CS5002NP

Software Engineering

Agendas

- **Software Analysis** and **Design**
- Types of **Software Analysis** and **Design**
- **Data Flow** Diagrams

Software Analysis and Design

- Includes all activities, which help the **transformation** of **requirement specification** into **implementation**
- **Requirement specifications** specify all **functional** and **non-functional expectations** from the software. These requirement specifications come in the shape of **human readable and understandable documents**
- **Software analysis** and **design** is the intermediate stage, which helps **human-readable requirements** to be transformed into **actual code**

Types of Software Analysis and Design

- Structured Analysis and Design
- Object Oriented Analysis and Design

Structured Analysis and Design Approach

- A **diagrammatic notation** that is designed to help people **understand the system**
- **Goal** - **improve quality** and **reduce the risk** of system failure
- Establishes concrete management specifications and documentation

Structured Analysis and Design Approach

- Focuses on the **solidity**, **flexibility**, and **maintainability** of the system
- Focuses on well-defined **system boundary**
- Approach based on the **Data Flow Diagram**

Mainly focused on

- System
- Process
- Technology

Involves Two Phases

- **Analysis Phase**
  - Data Flow Diagram
  - Data Dictionary
  - State Transition Diagram
  - ER Diagram
- **Design Phase**
  - Structure Chart
  - Pseudo Code

Analysis Phase - Data Flow Diagram

- **Graphical representation** of flow of data in the entire system
- Depicting **incoming data flow**, **outgoing data flow** and **stored data**
- Shows how data enters and leaves the system, what changes the information, and where data is stored

Analysis Phase - Data Flow Diagram

- **Objective** - show the scope and boundaries of a system as a whole
- **Communication tool** between a system analyst and any person who plays a part in the order that acts as a starting point for redesigning a system
- Also called as a **data flow graph** or **bubble chart**

Data Flow Diagram - Types

- **Logical DFD**
  - Concentrates on the system process, and flow of data in the system
- **Physical DFD**
  - Shows how the data flow is actually implemented in the system

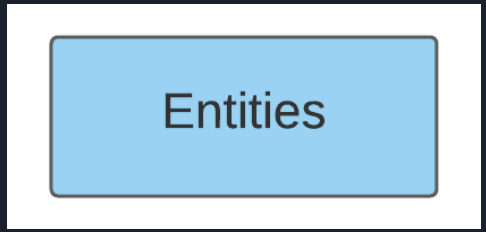
Eg: A logical DFD of a grocery store checkout process would include things like an item number, prices, and receipts. A physical DFD would instead take note of details like bar codes, transaction files, and payment details like a credit card number.

Data Flow Diagram - Components

- Entities
- Process
- Data Storage
- Data Flow

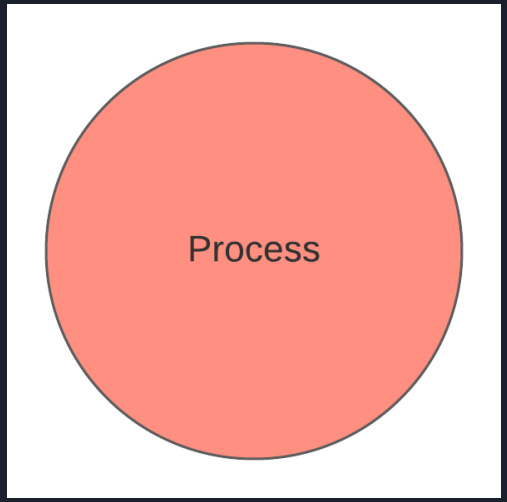
Data Flow Diagram - Components

- Entities
  - Entities are source and destination of information data
  - Entities are represented by a rectangles with their respective names



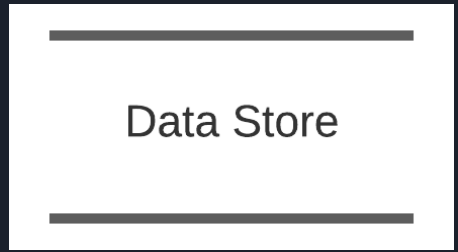
Data Flow Diagram - Components

- Process
  - Activities and action taken on the data
  - Represented by Circle with their respective name



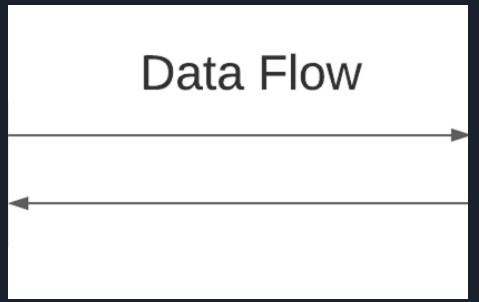
Data Flow Diagram - Components

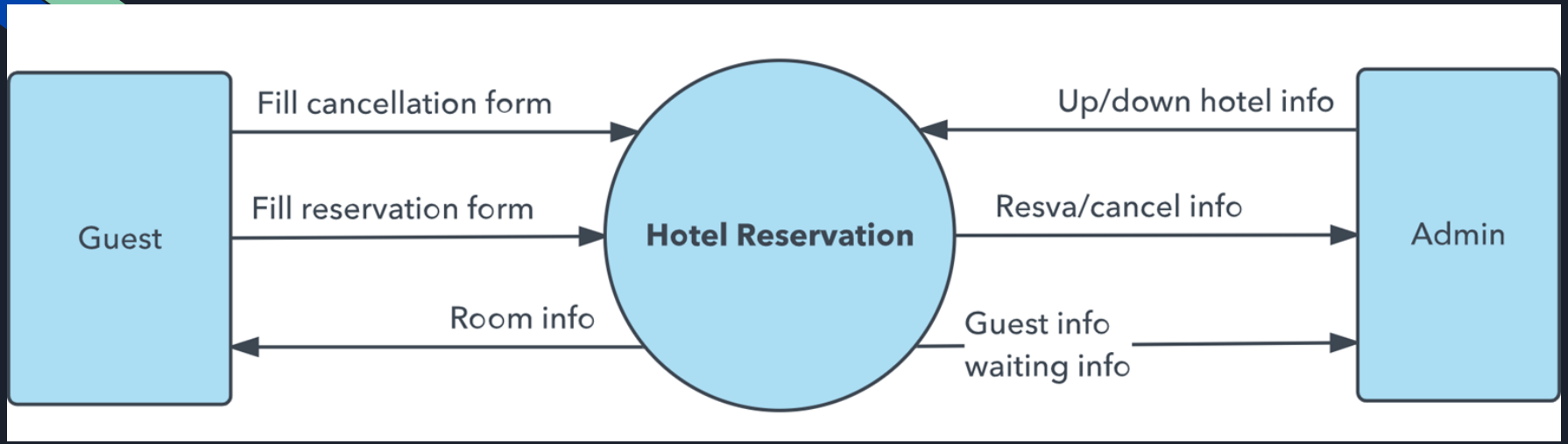
- Data Storage
  - Store Data
  - Two variants of data storage
    - A rectangle with absence of both smaller sides
    - An open-sided rectangle with only one side missing



Data Flow Diagram - Components

- Data Flow
  - Movement of data is shown by pointed arrows
  - Data movement is shown from the base of arrow as its source towards head of the arrow as destination



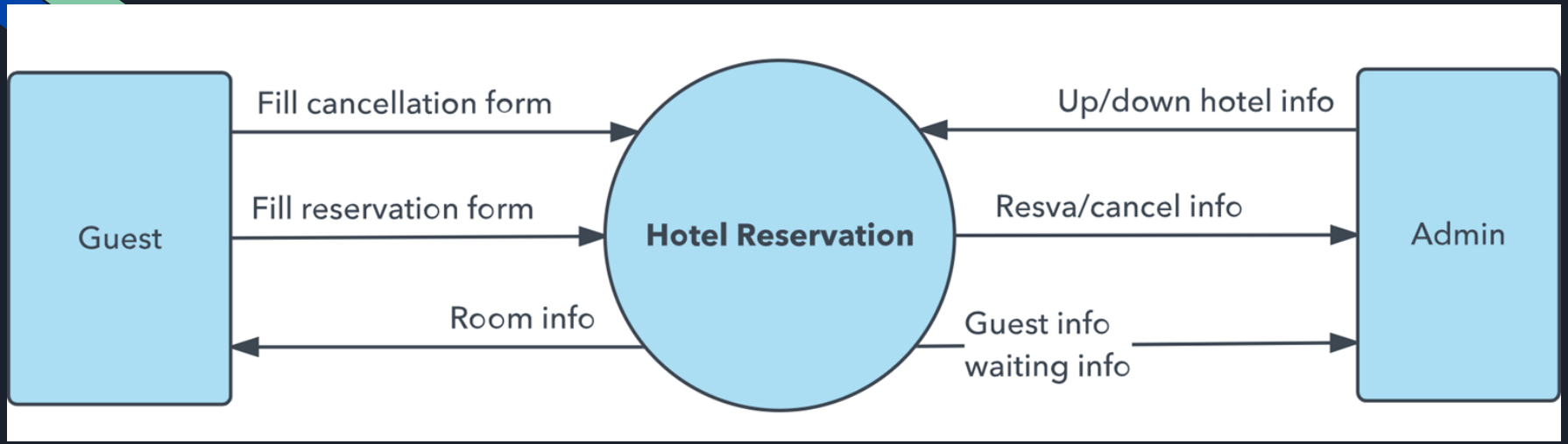

Guest
Fill cancellation form
Fill reservation form
Room info
Hotel Reservation
Up/down hotel info
Resva/cancel info
Guest info
waiting info
Admin

Data Flow Diagram - Rules

- Data Flow
  - 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**

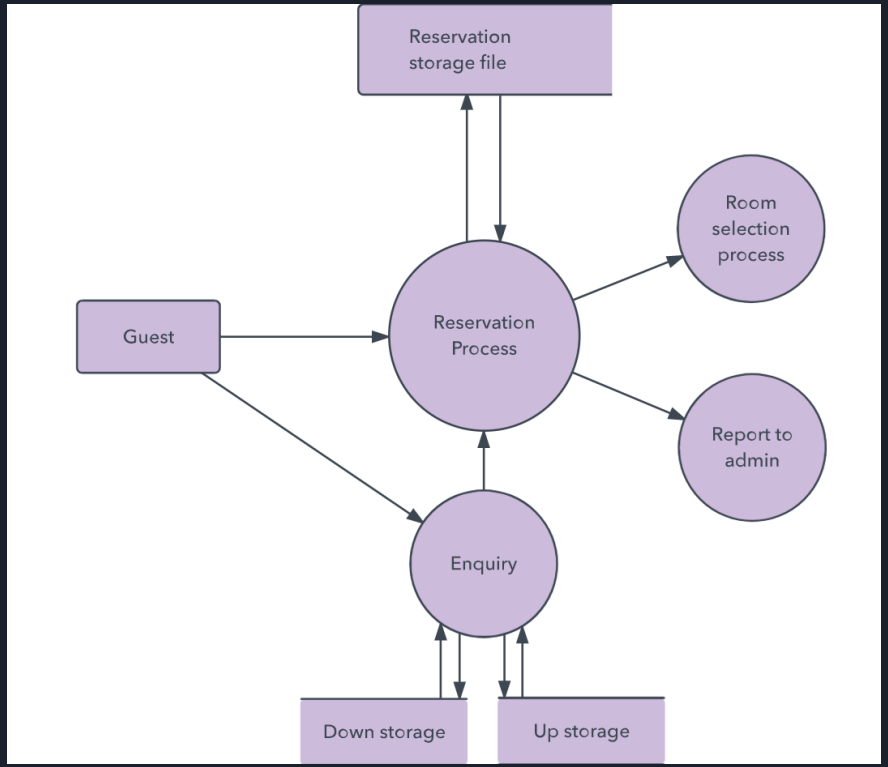
Data Flow Diagram - Levels

- Data Flow Diagram Level 0
  - Also called a **Context Diagram**
  - Basic overview of the whole system or process being analyzed or modeled
  - Designed to be **an at-a-glance view**, showing the system as a **single high-level process**, with its relationship to external entities
  - Should be **easily understood** by a wide audience, including stakeholders, business analysts, data analysts and developers


Guest
Fill cancellation form
Fill reservation form
Room info
Hotel Reservation
Up/down hotel info
Resva/cancel info
Guest info
waiting info
Admin

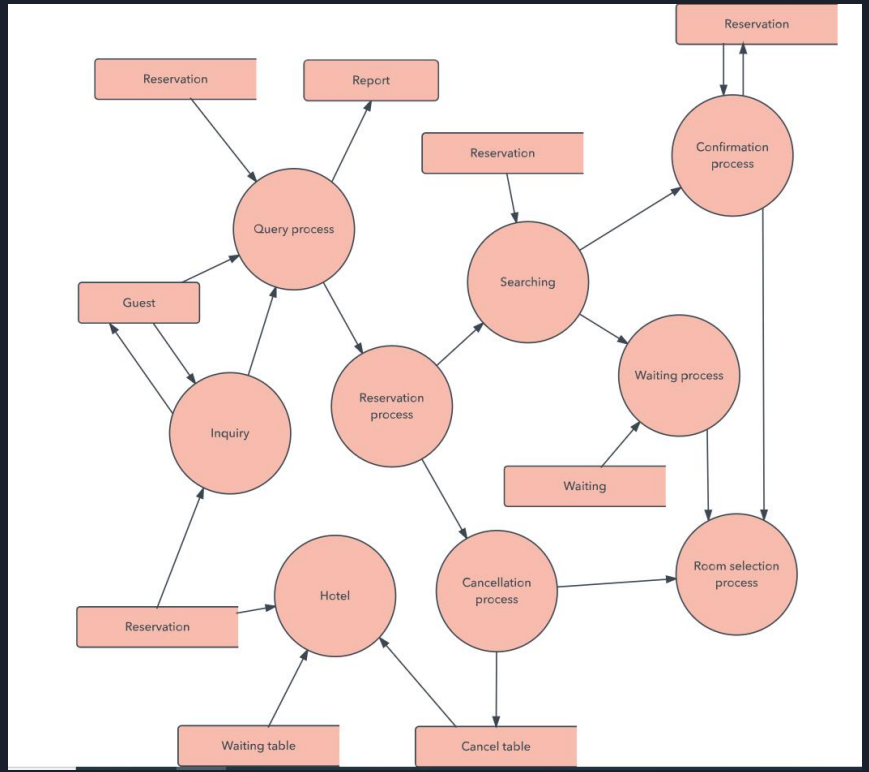
Data Flow Diagram - Levels

- Data Flow Diagram - Level 1
  - **A more detailed breakout** of pieces of the Context Level Diagram
  - **Highlight the main functions** carried out by the system, as you break down the high-level process of the Context Diagram into its subprocesses


Reservation storage file
Room selection process
Guest
Reservation Process
Report to admin
Enquiry
Down storage
Up storage

Data Flow Diagram - Levels

- Data Flow Diagram - Level 2
  - Goes one step deeper into parts of Level 1
  - May require more text to reach the necessary level of detail about the system’s functioning


Reservation
Reservation
Report
Reservation
Confirmation process
Query process
Searching
Guest
Waiting process
Inquiry
Reservation process
Waiting
Hotel
Cancellation process
Room selection process
Reservation
Waiting table
Cancel table

THANK YOU!