

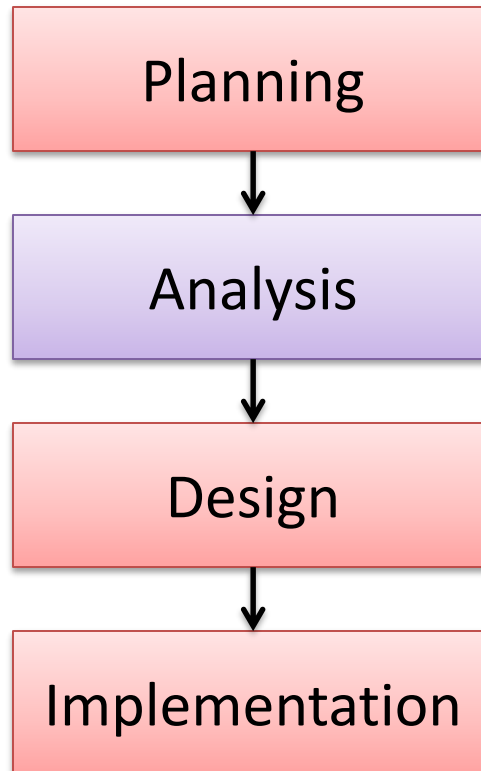
System Analysis & Design

Section 6

SDLC

- ✓ Interview
- ✓ Play Script
- ✓ Questionnaire
- ✓ Requirements Specs
- ✓ Data Flow Diagram

Data Dictionary
Process Specification



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

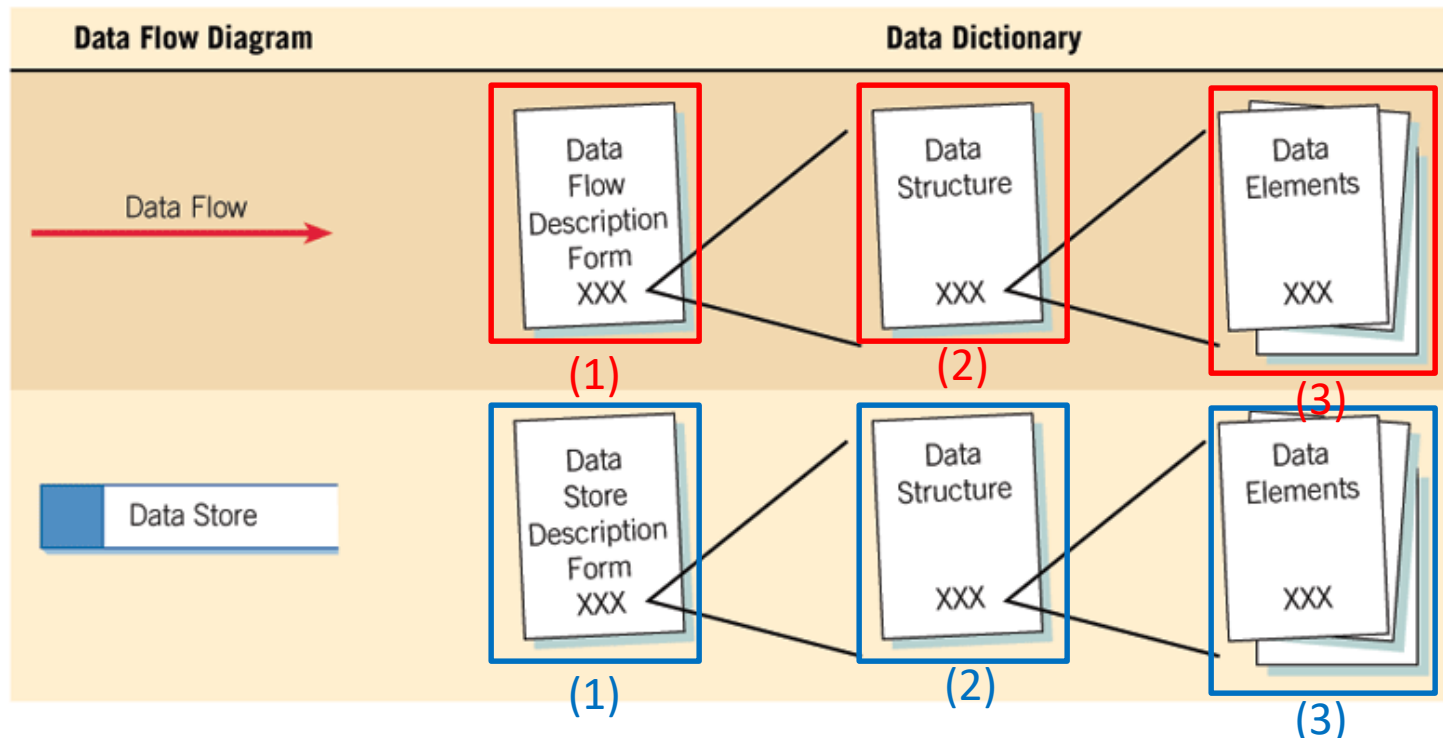
Data Dictionary

- Data dictionary
 - is a main method for analyzing the data flows and data stores of DFD
 - is a reference work of data about data (metadata).
- **Reasons** for Using a Data Dictionary:
 - ✓ Determine the **contents of data** stores
 - ✓ Develop the **logic** for data flow diagram **processes**.
 - ✓ Provide a **starting point** for developing **screens** and **reports**.
 - ✓ **Validate** the data flow diagram for **completeness** and **accuracy**.

Data Dictionary & Data Flow Diagram

- **Data Dictionary** is built for **each data flow** or **data store** in DFD:
 - **(1)** Description form, **(2)** Data structure, **(3)** Data Elements

Figure 8.1 How data dictionaries relate to data flow diagrams.

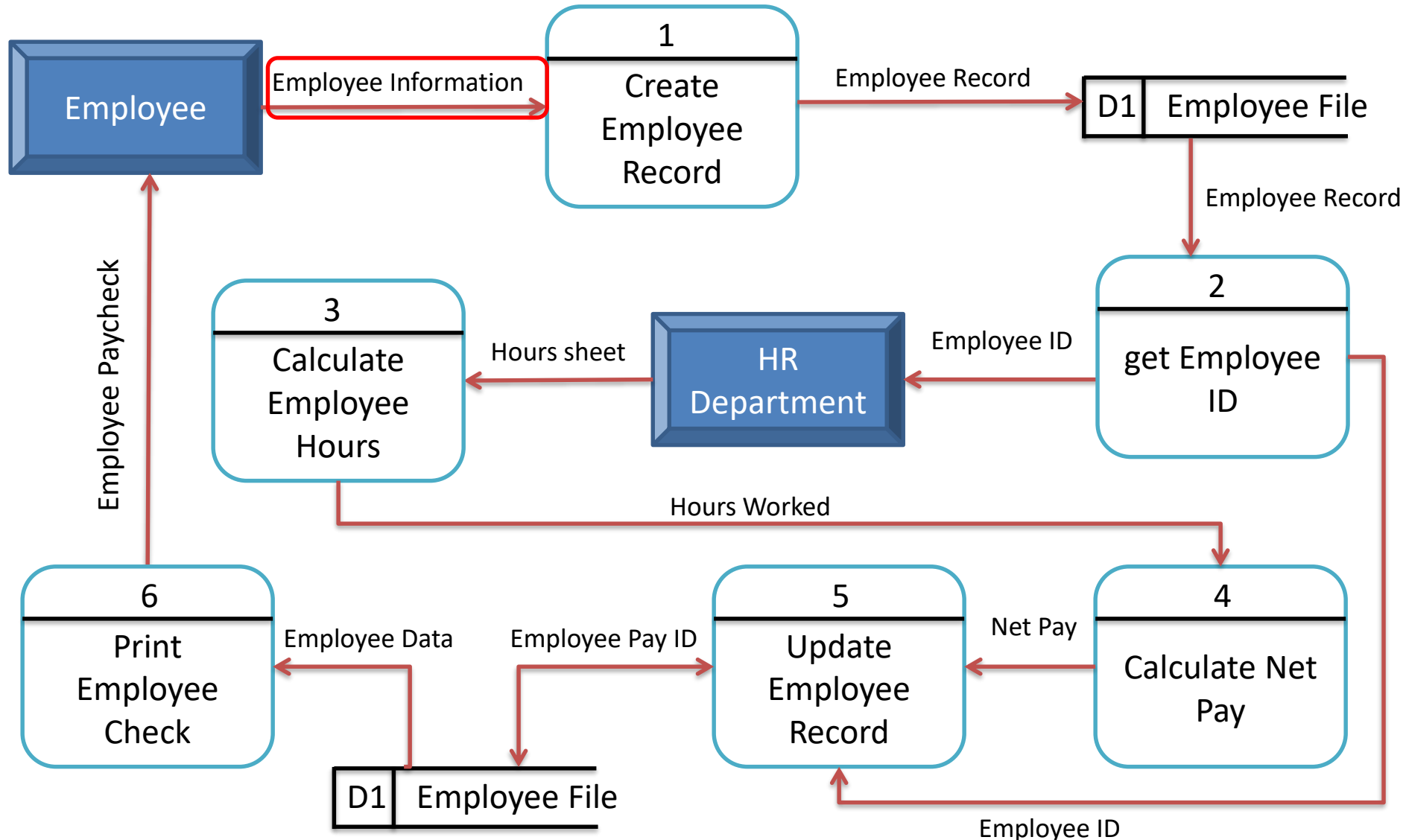


Data Dictionary – Data Flow

Data Flow: (1) Description Form

<u>Data Flow Description Form</u>	
ID:	
Name (label):	
Description:	
Source	Destination
Type of Data Flow <input type="checkbox"/> File <input type="checkbox"/> Screen <input type="checkbox"/> Report <input type="checkbox"/> Form <input type="checkbox"/> Internal	
Data structure	Volume/time
comments:	

Accounting System: Level 0 DFD



Data Dictionary – Data Flow

Data Flow: (1) Description Form

<u>Data Flow Description Form</u>	
ID: 1	
Name (label): Employee Information	
Description: Contains full unchecked information about employee	
Source External Entity – Employee	Destination Process 1 – Create employee record
Type of Data Flow <input type="checkbox"/> File <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Report <input type="checkbox"/> Form <input type="checkbox"/> Internal	
Data structure Employee data	Volume/time 10/hour
Comments: This is information for one employee in company that request paycheck.	

Data Dictionary – Data Flow

- **(2) Data Structure**

- is a group of smaller **structures** and **elements**.

- Is represented by the **algebraic notation**

- “=” → “consists of”

- “+” → “and”

- “{ }” → “group of elements”

- “[]” → “either or elements”

- “()” → “optional element”

Data Dictionary – Data Flow

- **(2) Data Structure Example:**

Employee data = Employee ID +

Employee Name +

Employee Address +

(Employee Email) +

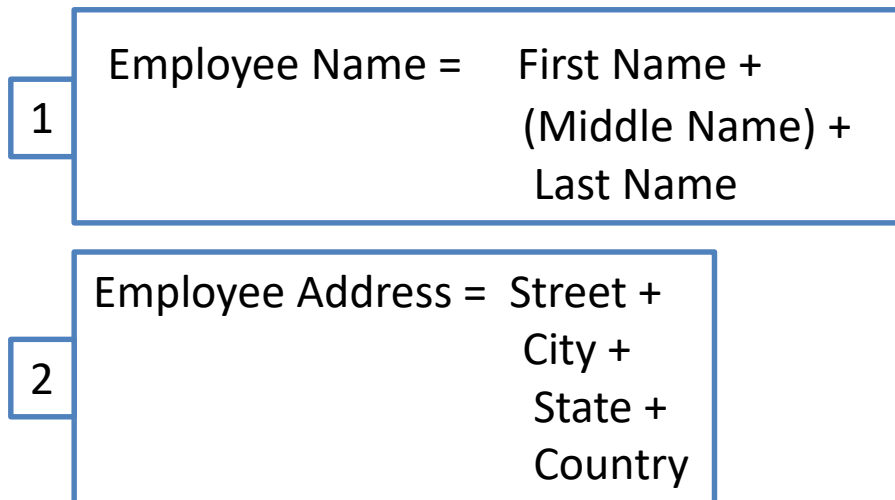
Employee Department +

{Employee Projects} +

[Pay Method]

Data Dictionary – Data Flow

- **(2) Data Structure:**
 - The **Employee Information** data structure consists of two structural records



Data Dictio

- (3) Data Element:

Formatting Character	Meaning
X	May enter or display/print any character
9	Enter or display only numbers
Z	Display leading zeros as spaces
,	Insert commas into a numeric display
.	Insert a period into a numeric display
/	Insert slashes into a numeric display
-	Insert a hyphen into a numeric display
V	Indicate a decimal position (when the decimal point is not included)

Name	Employee ID
Alias	Employee Number
Description	Unique number for each employee
Length	4
Input Format	9(4)
Output Format	9(4)
Default Value	
Continuous / Discrete	continuous
Type	number
Base / Derived	derived
Upper Limit	9999
Lower Limit	0000
Discrete	
Comments	This ID is auto increment and determines number of employees in company.

Data Dictionary – Data Flow

- **(3) Data Element: “First Name”:**

Name	First Name
Alias	Employee First Name
Description	Contains employee first name
Length	20
Input Format	X(20)
Output Format	X(20)
Default Value	
Continuous / Discrete	Discrete
Type	Alphabetic
Base / Derived	Base
Upper Limit	
Lower Limit	
Discrete	
Comments	There is abbreviation in name

Data Dictionary – Data Store

Data store: (1) description form

Data Store Description Form

ID:

Name:

Alias:

Description:

File Type: ☐ Computer ☐ Manual

File Format:

☐ Database ☐ Indexed ☐ Sequential ☐ Direct

Record Size (Characters):

Number of records (Maximum):

Number of records (Average):

Growth per year (percent):

Dataset name:

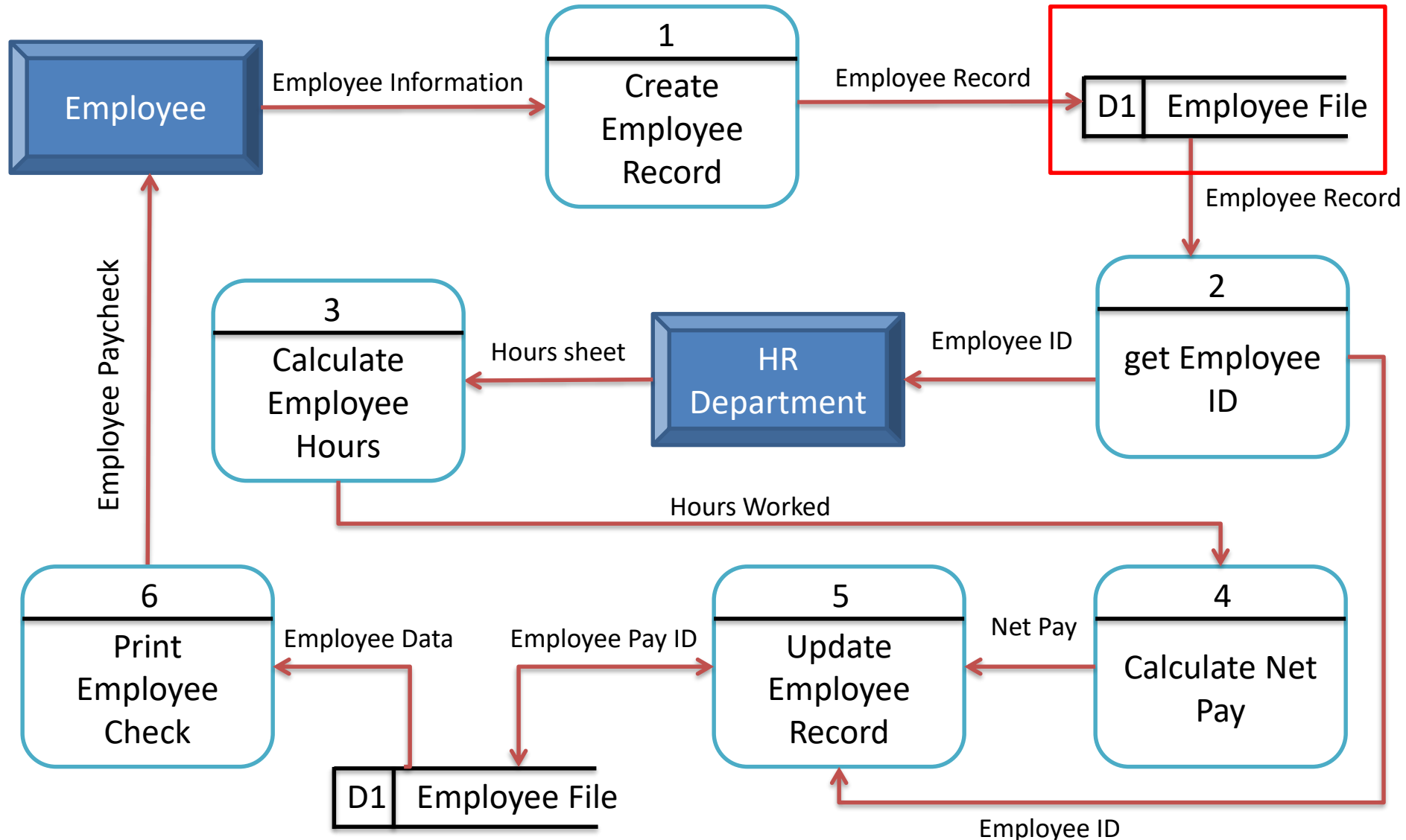
Data structure:

Primary key:

Secondary key:

Comments:

Accounting System: Level 0 DFD



Data Dictionary – Data Store

Data store: (1) description form

Data Store Description Form

ID: D1

Name: Employee File

Alias: Employee Database

Description: contains information about early employee in company

File Type: ☒ Computer ☐ Manual

File Format:

☒ Database ☐ Indexed ☐ Sequential ☐ Direct

Record Size (Characters): 500

Number of records (Maximum): 45000

Number of records (Average): 41000

Growth per year (percent): 6%

Dataset name: Employee

Data structure: Employee Data

Primary key: Employee ID

Secondary key: Employee Name

Comments: the file is updated as the employee receives paycheck

SDLC

- ✓ Interview
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- ✓ Data Dictionary

Process Specification

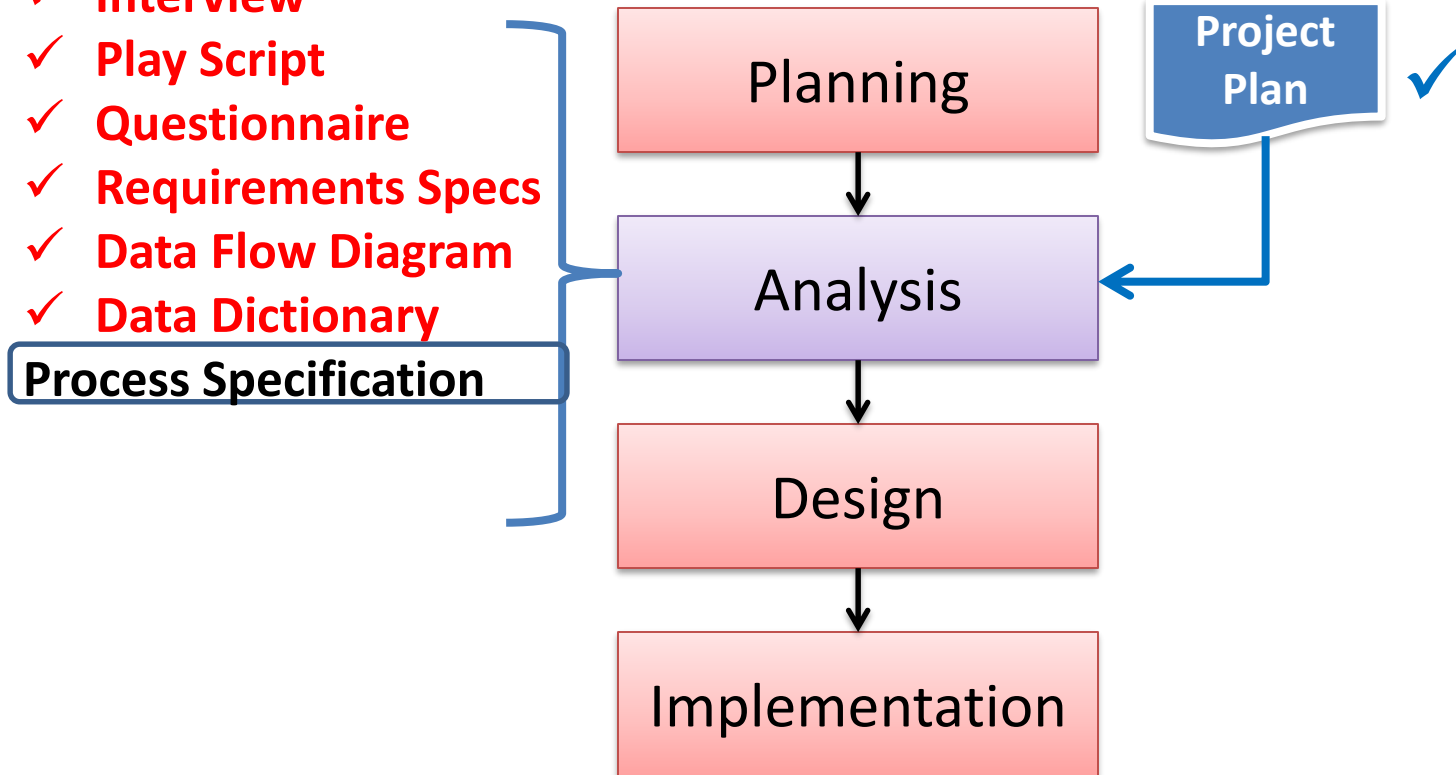
Planning

Project Plan ✓

Analysis

Design

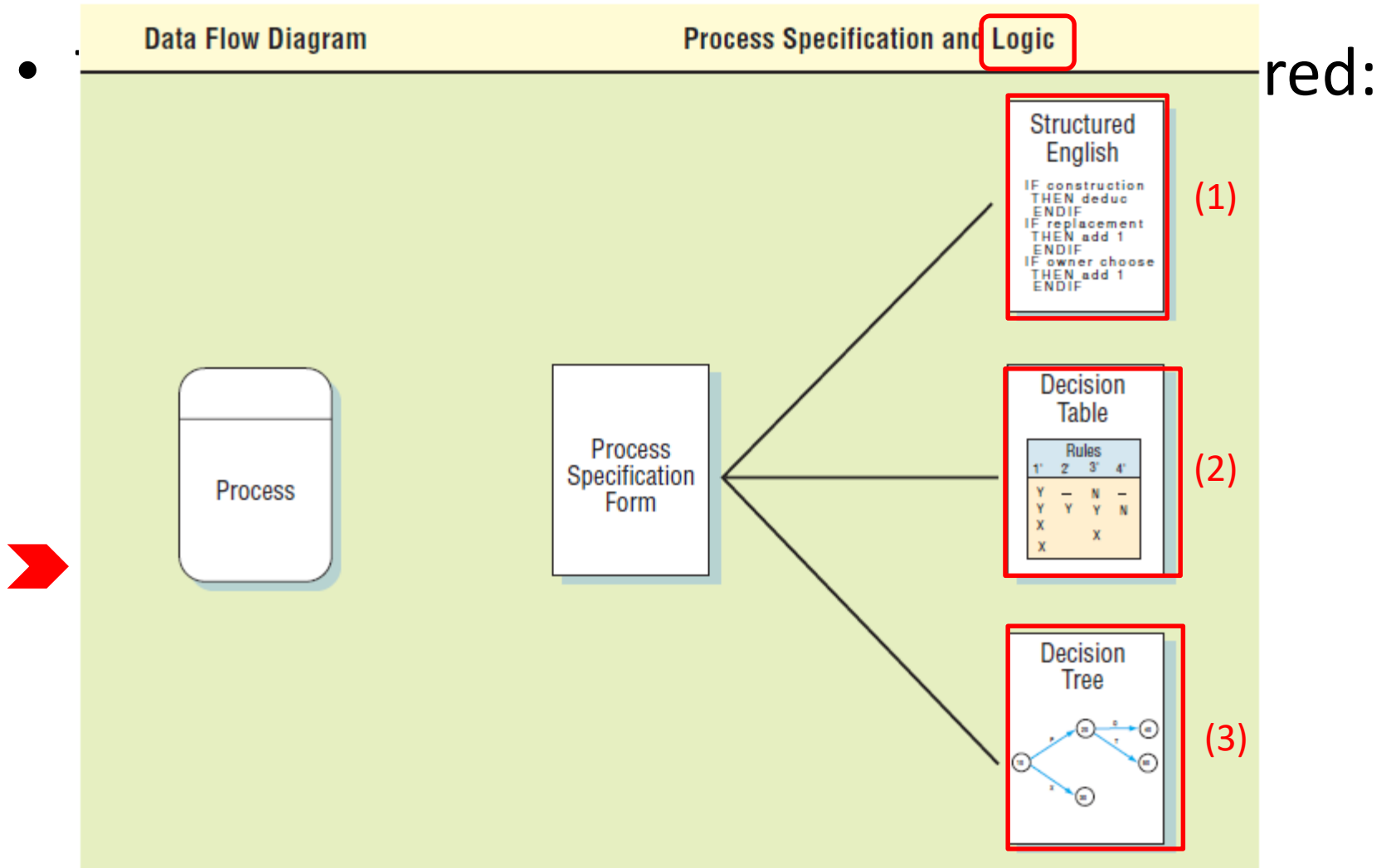
Implementation



Process Specification

- **Process specifications (or descriptions)**
 - **provide additional** information that the **DFD does not** provide
 - **Description of what** the process does
 - are **created** for **primitive** processes and some **higher level** processes on a DFD
 - are also called **mini-specs**
- Process specification **objectives**:
 - **Reduce** process **ambiguity**
 - Obtain a **precise sufficient details** of what is happened inside process
 - **Validate** the system design

Process Specification Format



Process Specification Form

Process Specification Form

Number:

Name:

Description:

Input Data Flow

Output Data Flow

Type of Process



Online



Batch



Manual

Process Logic:

Refer to name:

Structured English

Decision Table

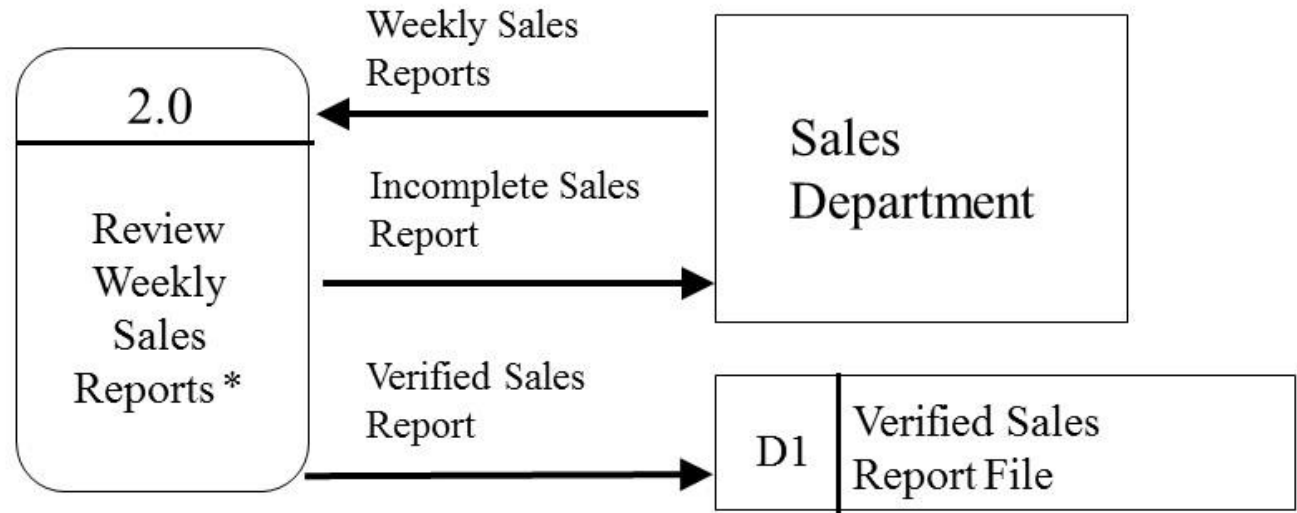
Decision Tree

Unresolved Issues:

Requires **well-defined procedures** for employees performing this process

Require **screen designs**

Example 1(DFD)



Process Specification Example 1

Process Specification Form

Number: 2.0

Name: REVIEW Weekly Sales Reports

Description: determine if sales reports is complete or not , if it is not complete, add reviewer comments

Input Data Flow:

Weekly Sales Report from External Entity Sales Department

Output Data Flow

- (1) Incomplete Sales Report to External Entity Sales Departement
- (2) verified sales report to Data Store Verified Sales Reports File

Type of Process



Online



Batch



Manual

Process Logic:

Refer to name: determine item quantity logic



Structured English



Decision Table



Decision Tree

Unresolved Issues: no

Process Specification **Example 1 (cont.)**

- “REVIEW Weekly Sales Reports ” logic:

REVIEW Weekly Sales Reports from Sales Department

DO WHILE there are Sales Reports to process

BEGIN IF

IF Sales Report has a value for each required element in data structure

THEN Verification Code = “Complete”

Verified Sales Report = Sales Report + Verification Code + Review Date + Reviewer Name

STORE Verified Sales Report in Verified Sales Report File

ELSE Verification Code = “Not Complete”

Incomplete Sales Report = Sales Report + Verification Code + Review Date + Reviewer Name +
Reviewer Comment

SEND Incomplete Sales Report to Sales Department

END-IF

END-DO WHILE

Process Logic: Structured English

- **Structured English:**
 - uses **short sentences** to describe the work that a process performs
 - **Used** when there are **many repetitious or decisions** are **not complex**
 - Use and **capitalize** accepted **keywords** such as **IF, THEN, ELSE, DO, and PERFORM**
 - **Indent** blocks of statements
to show their hierarchy (nesting) clearly
- Structured English **types:**

Process Logic: Structured English

Structured English Type	Example
Sequential Structure A block of instructions in which no branching occurs	Action #1 Action Action 1
Decision Structure Only IF a condition is true, complete the following statements; otherwise, jump to the ELSE	IF Condition A is True THEN implement Action A ELSE implement Action ENDIF 2
Case Structure A special type of decision structure in which the cases are mutually exclusive (if one occurs, the others cannot)	IF Case #1 implement Action #1 ELSE IF Case #2 Implement Action #2 ELSE IF Case #3 Implement Action 3 ELSE IF Case #4 Implement Action #4 ELSE print error ENDIF
Iteration Blocks of statements that are repeated until done	DO WHILE there are customers. Action #1 ENDDO 4

Process Logic: Decision Table

- **Decision table** represent **complex decisions** as a **table**
- **Decision table format**

Figure 9.9 The standard format of a decision table

		Rules							
Conditions		2	3	4	5	6	7	8	
Condition 1	Y	Y	Y	Y	N	N	N	N	
Condition 2	Y	Y	N	N	Y				
Condition 3	Y	N	Y	N	Y				
Actions									
Action 1		X			X				
Action 2	X					X		X	
Action 3			X	X			X		

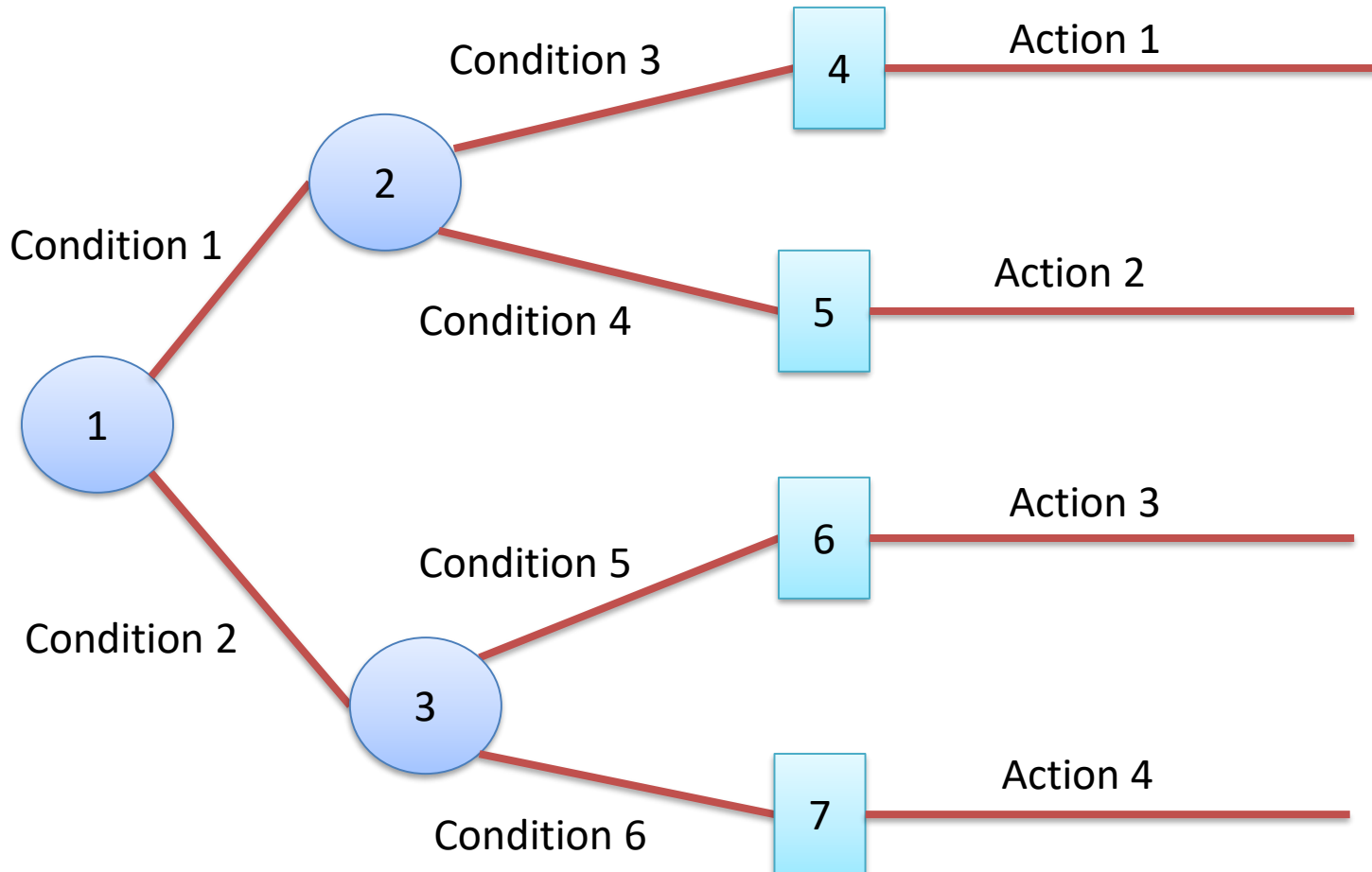
Represent **condition existence**

Represent **not satisfied condition**

Mark **performed action**

Process Logic: Decision Tree

- ✓ **Decision trees** display **decision logic (IF statements)** as a set of **nodes (questions)** and **branches (answers)**
- Used when a **sequence** of conditions and actions are critical



Example 1

- A company follows the following **sales promotion policy**:
 - **Preferred customers** who order more than 1000 USD are entitled to a 5% discount, and an additional 5% discount if they used our charge card.
 - **Preferred customers** who do **not order** more than 1000 USD receive an \$25 bonus coupon.
 - **All** other customers receive a **\$5 bonus coupon**.
- Represent the previous **process** using ***structured English, decision tree, decision table***.

Example 1: Structured English

IF customer is preferred customer THEN

 IF customer order more than \$1,000 THEN

 Apply a 5% discount

 IF customer use our charge card THEN

 Apply an additional 5% discount

 ENDIF

 Else

 Award \$25 bonus coupon

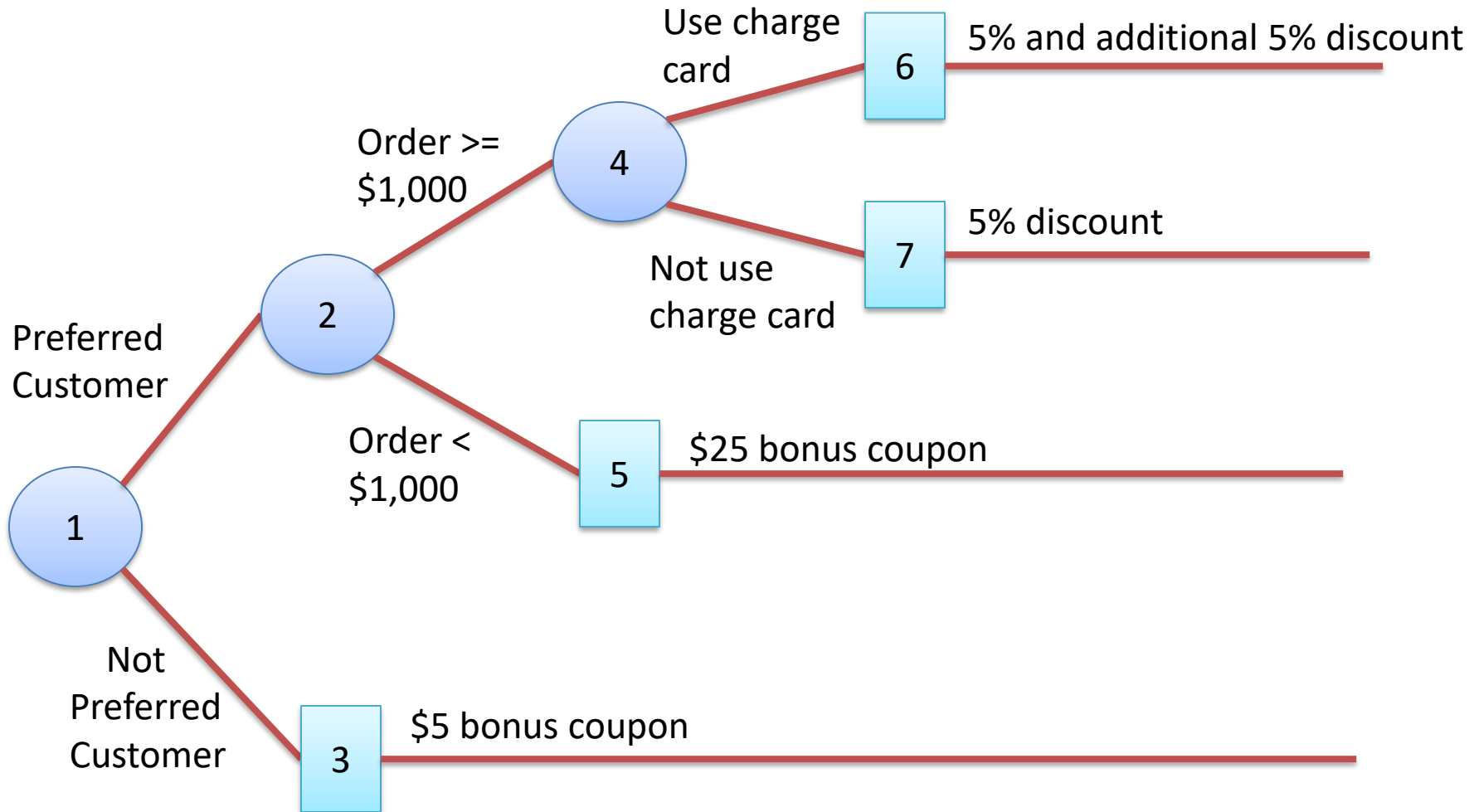
 ENDIF

Else

 Award \$5 bonus coupon

ENDIF

Example 1: Decision Tree



Example 1: Decision Table

	Rules							
Conditions	1	2	3	4	5	6	7	8
Preferred Customer	Y	Y	Y	Y	N	N	N	N
Order \$1,000 or more	Y	Y	N	N	Y	Y	N	N
Used our charge card	Y	N	Y	N	Y	N	Y	N
Actions								
5% discount	X	X						
Additional 5% discount	X							
\$25 bonus coupon			X	X				
\$5 bonus coupon					X	X	X	X

Example 1: Condensed Decision Table

	Rules			
Conditions	1	2	3	4
Preferred Customer	Y	Y	Y	N
Order \$1,000 or more	Y	Y	N	-
Used our charge card	Y	N	-	-
Actions				
5% discount	X	X		
Additional 5% discount	X			
\$25 bonus coupon			X	
\$5 bonus coupon				X

This Week Task

- Complete your project.
 - Create the **data dictionary** for **(1)** Data flows and **(2)** data stores
 - Create the **process specification** of your DFD