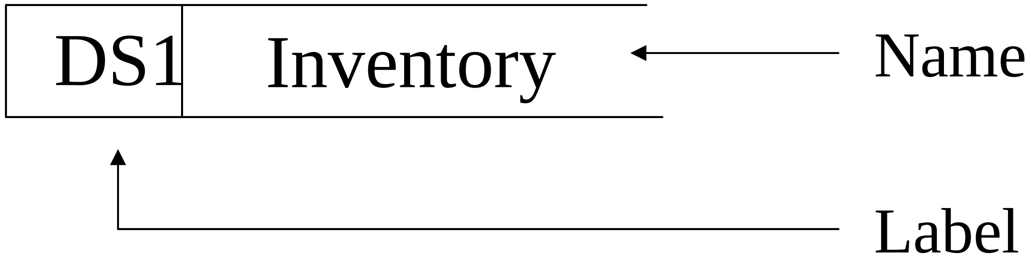
3

Store Issue

Label

Name

A Data store



DS1

Inventory

Name

Label

GOOD STYLE IN DRAWING DFD

- Use meaningful names for data flows, processes and data stores.

- Use top down development starting from context diagram and successively levelling DFD

- Only previously stored data can be read

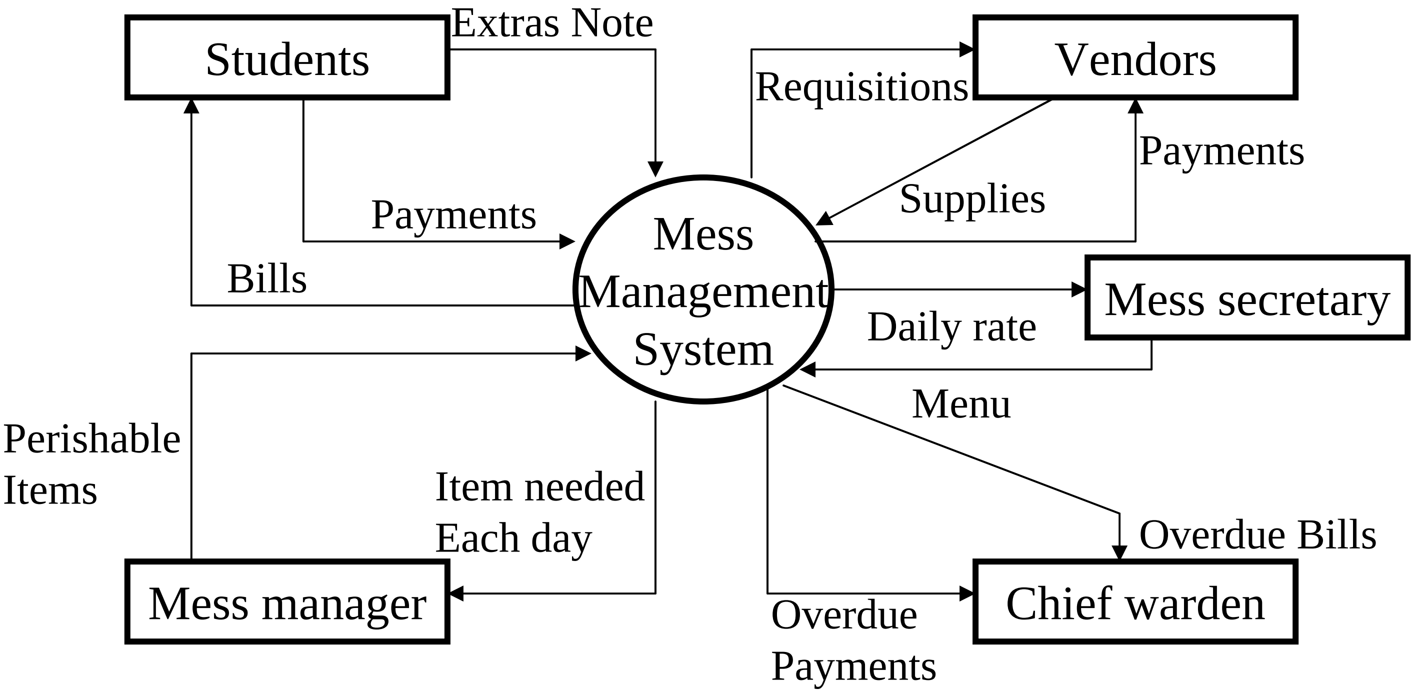
- A process can only transfer input to output.It cannot create new data

- Data stores cannot create new data

DESCRIBING A SYSTEM WITH A DFD

- An entire system is represented by one DFD which gives the system's overview
- It is called a context diagram
- It gives little detail & is also known as the top level DFD
- Context diagram of mess management is shown in the next transparency

CONTEXT DIAGRAM OF MESS MANAGEMENT SYSTEM



- Observe this diagram gives very little detail

LEVELLING DFD

- A context diagram gives an overview
- It should be split into major processes which give greater detail.
- Each major process is further split to give more detail.

- Each major process is further split to give more detail

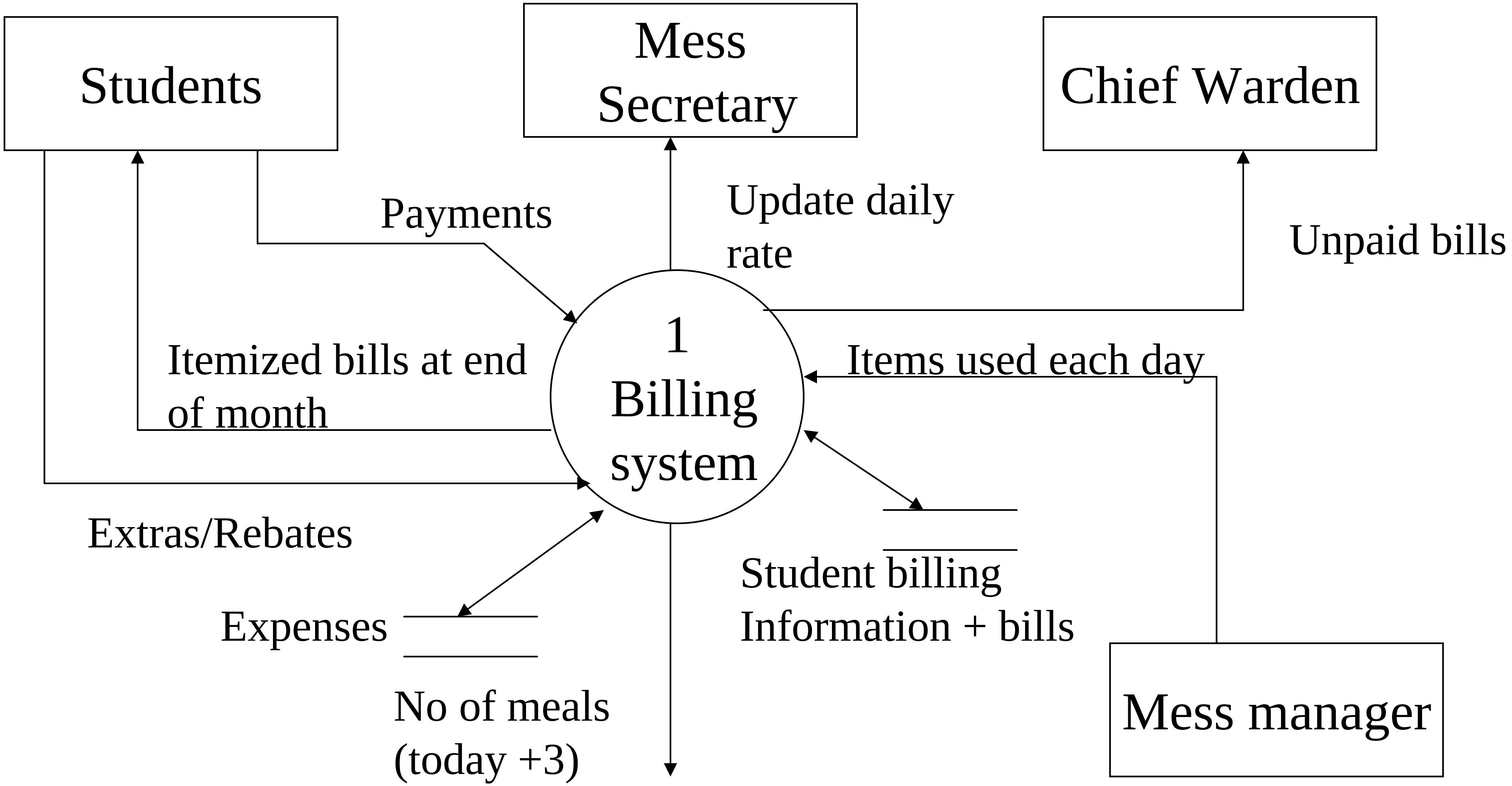
WHY LEVEL DFD?

- If a DFD is too detailed it will have too many data flows and will be large and difficult to understand

- Start from a broad overview. Expand to details - Idea similar to using procedures and linking these with a main program

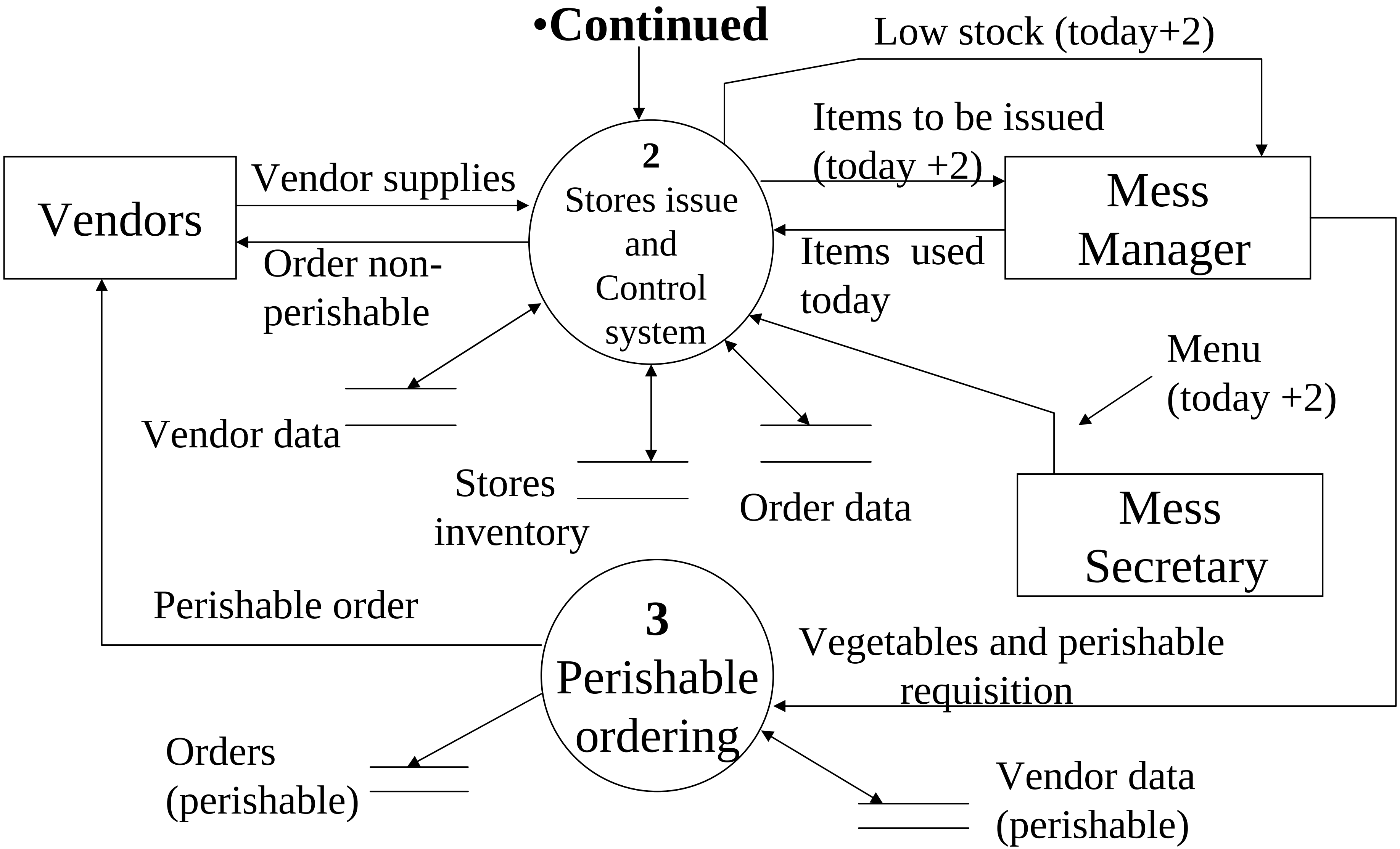
- Each DFD must deal with one aspect of a big system

EXPANDED DFD FOR HOSTEL MESS MANAGEMENT

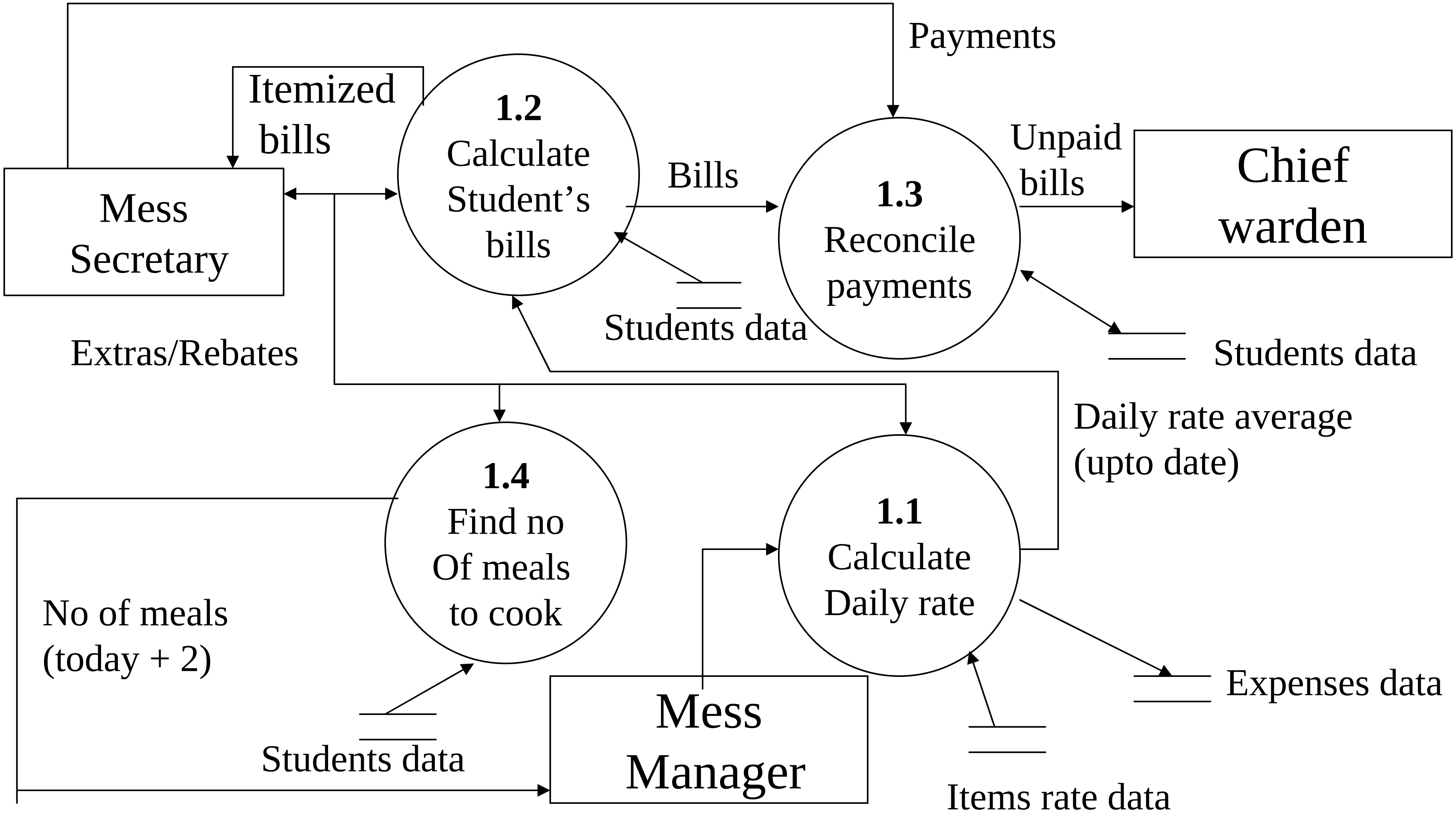


- **Going to next process (Continued in next slide)**

EXPANDED DFD FOR HOSTEL MESS MANAGEMENT



EXPANDED DFD-BILLING SYSTEM



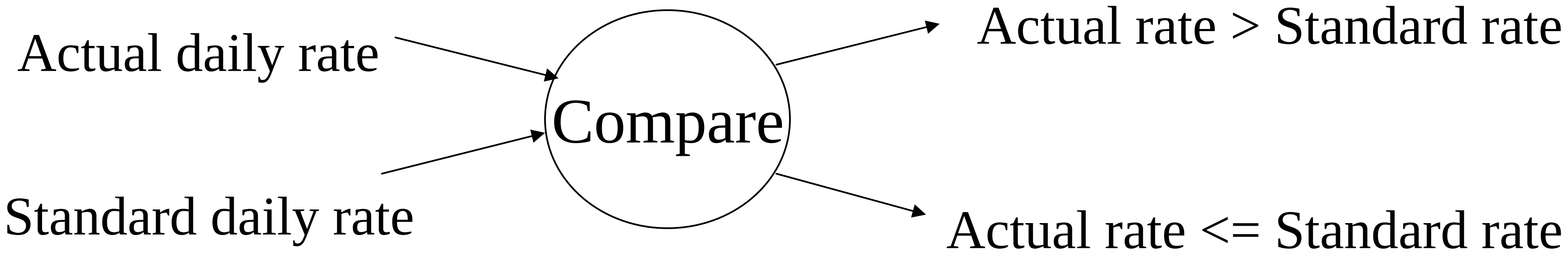
- **Observe numbering of processes**

LEVELLING RULES

- If process *p* is expanded, the process at the next level are labeled as *p.1,p.2* etc.
- All data flow entering or leaving *p* must also enter or leave its expanded version.
- Expanded DFD may have data stores
- No external entity can appear in expanded DFD
- Keep the number of processes at each level less than 7.

ILLEGAL CONSTRUCTS IN DFD

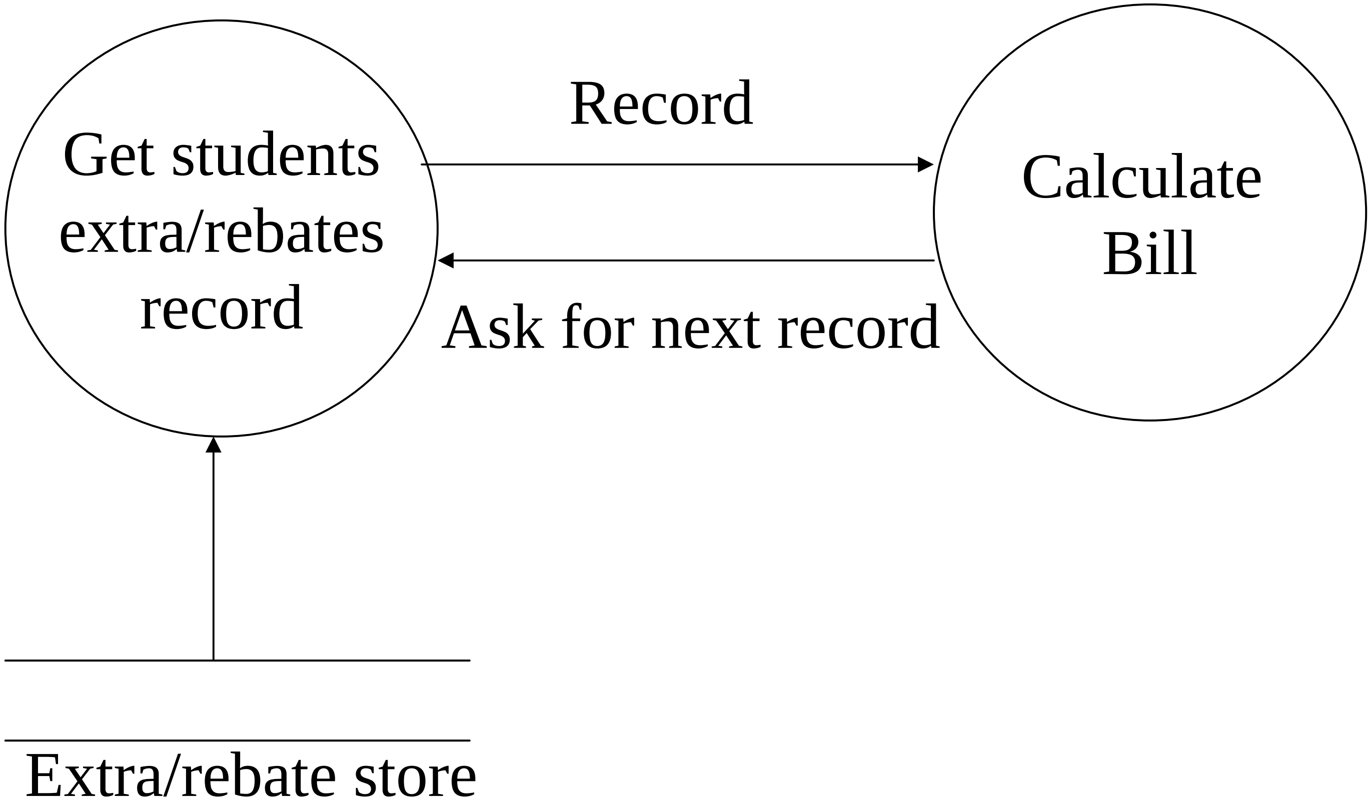
- No loops are allowed in DFD
- A process cannot be a pure decision



- A single data flow should not be split into many flows with different labels

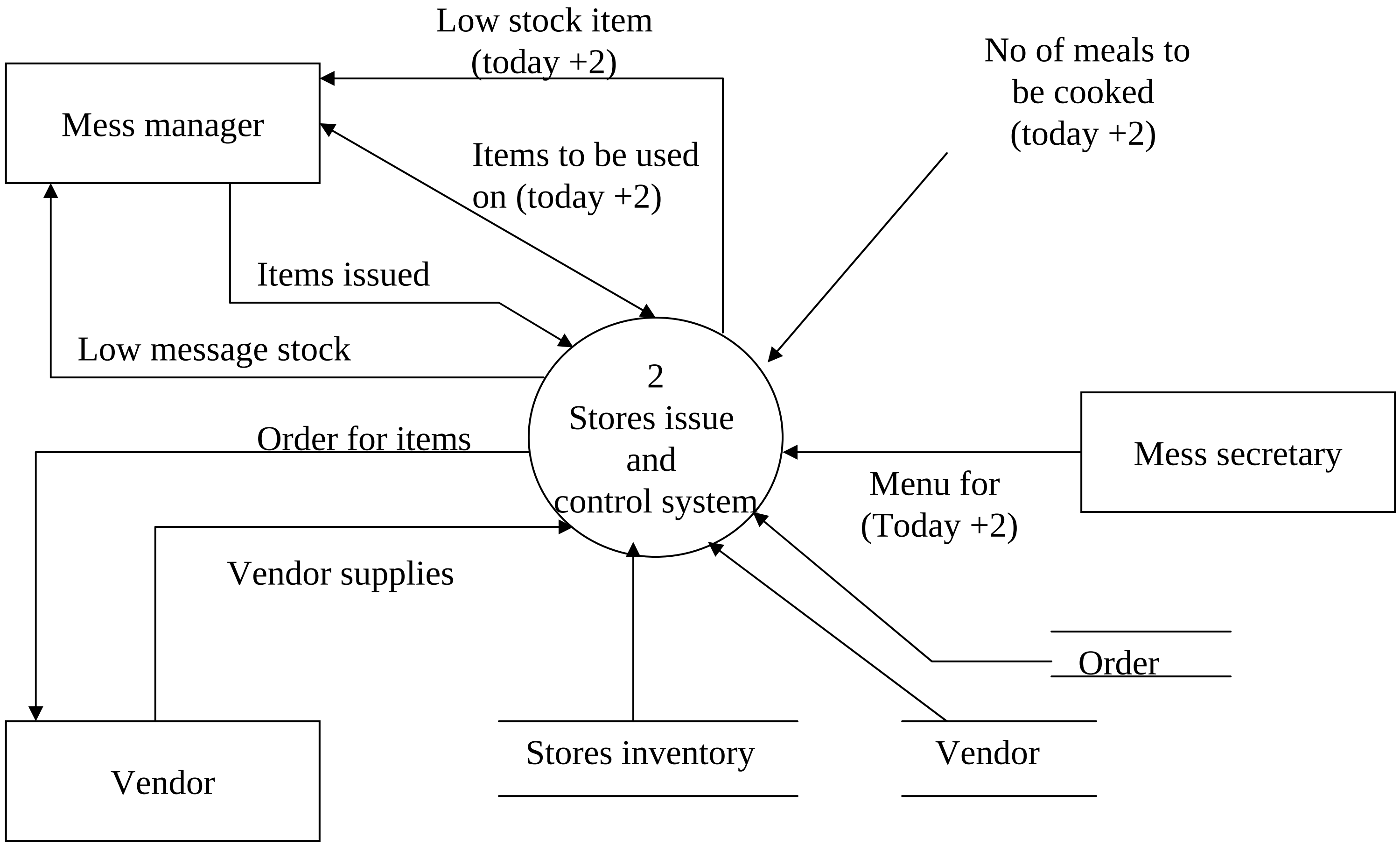
- No data flow allowed between data stores

ILLEGAL CONSTRUCTS IN DFD



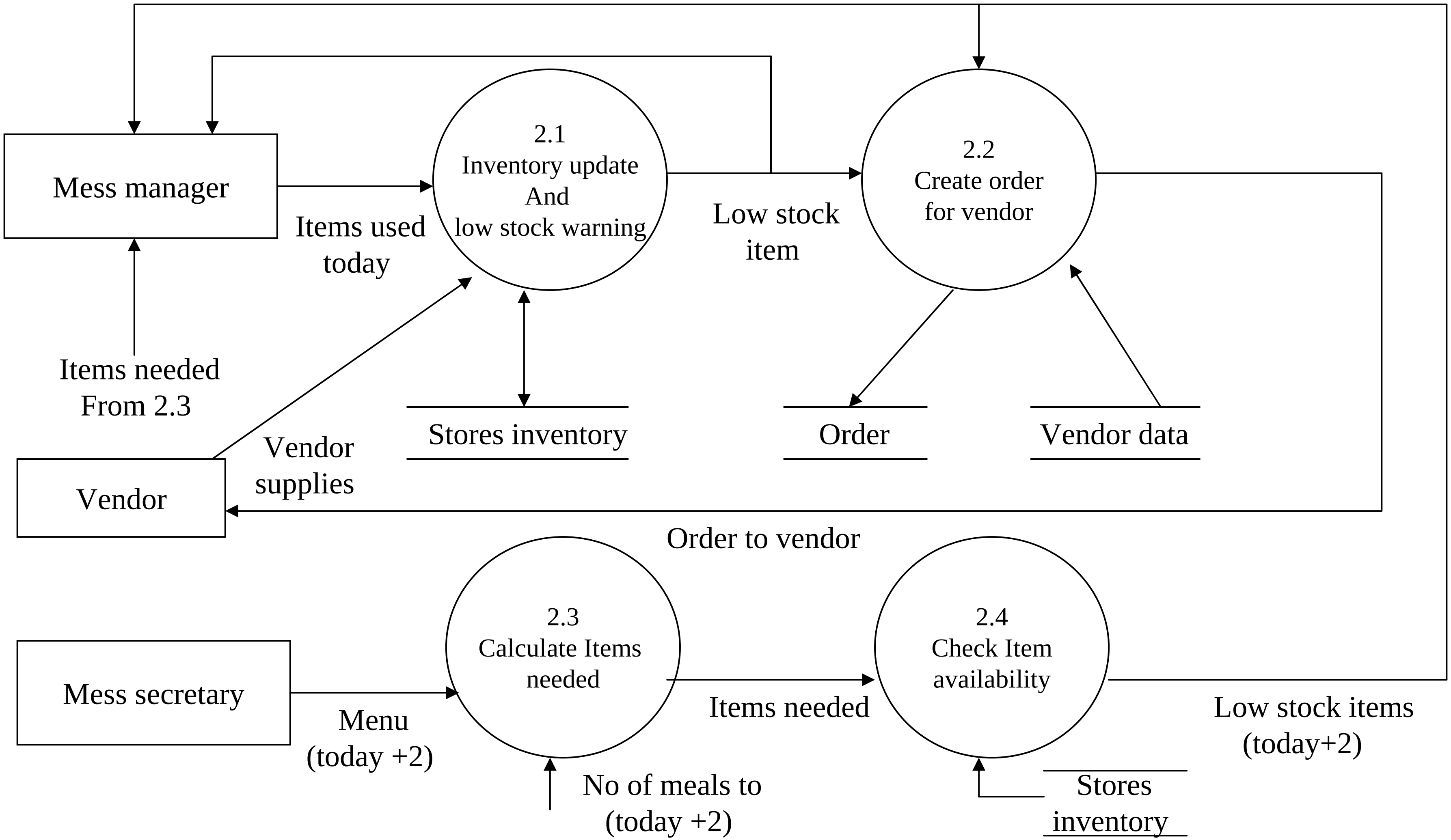
- Not correct as loop is formed

LEVELLING EXAMPLES

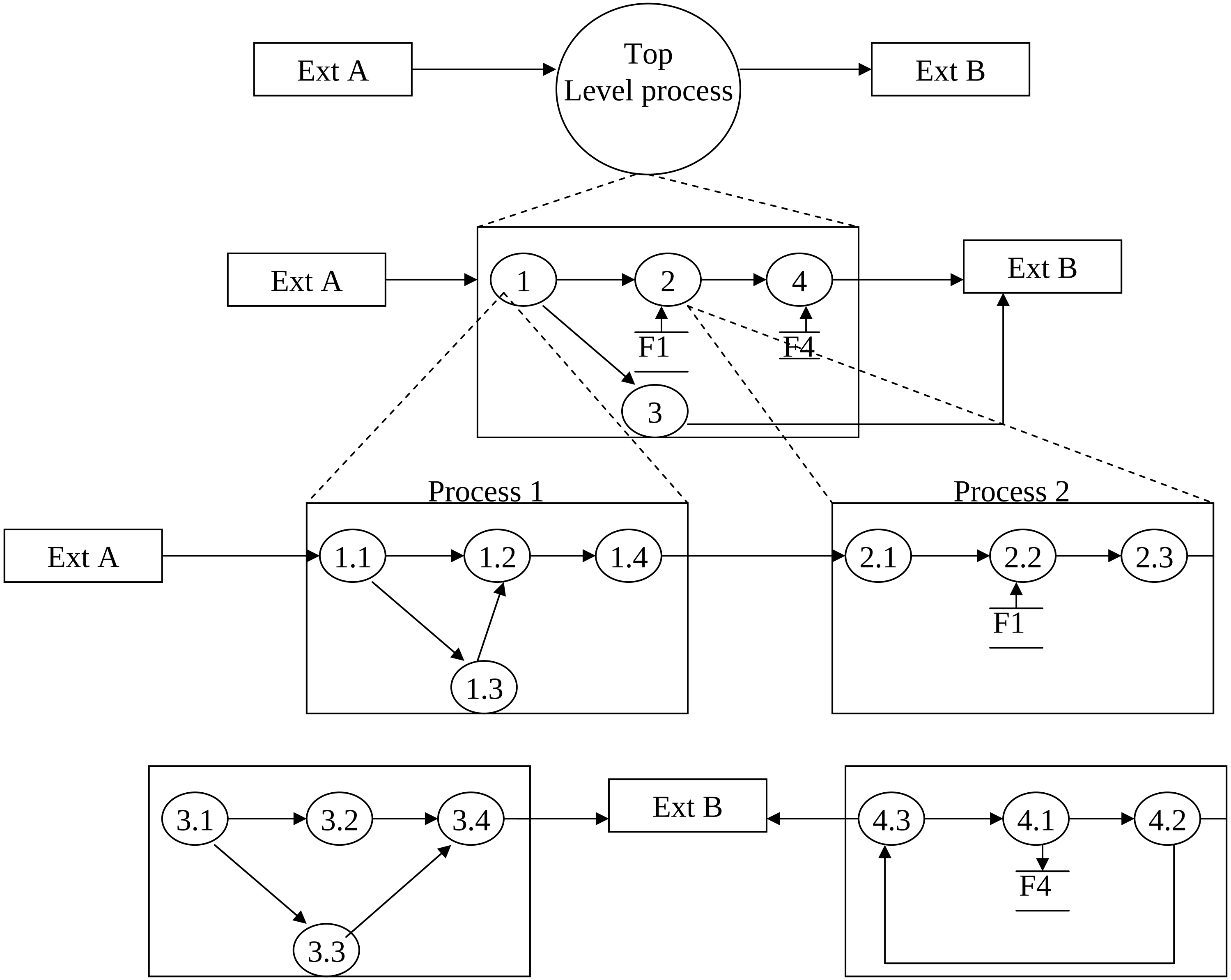


Stores issue control system process

LEVELLING EXAMPLES



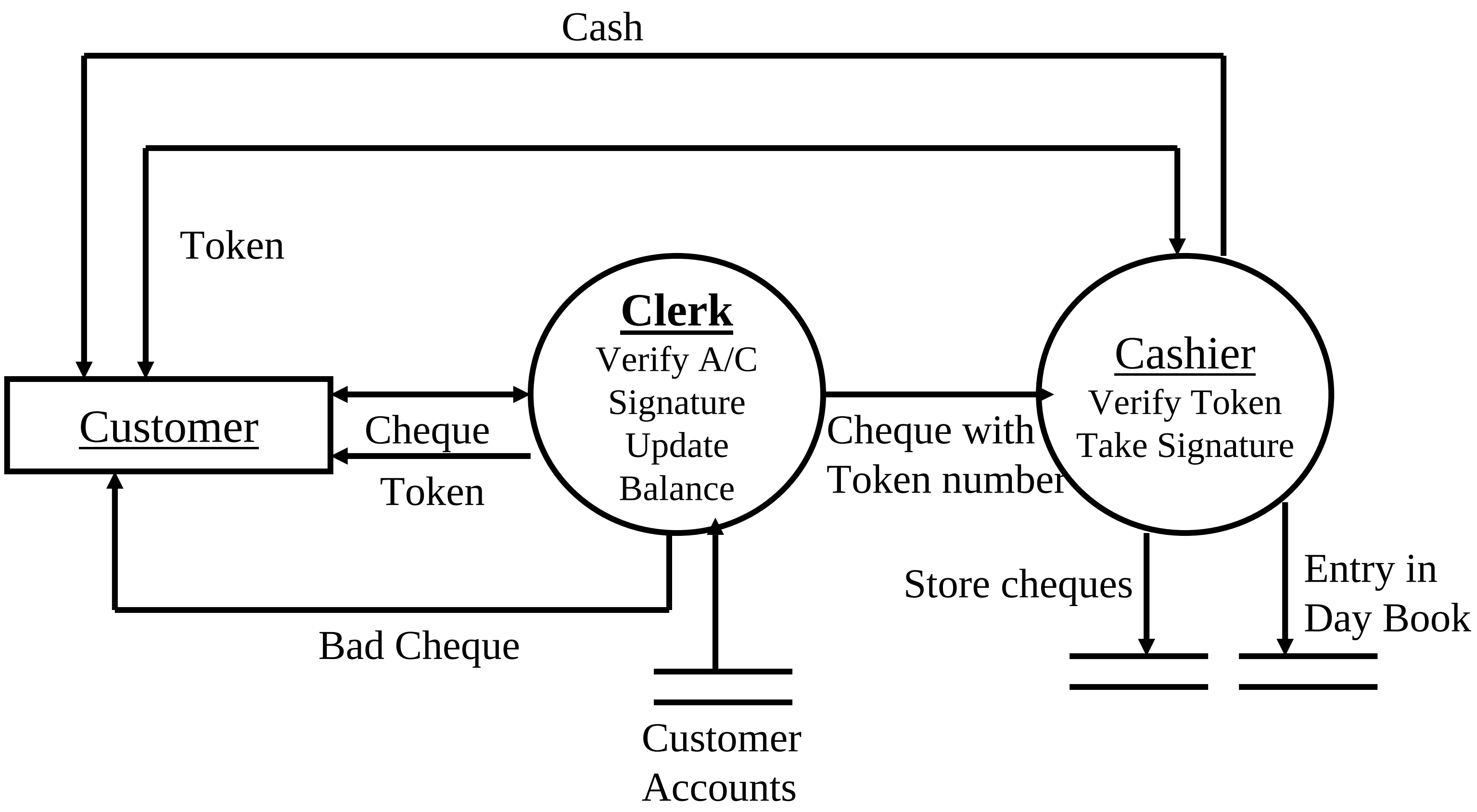
LEVELLING EXAMPLES



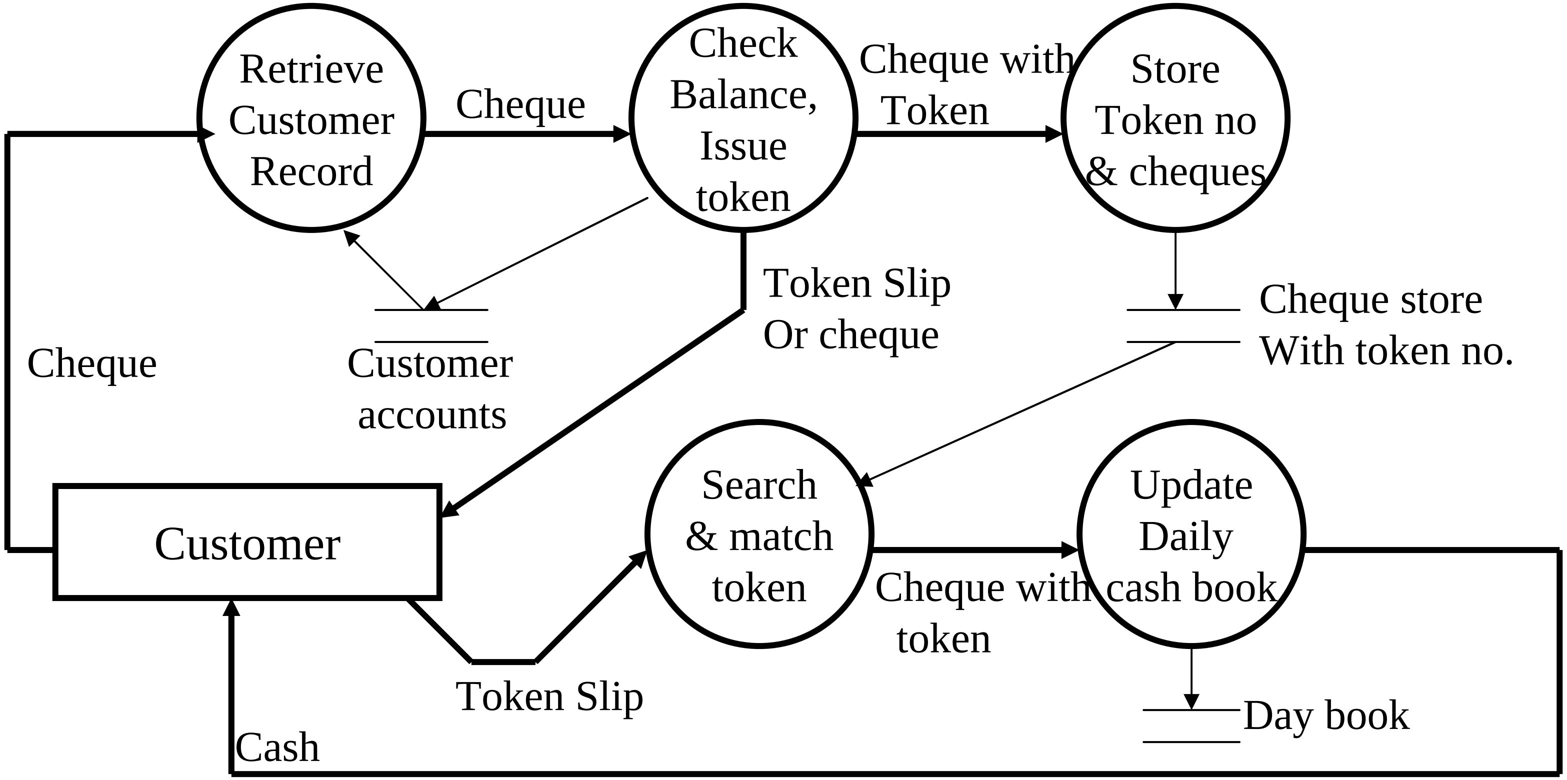
LOGICAL AND PHYSICAL DFD

- DFD’S considered so far are called logical DFDs
- A physical DFD is similar to a document flow diagram.
- It specifies who does the operations specified by the logical DFD
- Physical DFD may depict physical movements of the goods
- Physical DFDs can be drawn during fact gathering phase of a life cycle

PHYSICAL DFD FOR ENCASHING CHEQUE



LOGICAL DFD FOR CHEQUE ENCASHMENT


Retrieve Customer Record
Cheque
Check Balance, Issue token
Cheque with Token
Store Token no & cheques
Token Slip Or cheque
Cheque store With token no.
Cheque
Customer accounts
Customer
Search & match token
Update Daily cash book
Cheque with token
Token Slip
Day book
Cash