

# **System Analysis Design**

## **Week-4-Lesson-1**

### **Data Flow Diagram(DFD)**

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**Daffodil**  
*International*  
**University**

# Learning Goals

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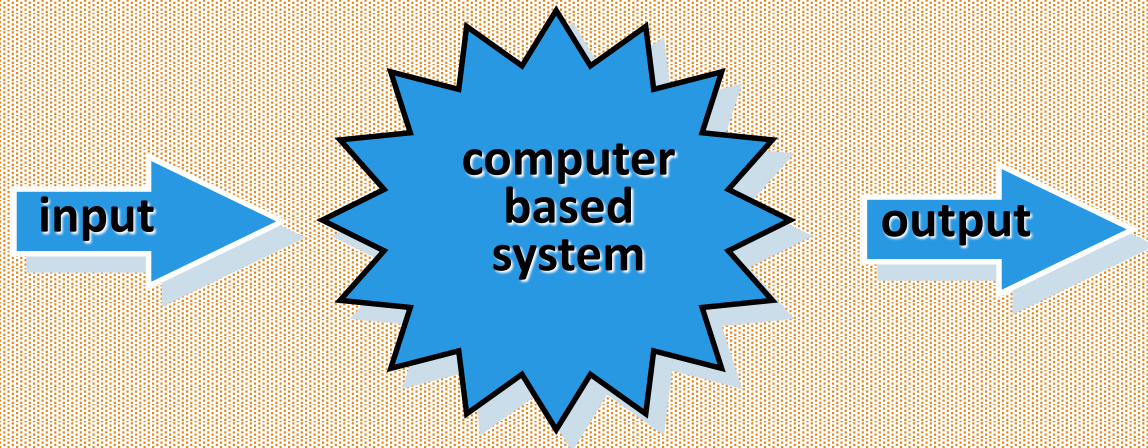
- What are Data Flow Diagrams (DFDs)?
- Why they are useful?
- How are they developed?
- How to level DFDs?
- Good style conventions in developing DFDs
- Difference between Logical and Physical DFDs
- Tools available to draw DFDs

# Flow-Oriented Modeling

- ❑ Represents how data objects are transformed as they move through the system.
- ❑ **Data flow diagram (DFD)** is the diagrammatic form that is used.
- ❑ By drawing a Data Flow Diagram, you can tell the information provided by and delivered to someone who takes part in system processes, the information needed to complete the processes and the information needed to be stored and accessed.

# The Flow Model

Every computer-based system is an information transform ....



# Data Flow Diagrams

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## WHAT ARE DATA FLOW DIAGRAMS?

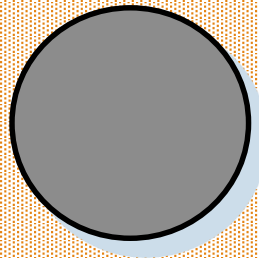
- DFDs models the system by depicting
  - **External entities** from which the data flows and where results terminate
  - **Processes** which transform data flows
  - **Data stores** from which the data are read or into which data are written by the processes.

# Flow Modeling Notation

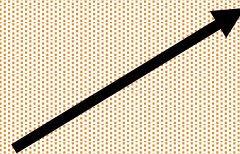
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**External Entity**



**Process**



**Data flow**



**Data store**

# External Entity

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**A producer or consumer of data**

*Examples: a person, a device, a sensor*

Another example: computer-based system

*Data must always originate somewhere  
and must always be sent to something*

# Process

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**A data transformer (changes input to output)**

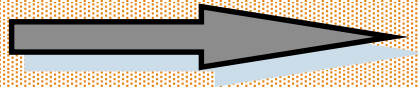
Examples: *compute taxes, determine area, format report, display graph*

*Data must always be processed in some way to achieve system function*

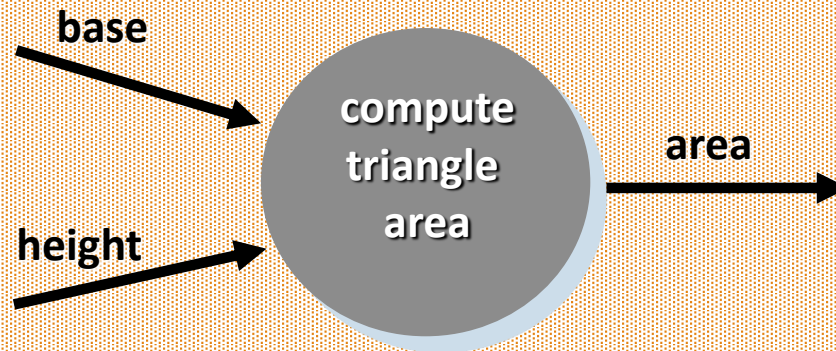


# Data Flow

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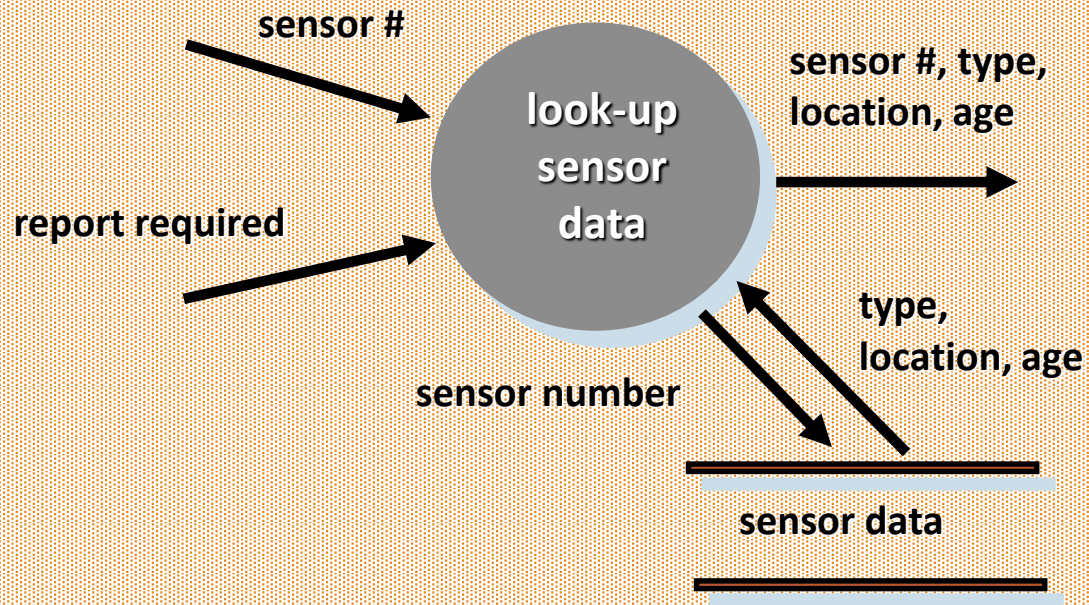
**Data flows through a system, beginning as input and transformed into output.**



# Data Stores



Data is often stored for later use.



# DFD Rules and Tips

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- ❑ Each process should have at least one input and an output.
- ❑ Each data store should have at least one data flow in and one data flow out.
- ❑ Data stored in a system must go through a process.
- ❑ All processes in a DFD go to another process or a data store.

# DFD levels and layers: From context diagrams to pseudocode

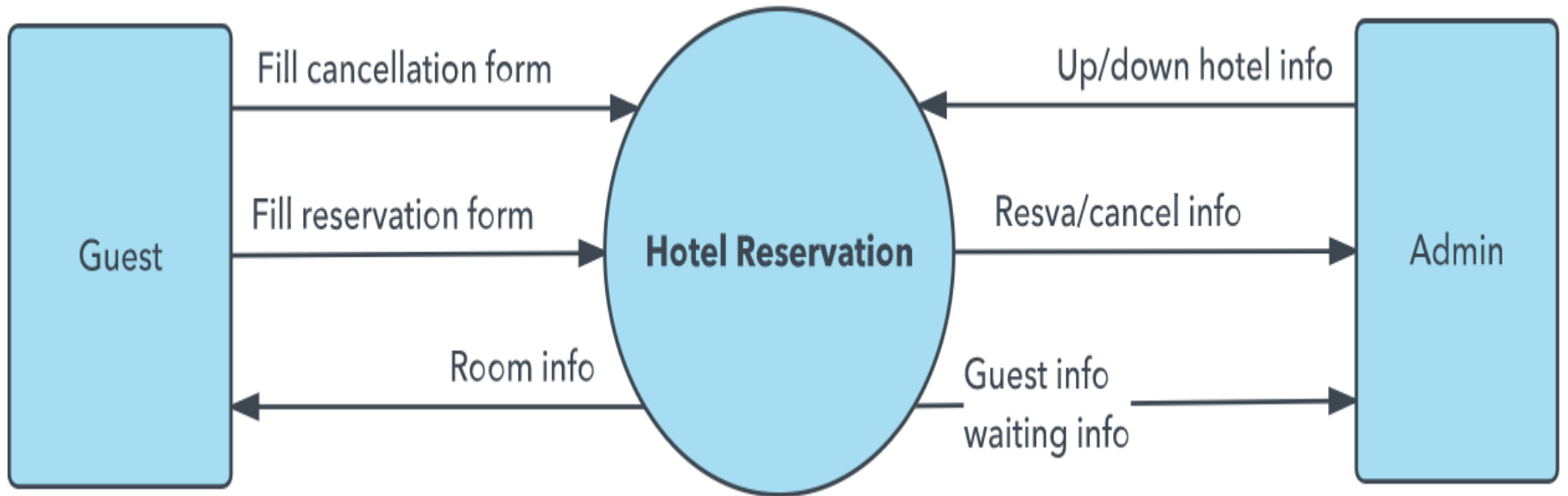
- ❑ A data flow diagram can dive into progressively more detail by using levels and layers, zeroing in on a particular piece.
- ❑ DFD levels are numbered 0, 1 or 2, and occasionally go to even Level 3 or beyond.

# DFD 0

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- ❑ DFD Level 0 is also called a **Context Diagram**. It's a basic overview of the whole system or process being analyzed or modeled.
- ❑ It's designed to be an at-a-glance view, showing the system as a single high-level process, with its **relationship to external entities**.

# DFD 0

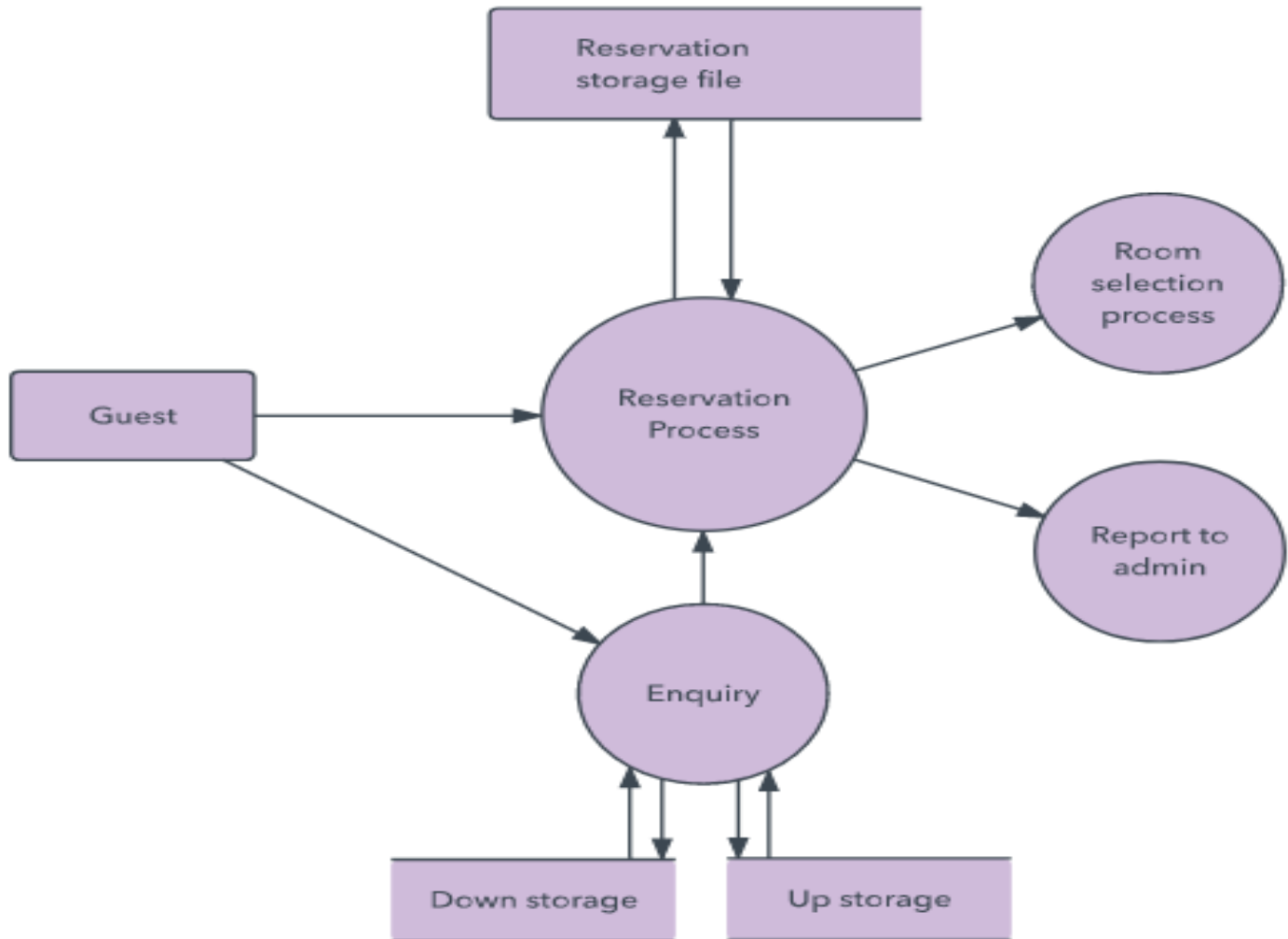


# DFD-1

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- ❑ DFD Level 1 provides a **more detailed breakout of pieces** of the Context Level Diagram.
- ❑ You will highlight the main functions carried out by the system, as you break down the high-level process of the Context Diagram into its sub-processes.

# DFD-1



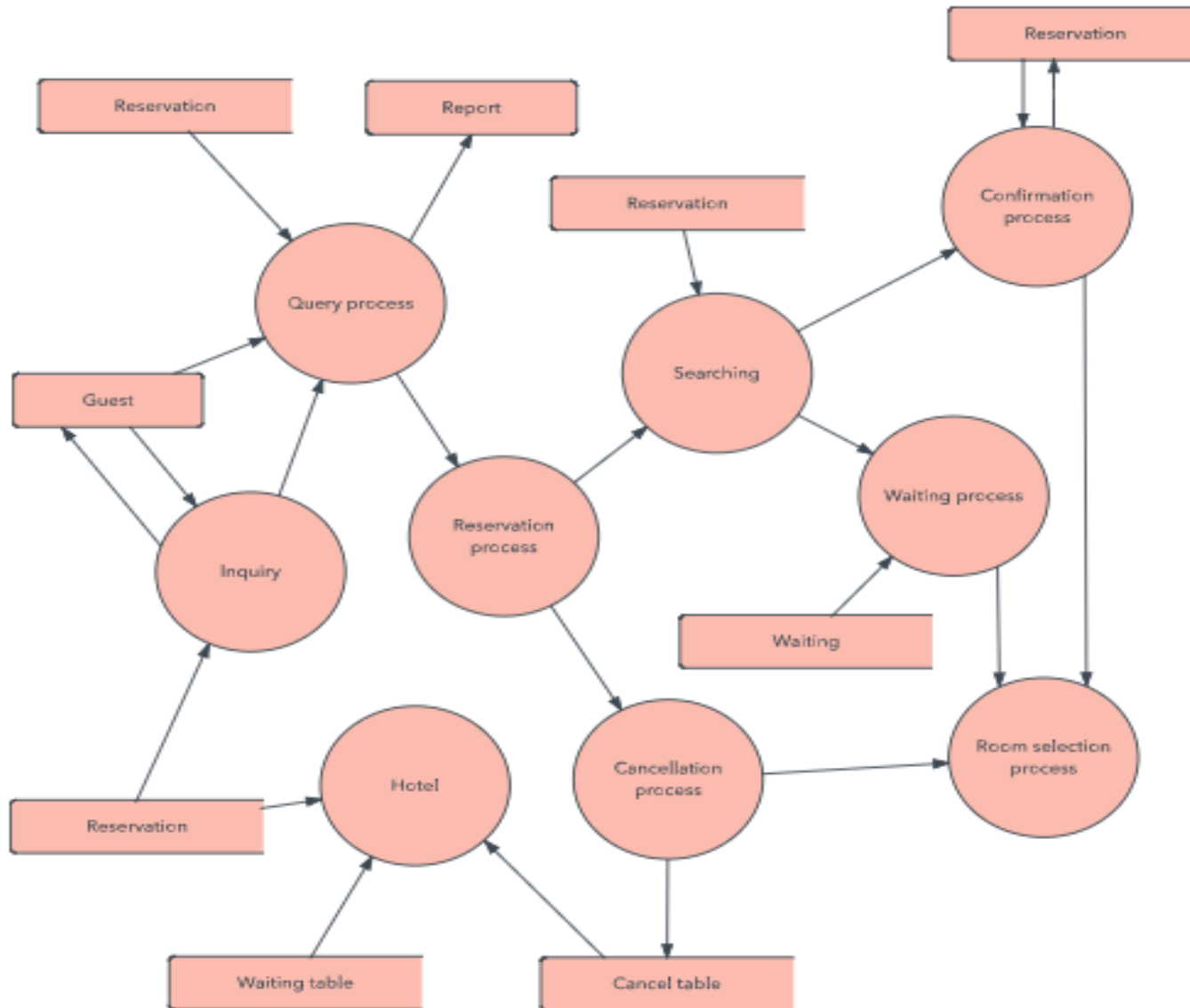


## DFD-2

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- ❑ DFD Level 2 then goes one **step deeper into parts of Level 1.**
- ❑ It may require more text to reach the necessary level of detail about the system's functioning.

# DFD-2



## DFD 3, 4

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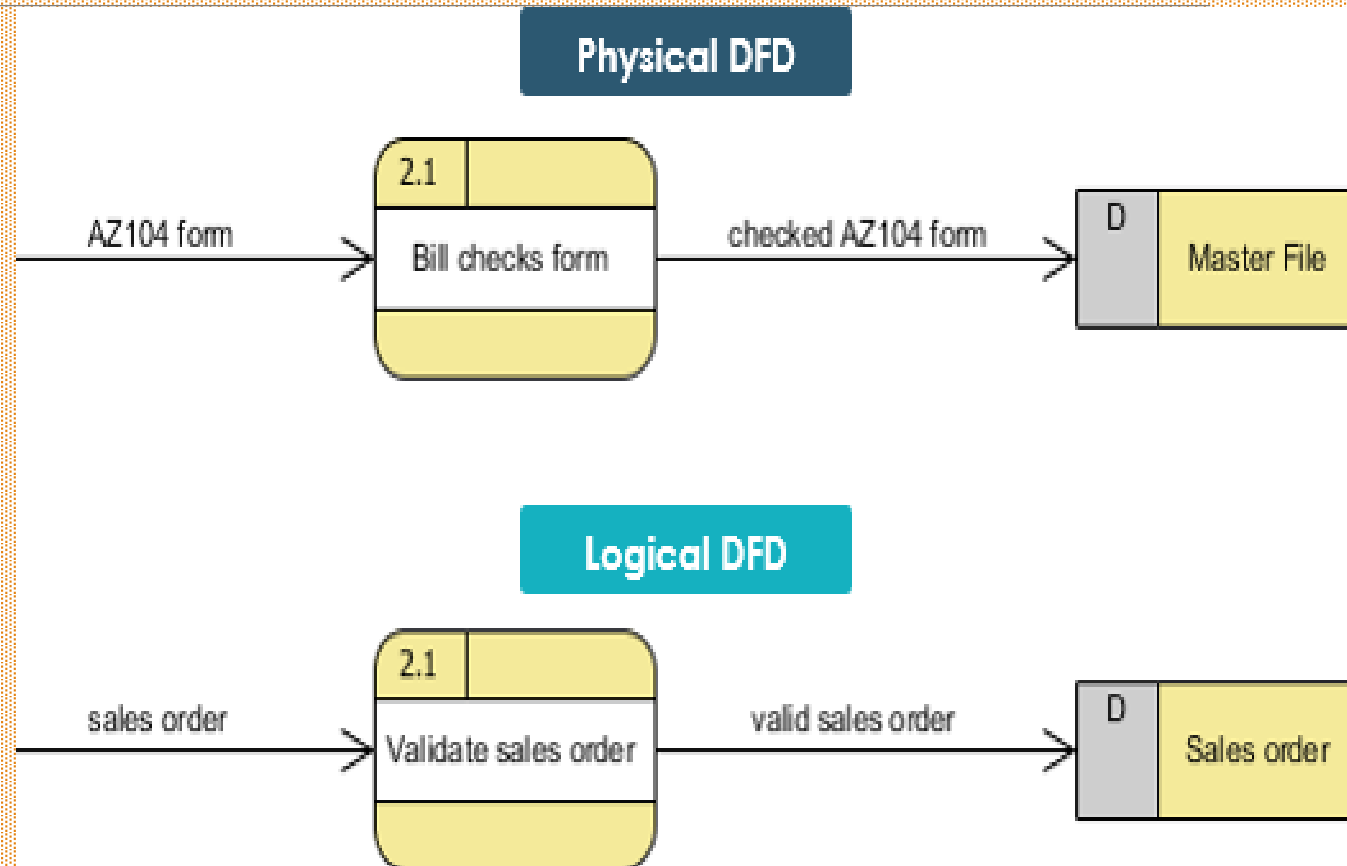
- ❑ Progression to Levels 3, 4 and beyond is possible, but going beyond Level 3 is uncommon.
- ❑ Doing so can create complexity that makes it difficult to communicate, compare or model effectively.

# Logical DFD vs. Physical DFD

- ❑ A Logical DFD visualizes the data flow that is essential for a business to operate. It focuses on the business and the information needed, not on how the system works or is proposed to work.
- ❑ A Physical DFD shows how the system is actually implemented now, or how it will be. For example, in a Logical DFD, the processes would be business activities, while in a Physical DFD, the processes would be programs and manual procedures.

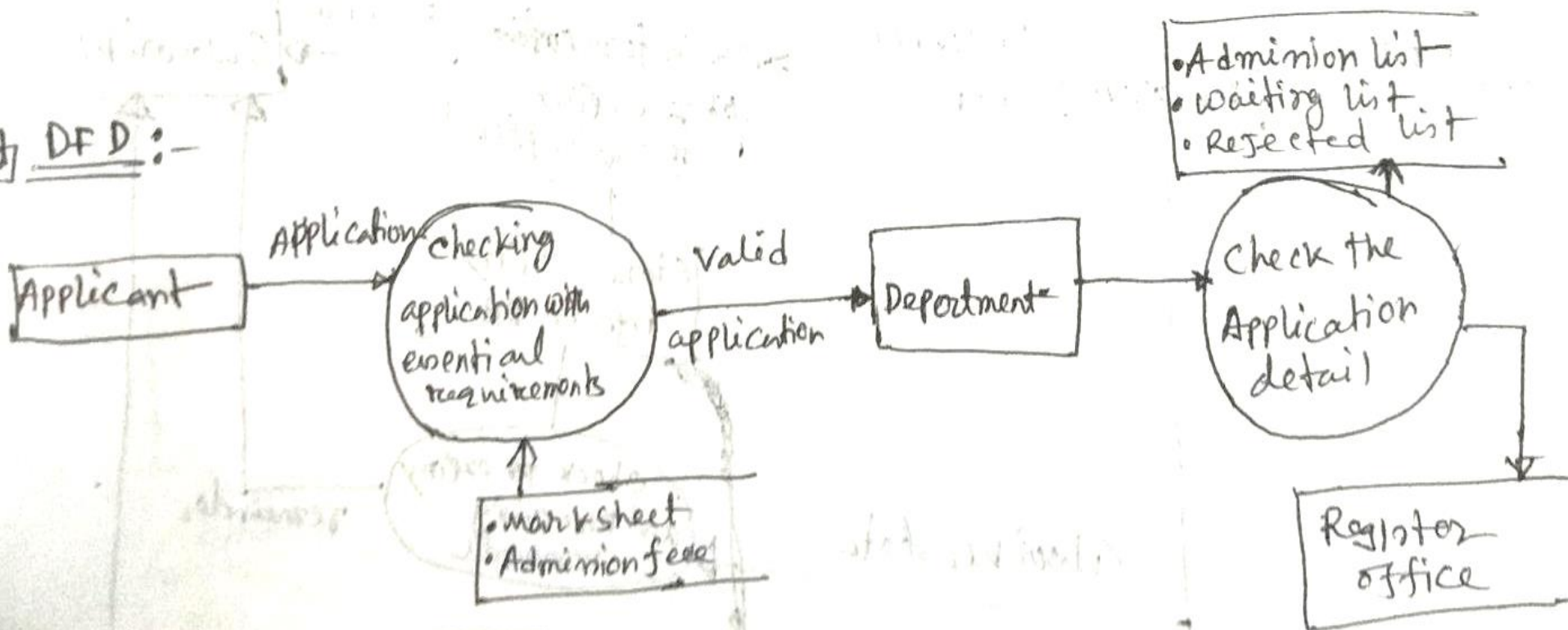
# Physical and Logical DFD: Example 1

- **Physical DFD** specifies actual flow of physical documentation, while **logical DFD** only focus on the information flow in business term.



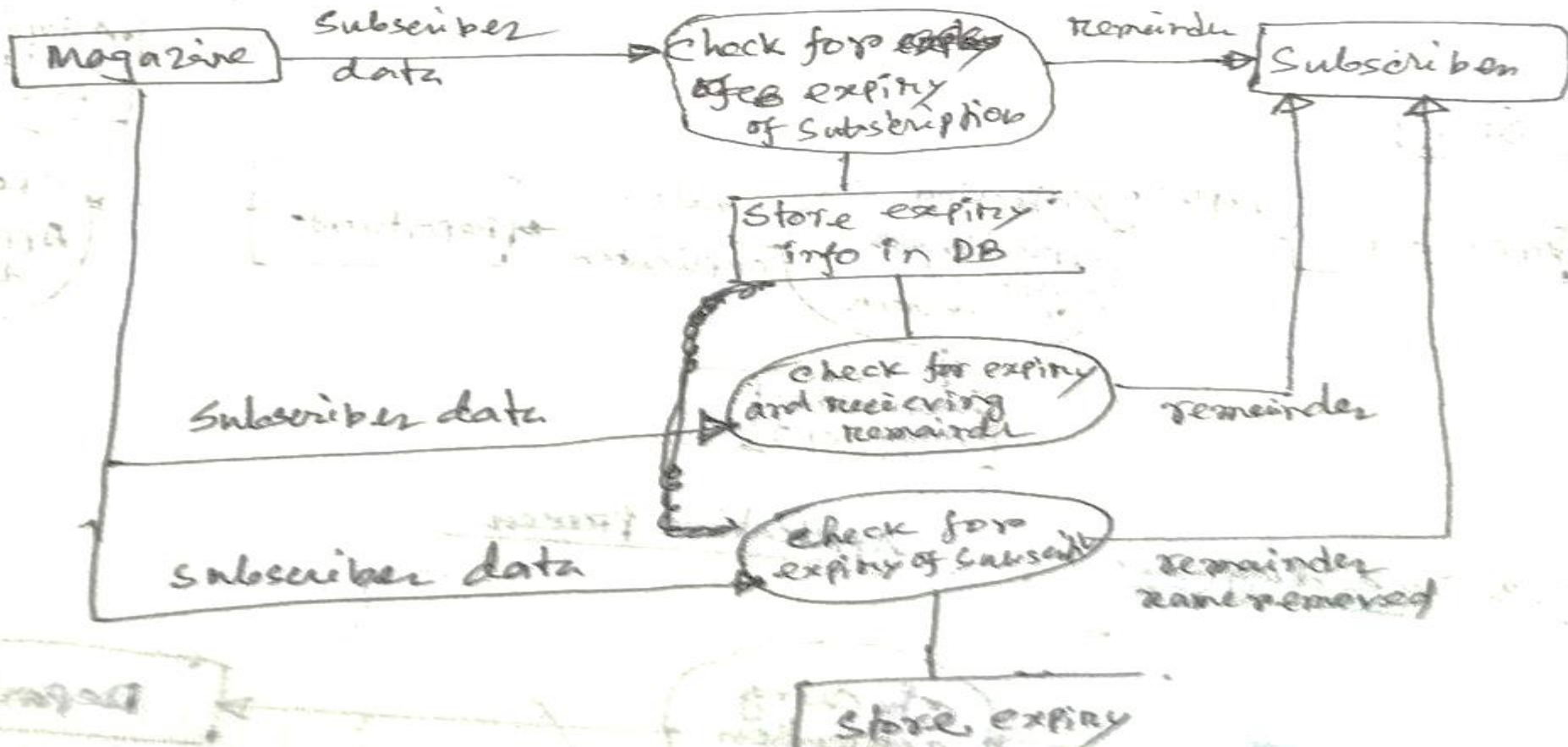
# Example-1

An advertisement is issued giving essential qualifications for the course, the last date for receipt of application, and the fee to be enclosed with the application. A clerk in the Registrar's office checks the received applications to see if mark sheet and fee are enclosed and sends valid applications to the concerned academic department. The department checks the application in details and decides the applications to be admitted, those to be put in the waiting list, and those rejected. Appropriate letters are sent to the Registrar's office which intimates the applicant.



# Example-2

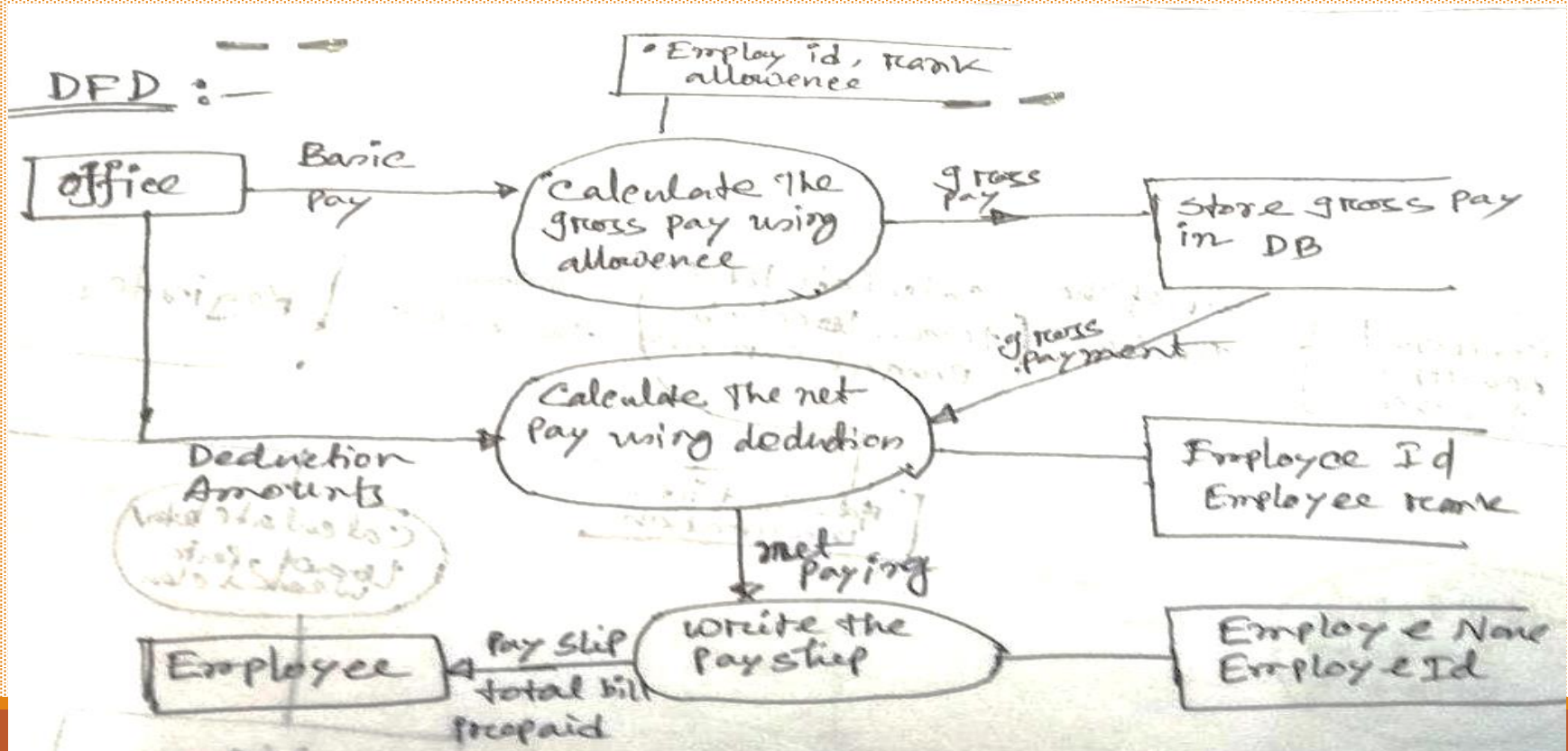
A magazine is published monthly and is sent by post to its subscribers. Two months before the expiry of subscriptions, a reminder is sent to the subscribers. If subscription is not received within a month, another reminder is sent. If renewal subscription is not received up to two weeks before the expiry of the subscriptions, the subscribers name is removed from the mailing list and the subscriber informed.





# Example-3

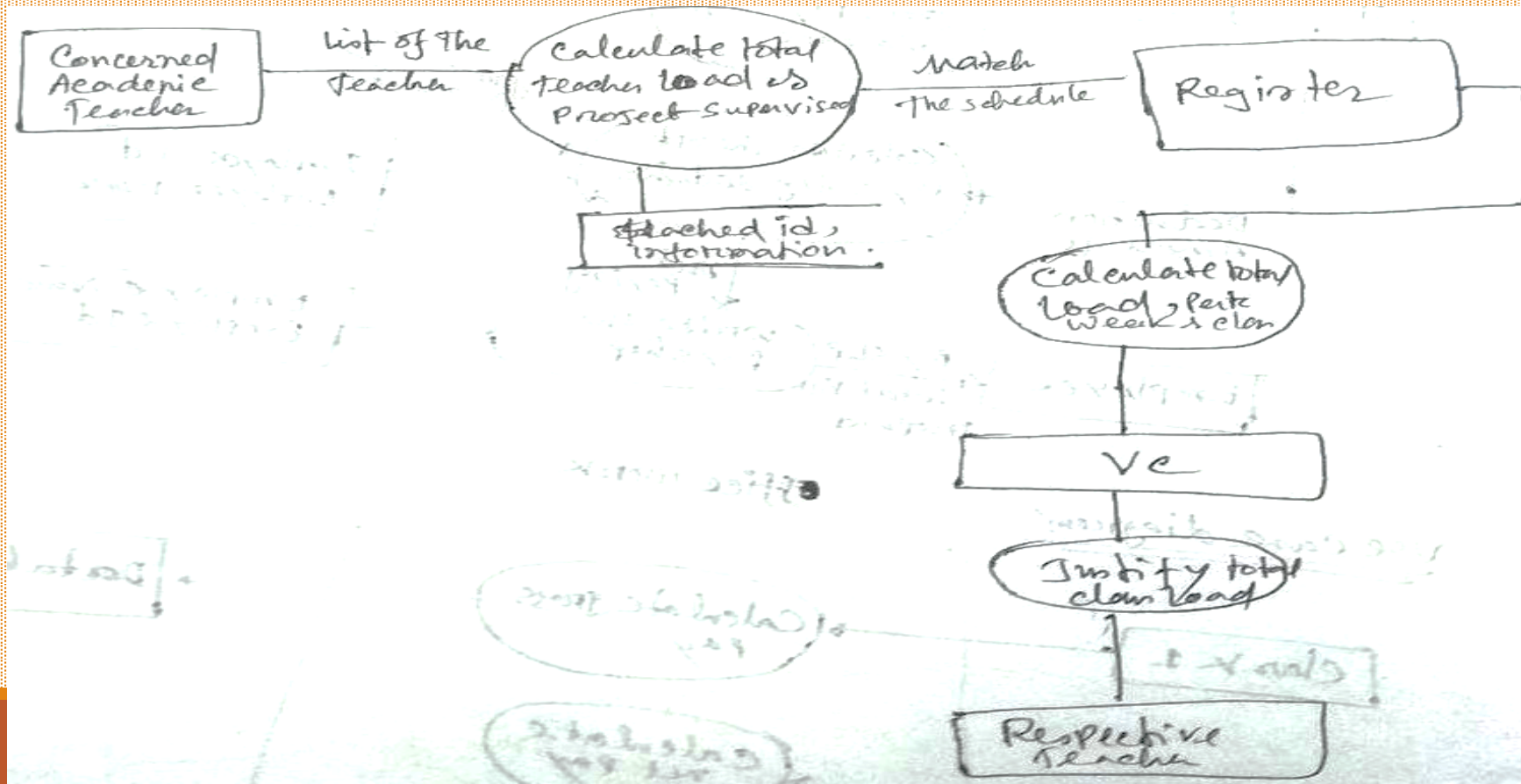
A list of employees with their basic pay is sent to a clerk. He calculates the gross pay using standard allowances which are known for each pay slab. Deduction statements such as loan payment subscription to association etc. are also sent to another clerk who matches these slips with the slips of gross pay and calculates net pay. This slip is used by another clerk to write out pay cheques for each employee and sent to respective employees. The total pay bills paid are also computed.





# Example-4

A list of teachers with their class schedule is sent to the concerned teachers. He calculates the total teacher load using the practice of the department. Projects that are supervised by the teachers are also sent to Registrar. He matches the class schedule and projects and calculates total load per week for each teacher. This slip is used by the VC to justify total class load for each teacher and sent to the respective teachers. The complete routines are also generated.



# References

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1. **System Analysis and Design**, by Elias M. Awad
2. **Systems Analysis and Design**, Kendall and Kendall, Fifth Edition
3. **Management Information Systems: Managing the Digital Firm** (11th edition), Pearson/Prentice-Hall
4. <https://www.visual-paradigm.com/tutorials/data-flow-diagram-example-supermarket-app.jsp>