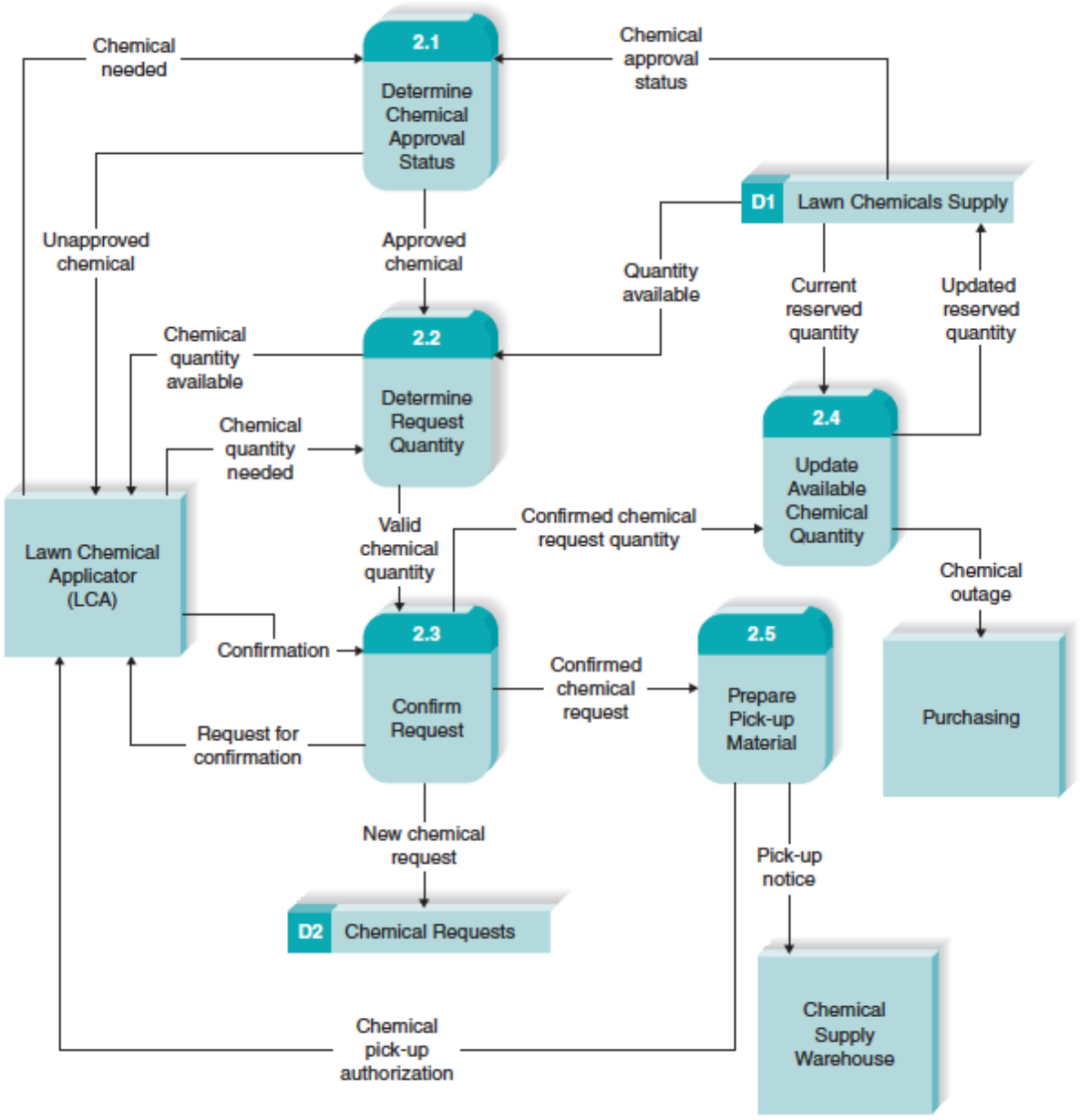
UECS2344 Software Design: Lecture 7

Structured Analysis and Design

STRUCTURED ANALYSIS

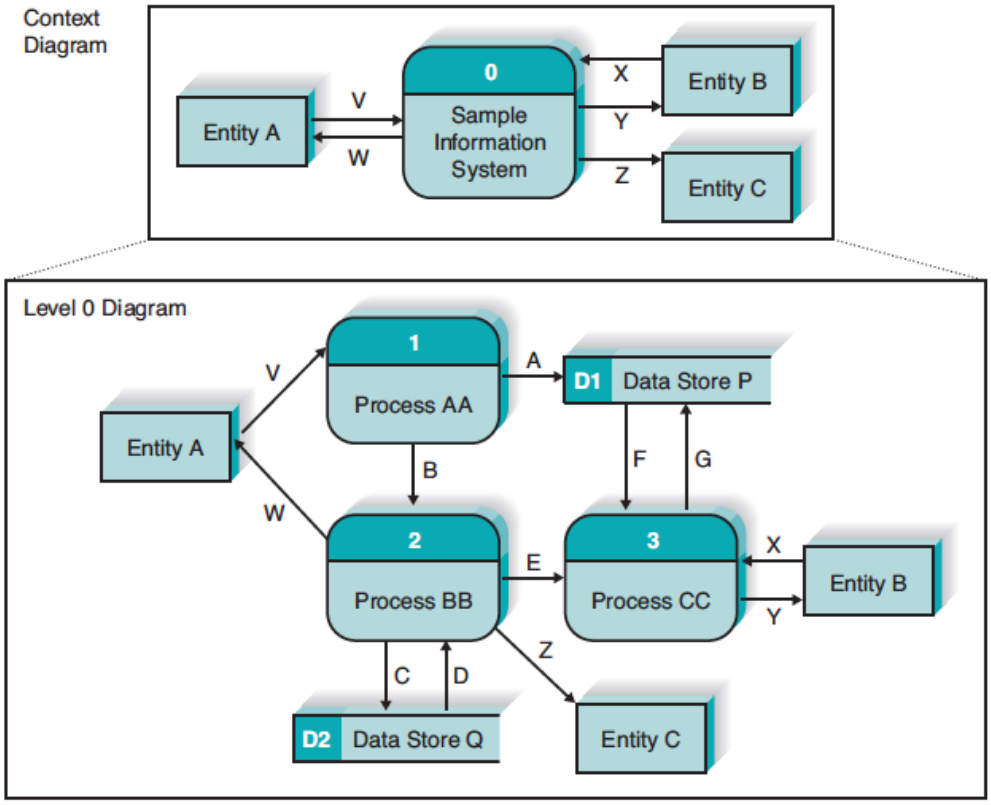
Data Flow Diagrams

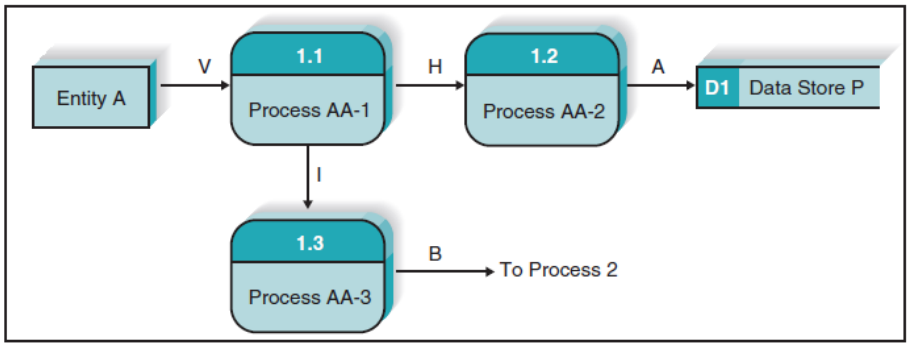
(From Systems Analysis and Design – Dennis, Wixom, & Roth - Wiley)



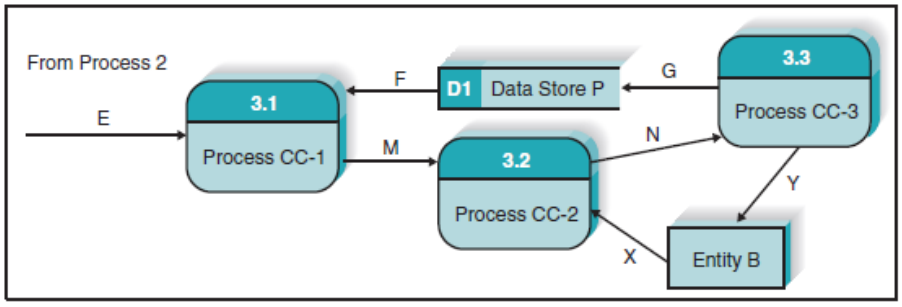
Modelling Process

Stepwise Refinement or **Top-Down Design**: Proceed from general to specific; start with a high-level or abstract process, then develop each lower-level processes with more and more specific details.





Process 1 Level 1 Diagram



Process 3 Level 1 Diagram

Context Diagram

- ❑ Top-level DFD
- ❑ Shows the context into which the business process fits
- ❑ Shows the overall business process as just one process (process 'zero')
- ❑ Shows all the external entities that receive information from or contribute information to the system

Level 0 Diagram

- ❑ Shows all the major processes that comprise the overall system – the internal components of process 0
- ❑ Shows how the major processes are interrelated by data flows
- ❑ Shows external entities and the major processes with which they interact
- ❑ Adds stored data via the data stores

Level 1 Diagrams

- ❑ Create one level 1 diagram for every major process on the level 0 diagram
- ❑ Shows the internal processes that comprise a single process on the level 0 diagram
- ❑ Shows how information moves to and from each of these processes
- ❑ If a parent process is decomposed into, say, three child processes, the these three child processes wholly and completely make up the parent process

Level 2 Diagrams

- ❑ Shows all processes that comprise a single process on the level 1 diagram
- ❑ Shows how information moves to and from each of these processes
- ❑ Level 2 diagrams may not be needed for all level 1 processes
- ❑ Correctly numbering each process helps the user understand where the process fits into the overall system

STRUCTURED DESIGN

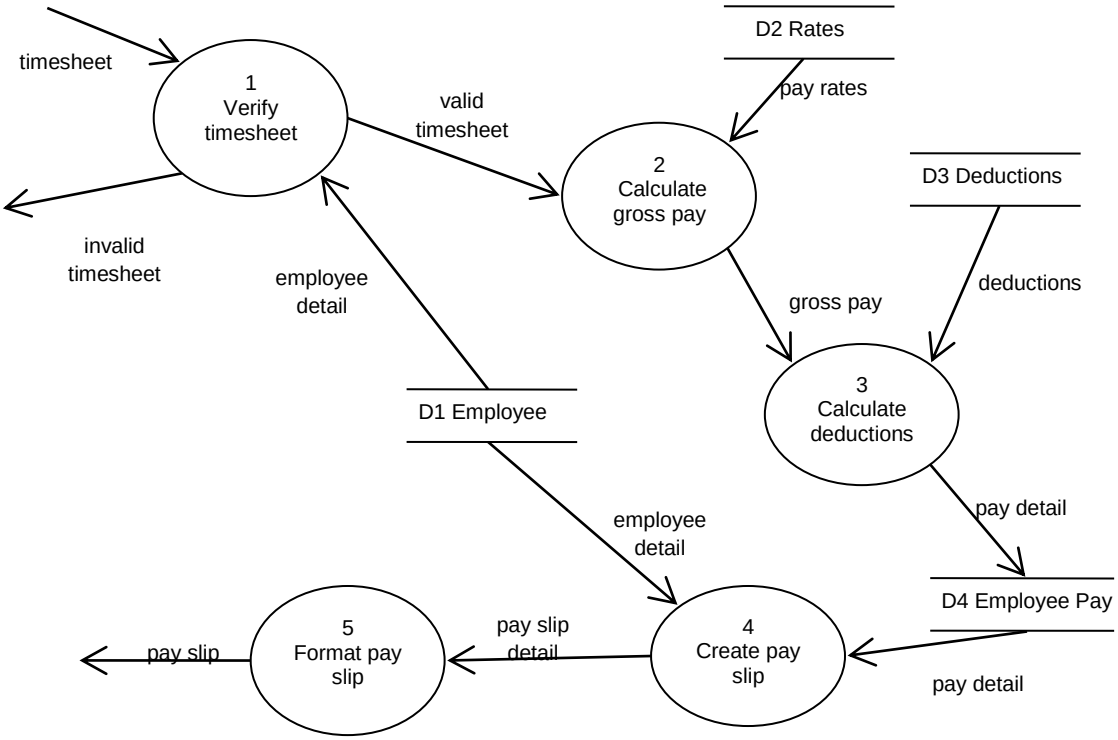
Two approaches:

- **Transform Analysis**
- **Transaction Analysis**

Transform Analysis

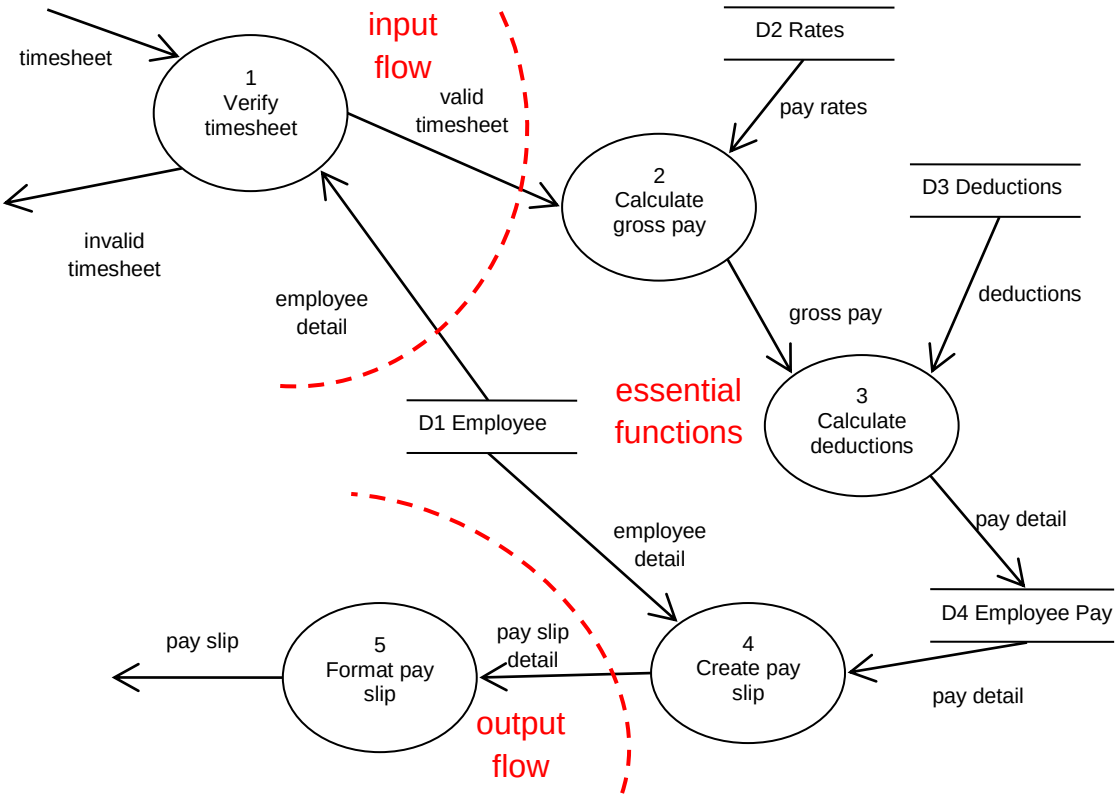
1. Start with Data Flow Diagram.
2. Identify the *essential functions, input flow, and output flow* for the system in the DFD.
   - The *essential functions* are the main processes of the system.
   - All processes before these essential functions would be part of the *input flow.*
   - All processes after these essential functions would be part of the *output flow*.
3. Divide the DFD into input, process, and output sections, and create a structure chart accordingly.

Example: Payroll Processing System

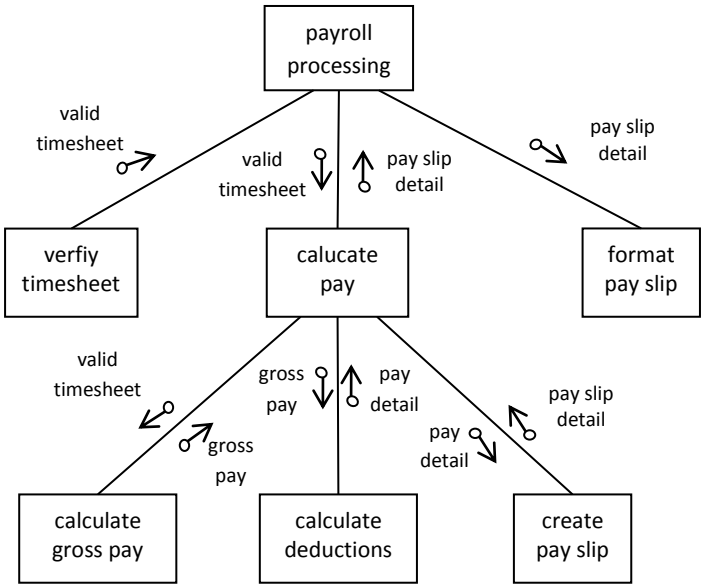


Processes 2, 3, and 4 are the essential functions (or main processes) of the payroll processing system. Process 1 is part of the input flow and Process 5 is part of the output flow.

Divide the DFD processes into three sections as follows:

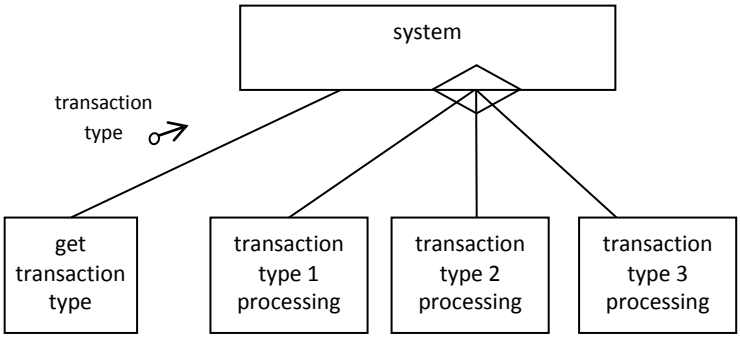


Create a structure chart based on these three sections as follows:



Transaction Analysis

Transactions are events that trigger actions or processing in the system. Different types of transactions trigger different processing. The general structure chart for this type of system is as follows:



Example: Ticket Reservation System

There are three types of transactions: check availability, reserve ticket, and cancel ticket. The user selects the required transaction type. The first step is to identify the transaction type selected by the user. Next is calling one of several modules that handle processing for the different types of transaction.