

System Analysis and Design

Section 5

Simple Review

- What is the purpose of the analysis phase?
- Mention the information gathering techniques?
- What is the final deliverable of the planning phase?

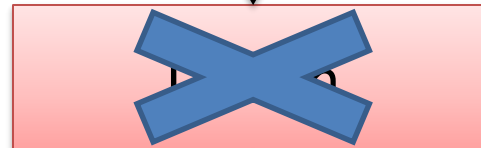
SDLC

- ✓ Interview
- ✓ Questionnaire
- 4. Data Flow Diagram
- 5. Data Dictionaries
- 6. Process Specs
- 7. Process Logic

Planning



Analysis



Implementation

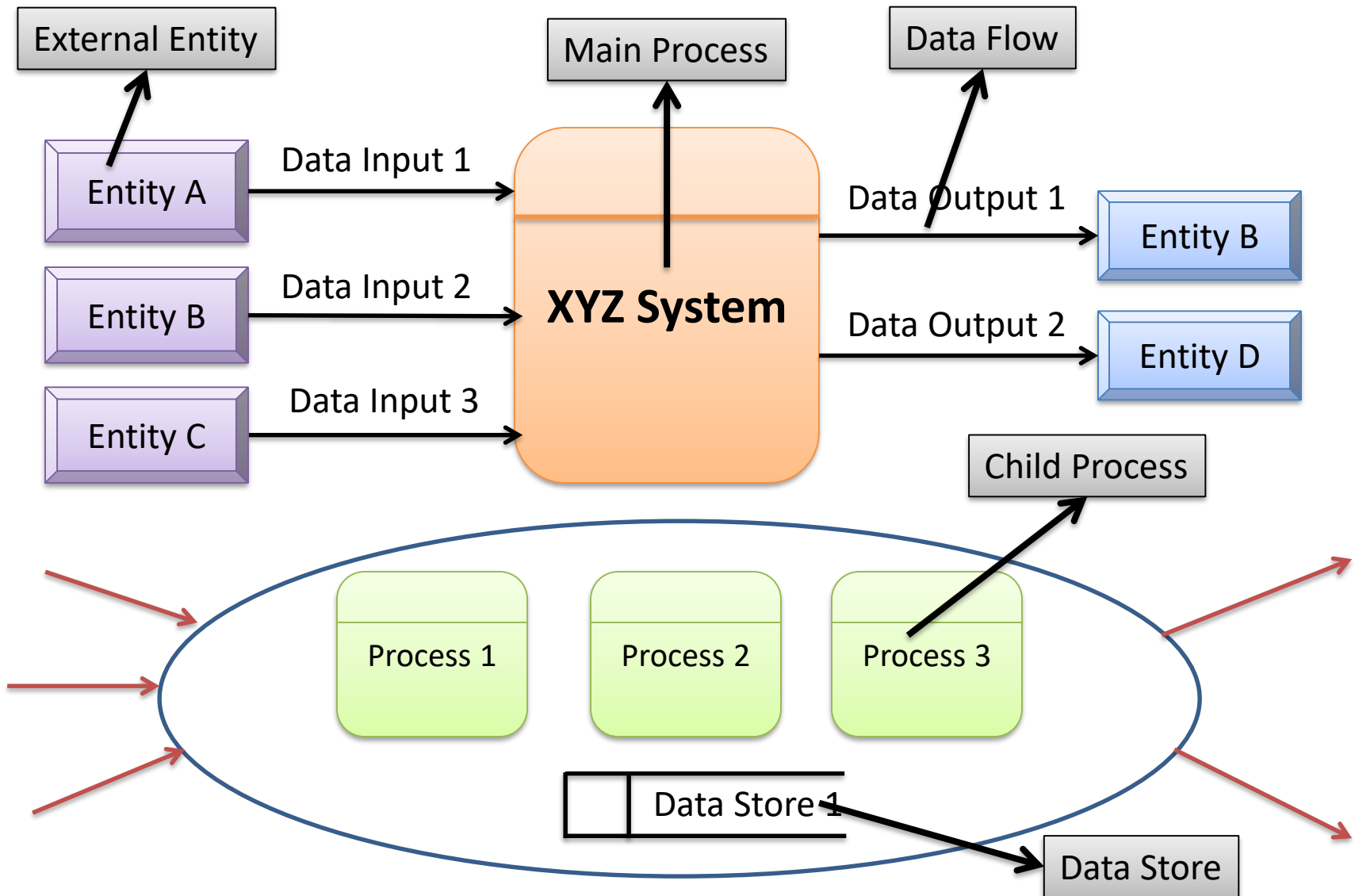
- ✓ System Request
- ✓ Feasibility Study
- ✓ Project Plan
 - ✓ Methodology
 - ✓ Time Estimation
 - ✓ Task Identification
 - ✓ Pert Chart
 - ✓ Gantt Chart
 - ✓ Scope Management

Data Flow Diagram (DFD)

- DFD is a **graphical** representation that describes **processes** and **data movement** through the organization.
- What are the main components of a DFD?



Data Flow Diagram (DFD)

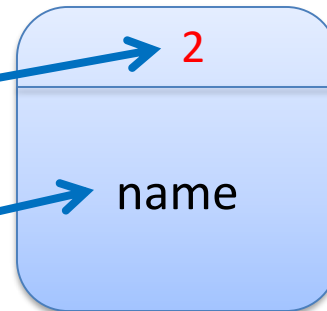


Data Flow Diagram (DFD)

- DFD
 - is **graphical** representation **technique** for the **(1) business processes** and the **(2) data** that pass among them
 - Consists of **4** elements:
 1. Process
 2. Data flow
 3. Data store
 4. External entity

DFD Elements: (1) Process

- Process is an **activity** or a **function** performed for some **specific business reason**
- Every ***process*** has
 - a number
 - a name (verb phrase)
 - at least **one output** data flow
 - at least **one input**
 - Can be exploded to **child** processes
 - Rounded rectangle




Process **symbol**



Process **example**

DFD Elements: (2) Data Flow

- It is describe **movement** of **data** from one point to another.
 - **Data** is a (1) single piece or a (2) logical collection of **several** pieces of information
- Every ***data flow*** has
 - a name (a noun)
 - one or more Connections (could be parallel)
 - shall be in one direction

Name (noun) 

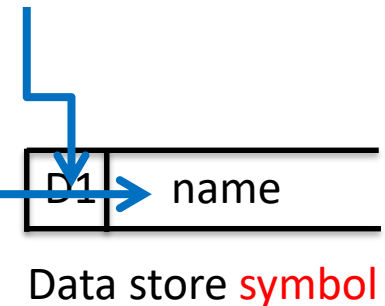
Data flow **symbol**

Employee Data 

Data flow **example**

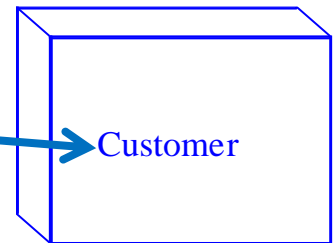
DFD Elements: (3) Data Store

- It is a **collection of data** that is **stored in some way** (determined **later** during the **physical model** [file, database, ...])
- Every *data store* has
 - a number (**unique** such as **D1, D2, D3, ...**)
 - a name (a noun)
 - at least **one input** data flows (unless it's created by another DFD)
 - at least **one output** data flows
 - Shall be **connected to process**



DFD Elements: (4) External Entity

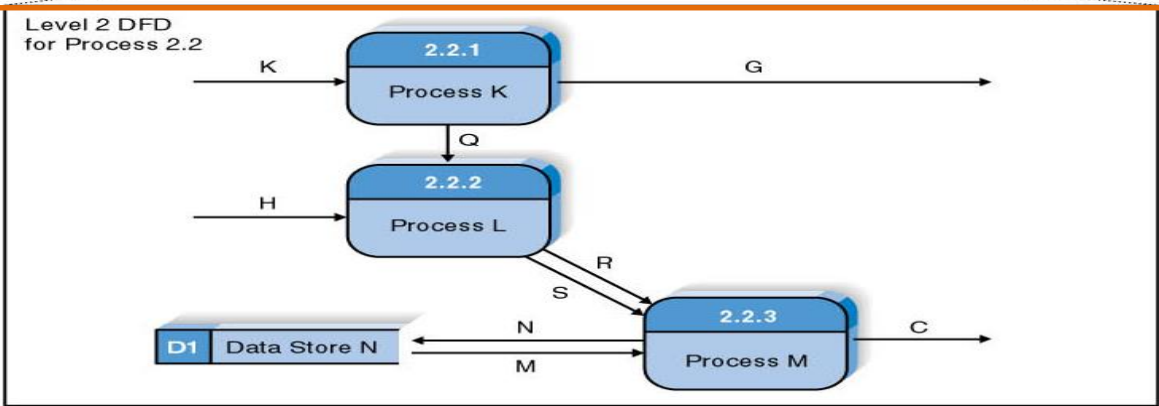
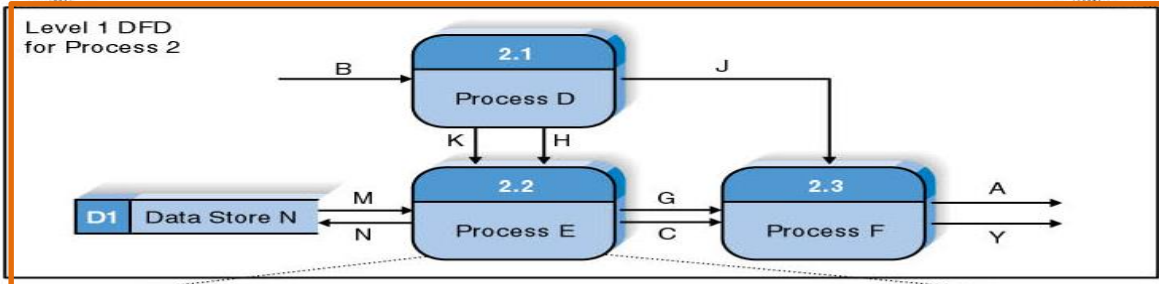
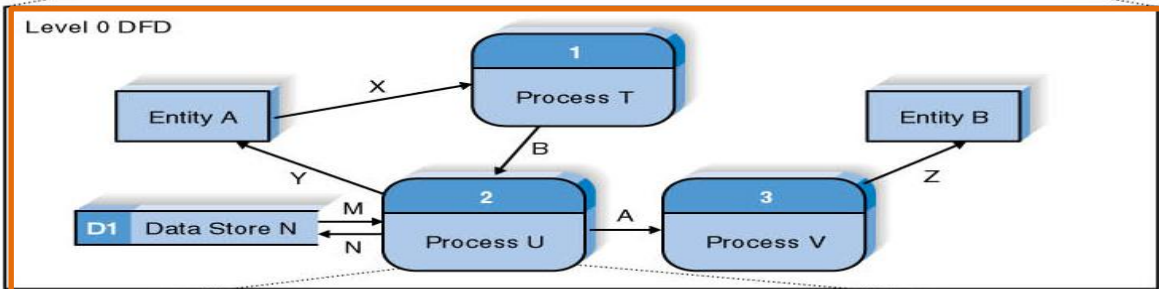
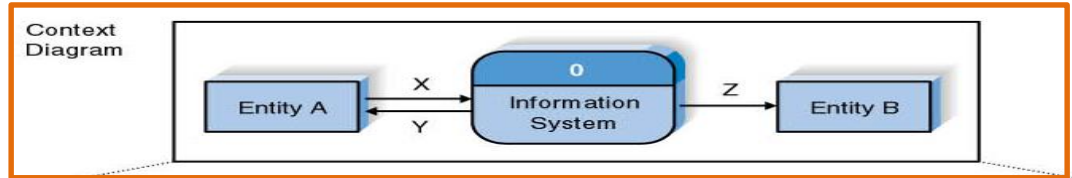
- It is a person, organization, or system that is **external** to the system, but **interacts** (provide data or receive data) with it
- External entities **examples**:
 - **Person**: student, customer, ...
 - **Organization**: bank, supplier, government, ...
 - **Department**: ORDER FULFILLMENT
 - **Another system**: accounting system, inventory system
- Every **external entity** has
 - a name (a noun)
 - Can't be connected to another entity
 - Two rectangles inside each others



External entity

Developing DFD

- DFDs are built in **levels** (series of DFDs)
 - **Why?** Most **business processes** are **too complex** to be explained in **one DFD**
 - Creating the DFD in levels is called **Decomposition** of the business process into a series of DFDs, each representing a **lower level of detail**

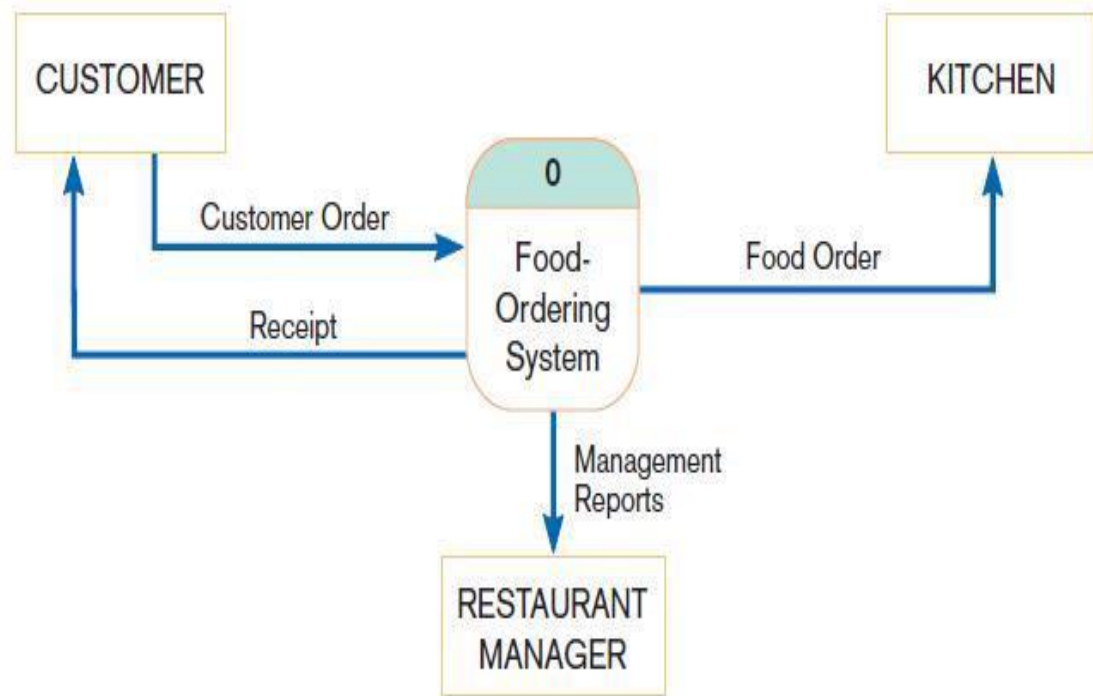


Context Diagram

- **Purpose:** defines **how** the business process or computer system **interacts** with **its environment** (external entities)
- shows
 1. **all business process** as just **one process**
 - This **process** given the number **zero** representing the **system** itself
 2. **all external entities** and the data flows **to** and **from** them
- **How to create?**
 1. **Draw one** process **symbol** for the business process or **system** being modeled (numbered **0** and **named** for the process or **system**)
 2. **Draw in external entities** as the source or destination of the **data flows**
- × No **data stores** are included in the context diagram

Features of context diagram:

- Top-level view that shows the overall boundaries of the system
- Represent the results of fact-finding
- One process symbol, numbered 0 (zero) is drawn in the center
- Data flows connect the process to the entities
- No data store
- No sub-processes



Context Level DFD Example

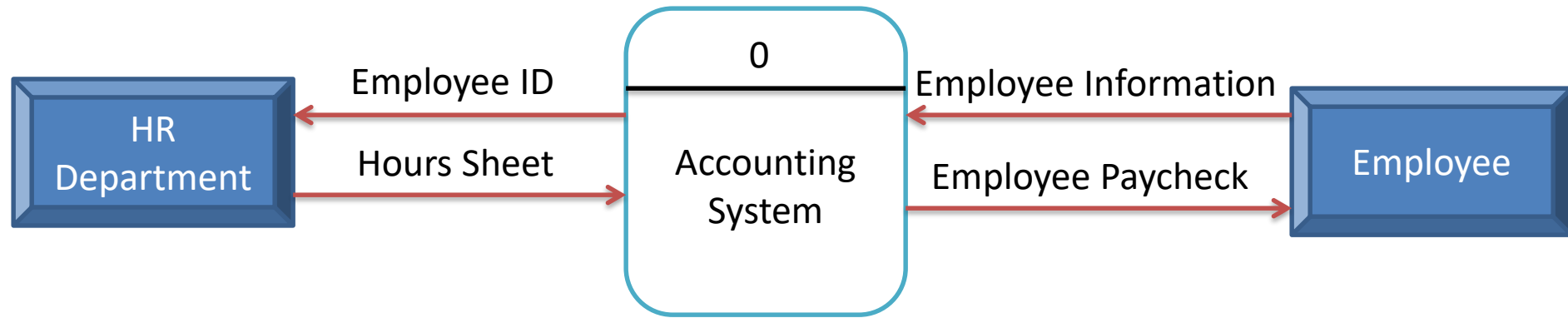
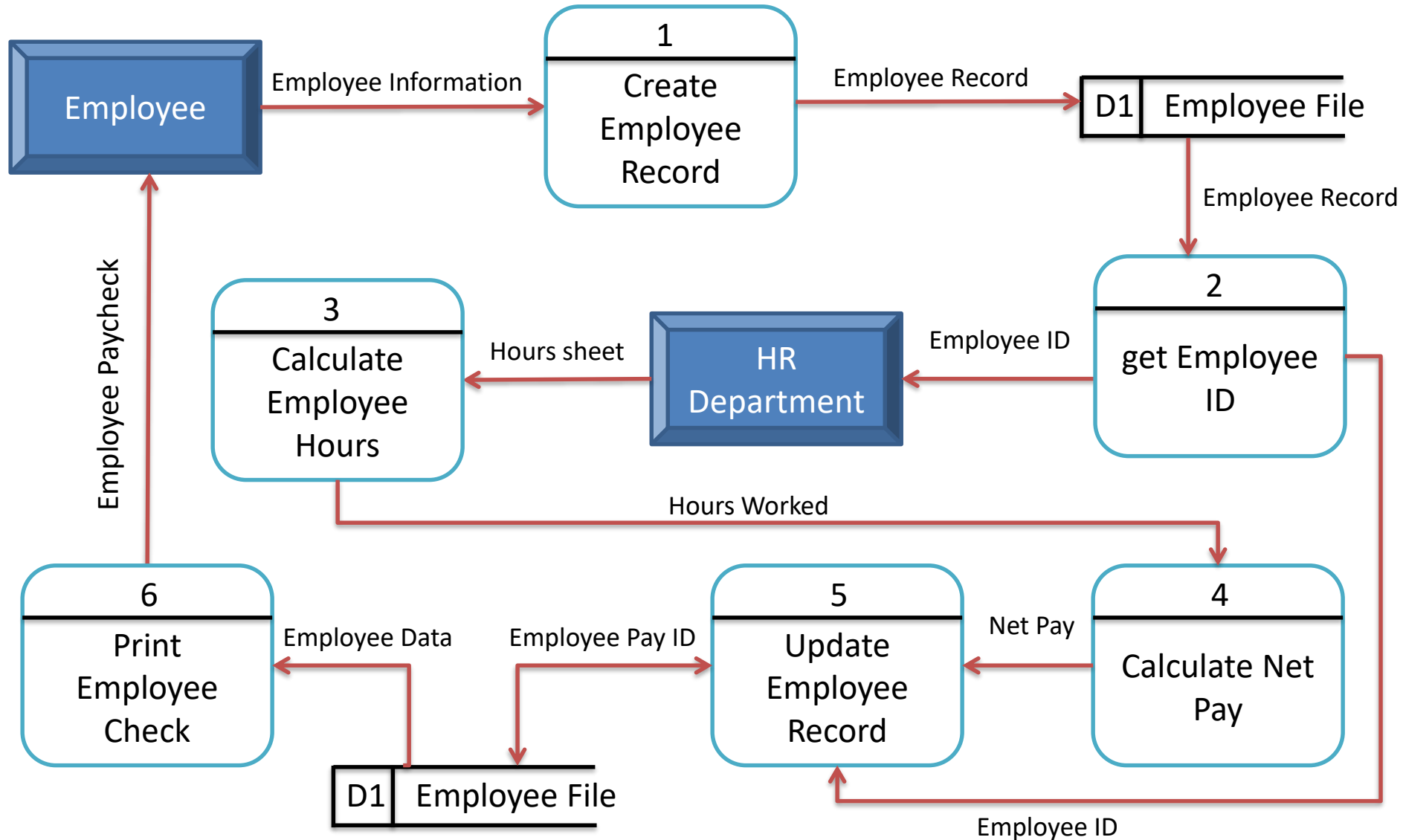


Diagram 0

- Also called “Level 0 Diagram” is the explosion of process 0 in the context level diagram.
- Shows **all the major-processes** that comprise the **system and how** they are **interrelated**
- It should include up to 7 or 9 processes.
- Processes are numbered with an integer. These **processes** are **numbered 1, 2, ...**
- The major data stores and all external entities are included on Diagram 0.
- Shows **data movement** from and to each **process**
- There is **one and only one** level 0 DFD

Diagram 0 Example



Child Diagram

- Each process on diagram zero may be exploded to create a child diagram.
- Each process on a lower-level diagram may be exploded to create another child diagram.
- These diagrams found below Diagram 0 are given the same number as the parent process.
 - Process 3 would explode to Diagram 3.

Child Diagram

- Each process is numbered with the parent diagram number, a period, and a unique child diagram number. It could be created on many levels.
- Examples are:
 - 3.2 on Diagram 3, the child of process 3.
 - 5.2.7 on Diagram 5.2, child of process 5.2.
 - On Diagram 3, the processes would be numbered 3.1, 3.2, 3.3 and so on.

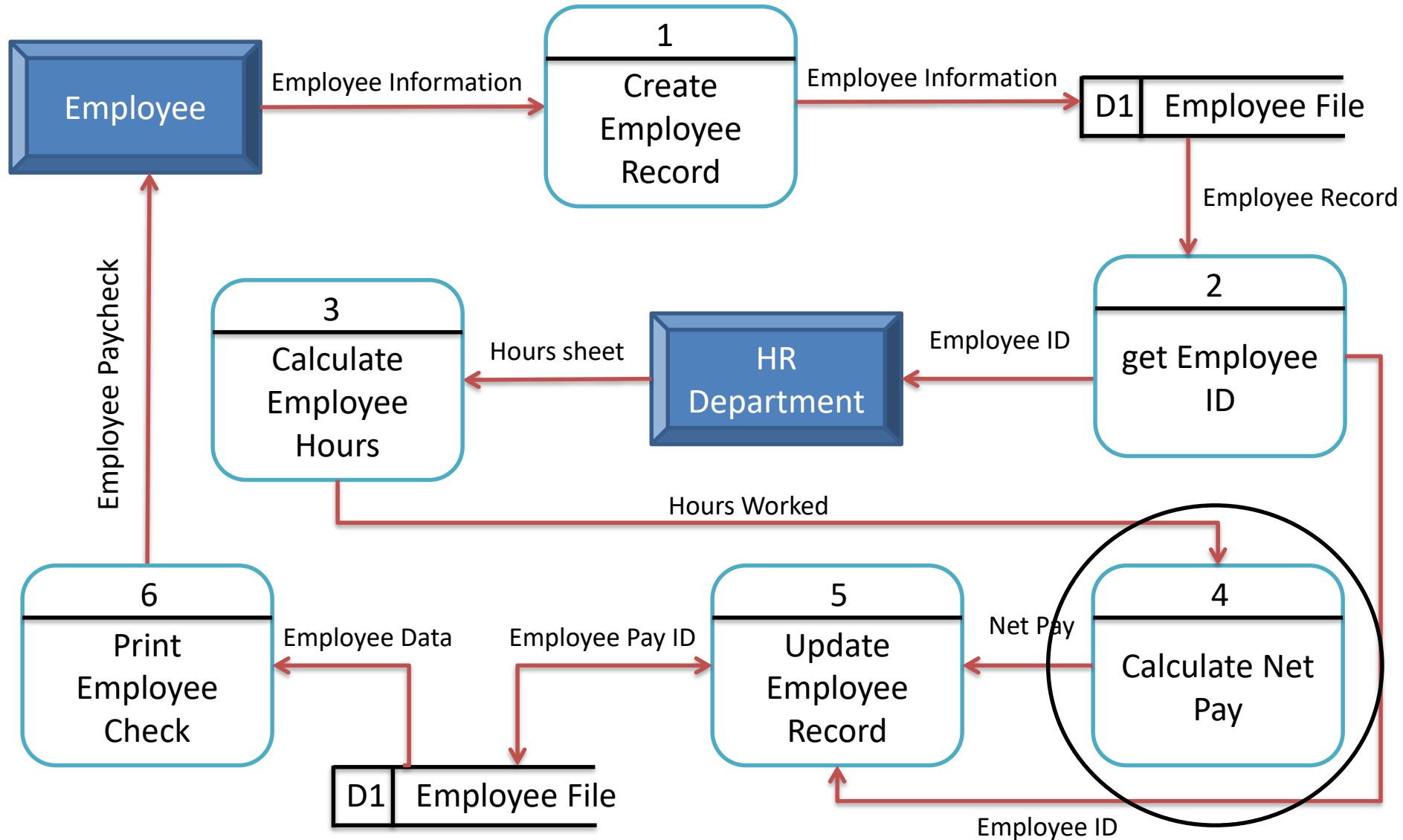
Child Diagram

- External entities are usually not shown on the child diagrams below Diagram 0.
- If the parent process has data flow connecting to a data store, the child diagram may include the data store as well.
- A lower-level diagram may contain data stores not shown on the parent process.

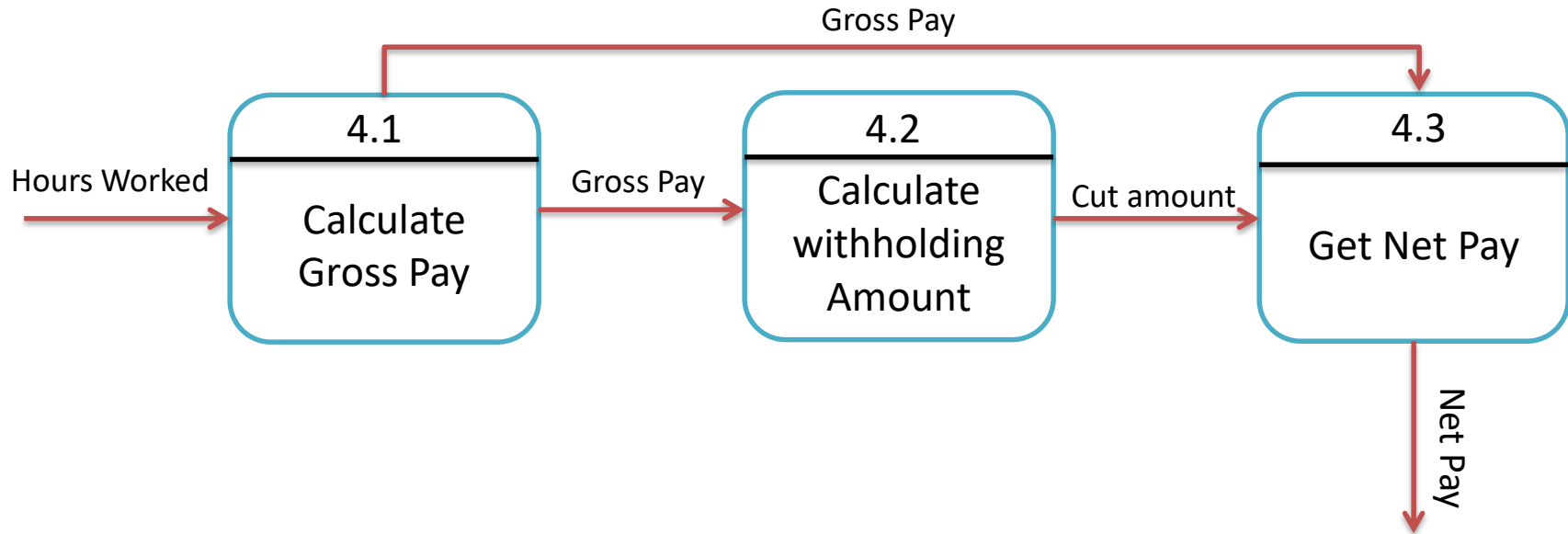
Child Diagram

- An interface data flow is data that are input or output from a child diagram that matches the parent diagram data flow.
- Processes that do not create a child diagram are called primitive processes.

Diagram 0 Example



Child Diagram 4 Example



DFD Rules

There are two DFD rules that apply:

- The inputs to a process are different from the outputs of that process.

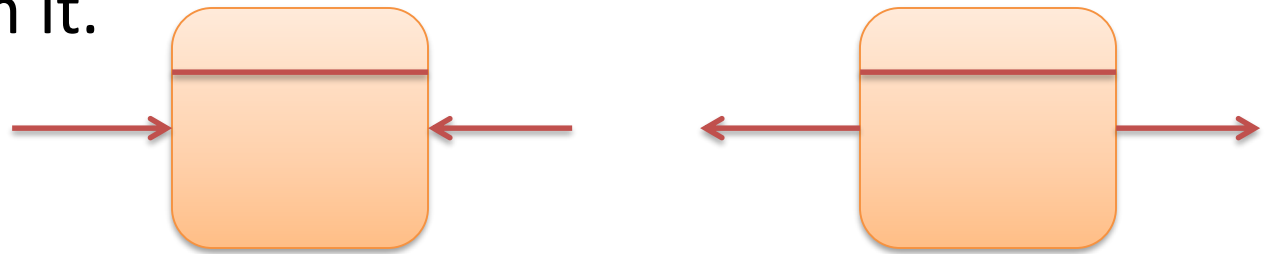
Processes intend to transform inputs data into outputs data

- Objects on a DFD have unique names.

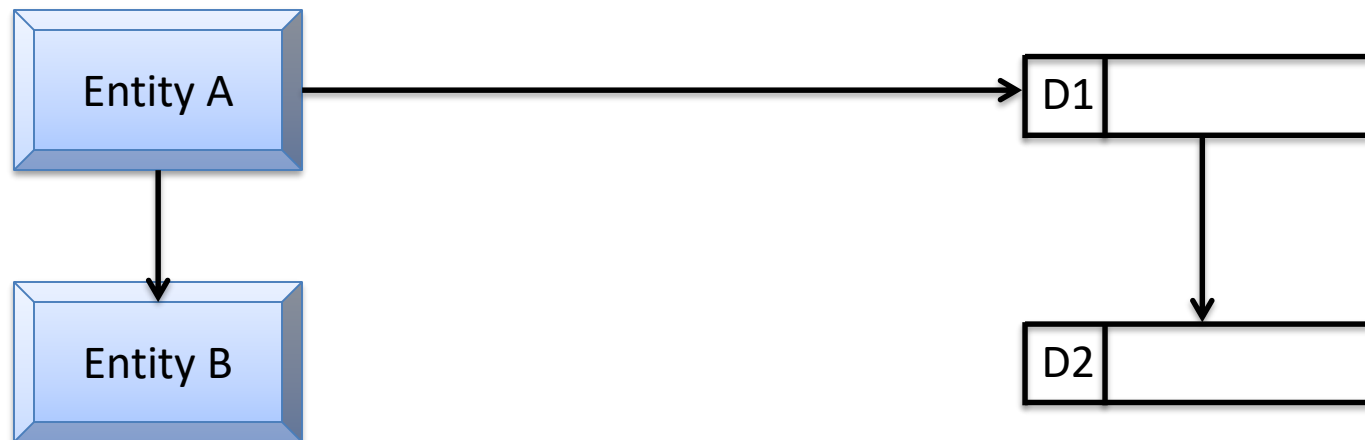
Every process has a unique name.

DFD Errors

- A process with only input data flow or only output data flow from it.



- Data stores or external entities are connected directly to each other, in any combination.



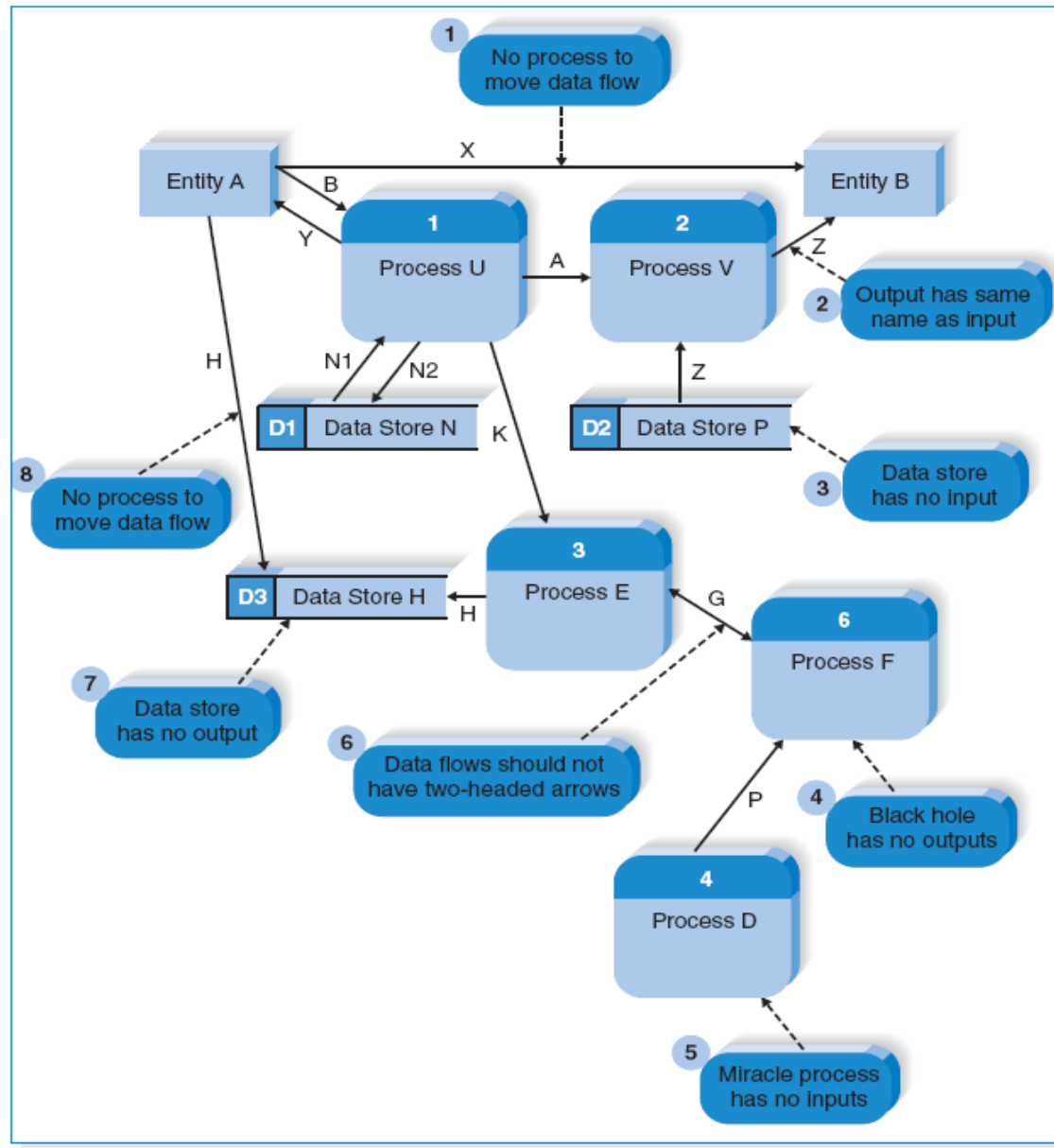
DFD Errors

- Incorrectly labeling data flow or objects
 - Labels omitted from data flow or objects.
 - Data flow labeled with a verb.
 - Processes labeled with a noun.
- Too many processes on a data flow diagram.
- Unbalanced decomposition between a parent process and a child diagram
 - The data flow in and out of a parent process must be present on the child diagram.

Balancing DFD

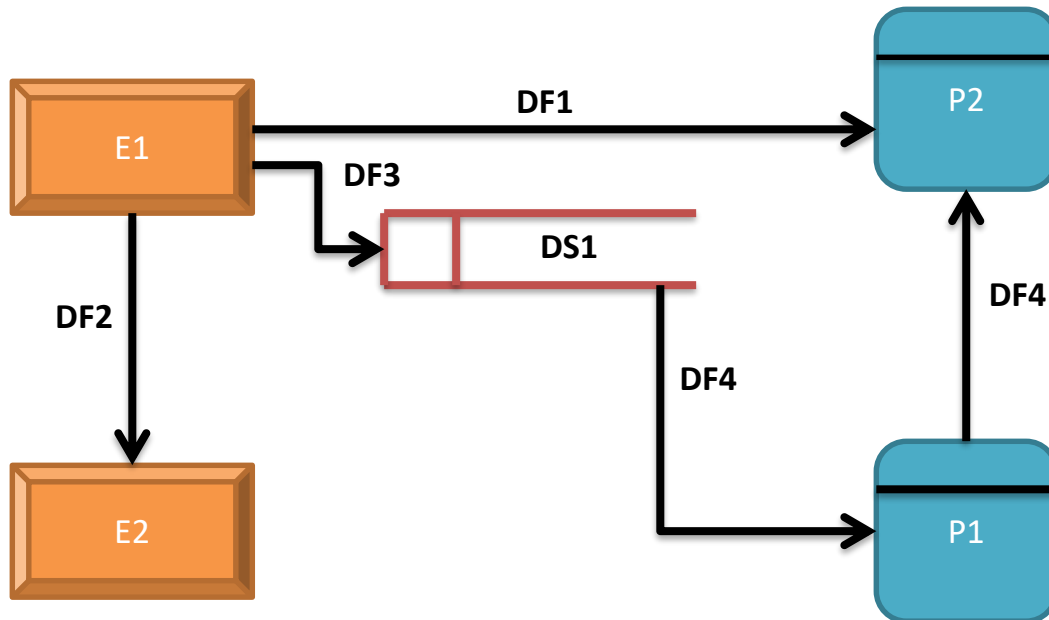
The concept of balancing define that all the input data flows to a process and all the output data flows from a process in the parent diagram should be preserved at the next level of DFD decomposition.

Common Syntax Errors



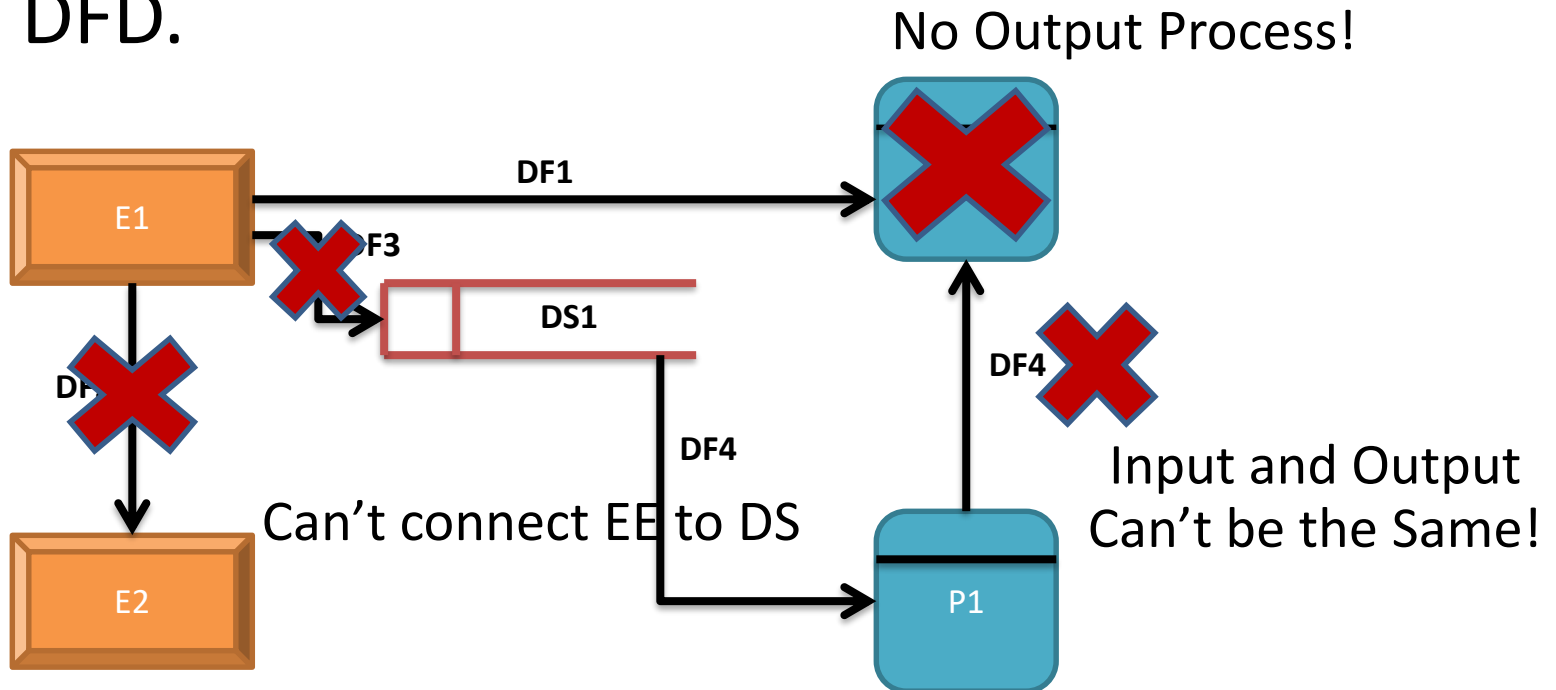
Question 1

- Consider the following DFD. List two errors on this DFD.



Solution of Question 1

- Consider the following DFD. List two errors on this DFD.



Don't connect EE to EE

Notes when creating DFD

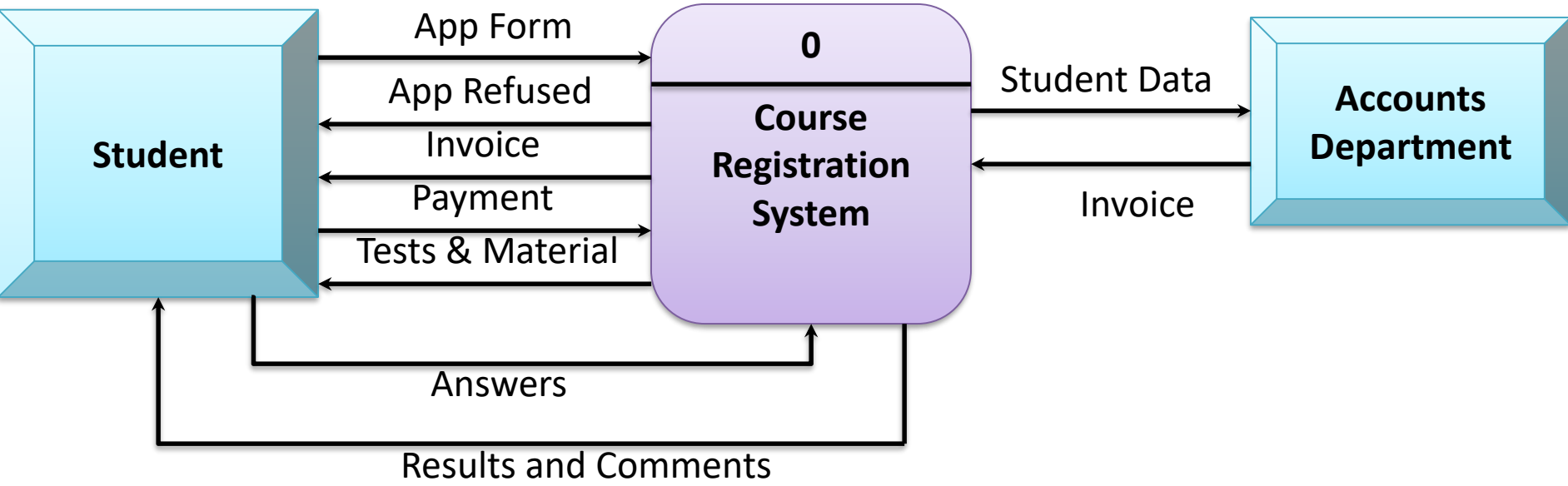
1. Determine External Entities.
2. Make a list of business activities.
3. Determine Data Stores.
4. Analyze what happens to an input data flow from an external entity.
5. Analyzing what is necessary to create an output data flow to an external entity.
6. Omit internal entities
7. Determine processes needed to process data.
8. Determine the data flow to or from a data store.
9. Analyzing a well-defined process for business requirements – Could be varied!
10. Review by balancing :)

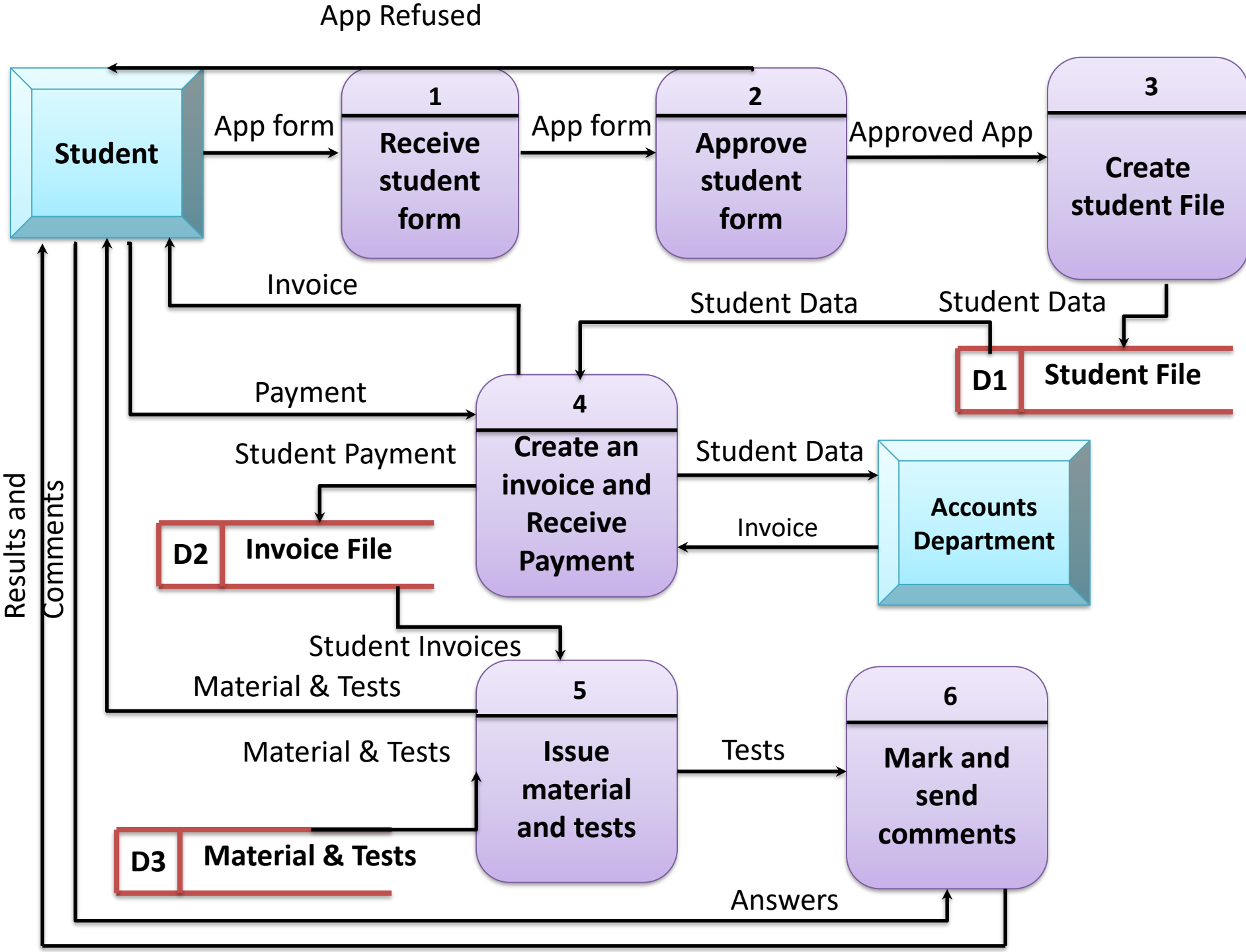
Practice Question

- Draw a context diagram and level-0 diagram for the following Course Registration System.
 - A college offers correspondence courses to students. Each course lasts 20 weeks and is based on a weekly study module and progress test. At the end of the course students sit an invigilated examination. The college Registrar deals with enquiries and applications, and students applying who have sufficient qualifications are asked to register by completing and submitting an application form. After approval by the Academic Director, the application form is returned to the Registrar who creates a student file.

Practice Question

- The Accounts department receive the application form and using information from the student file creates an invoice that is sent to the student. Payments made are registered on the invoice file. The first batch of student material and tests is issued from the library only to students who have paid fees (this information is taken from the invoice file). Progress tests are marked by academic staff and the results, together with comments, are sent out to student with next week's study block. The library will only issue study material/progress tests when a student has returned test answers from the previous week.





Assignment

- Solve DFD Assignment on Classroom
- Finish your project Play Script
- Finish your project Functional and Non-functional requirements.