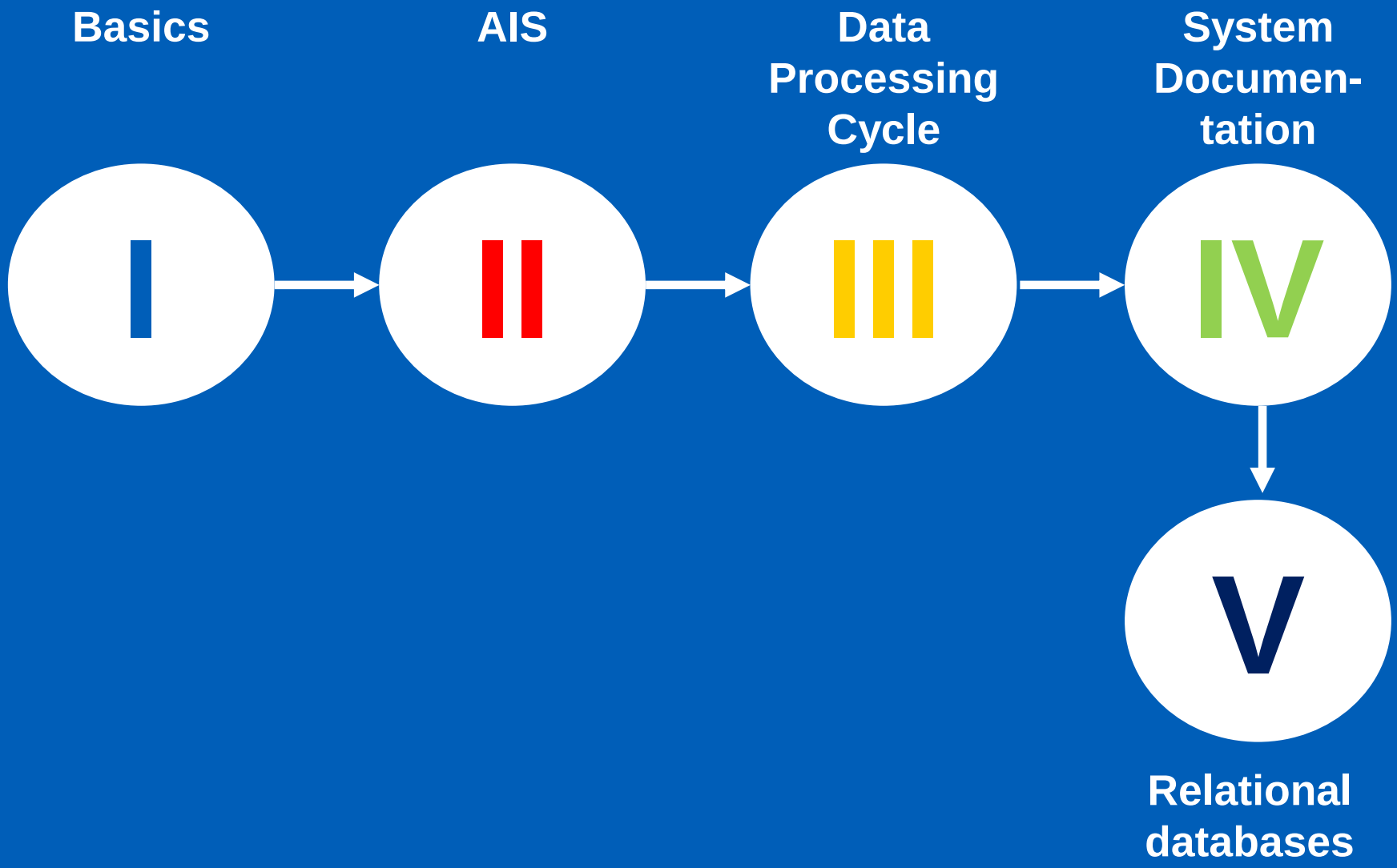
Aalto University
School of Business

Conceptual foundations of AIS

by David Derichs ©
Lecture 1


Basics
AIS
Data Processing Cycle
System Documen-tation
I
II
III
IV
V
Relational databases

I. Basics

Information is data organized into a meaningful format

- **Data** are facts collected, recorded, and stored in the system
  - A fact could be a number, date, name, and so on.
- If we organize and process data and it is meaningful it can be considered **information**.
  - Information can help us make **better decisions**
  - Too much information leads to **overload**
  - **IT** can support to filter and condense information
  - Information is **valuable** when its **benefits exceed the costs** of gathering, maintaining, and storing the data.

What attributes make information useful?

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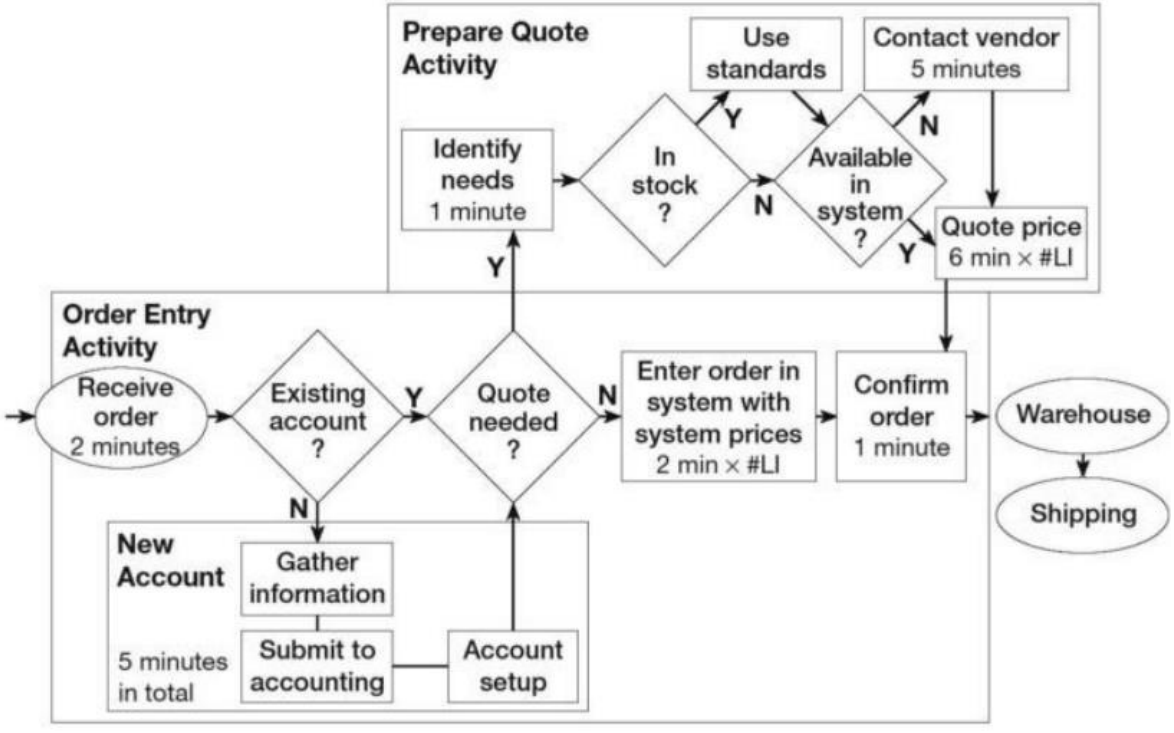
Where is information needed?

- Information is needed in business processes
  - A **business process** is a set of related, coordinated, and structured activities and tasks performed by people, machines, or both to achieve a specific organizational goal.
- Key decisions and information needed often come from these business processes.

Example business process



Imagine you just opened a new pizza place in AaltoBIZ: What decisions would you need to take to run the restaurant successfully?

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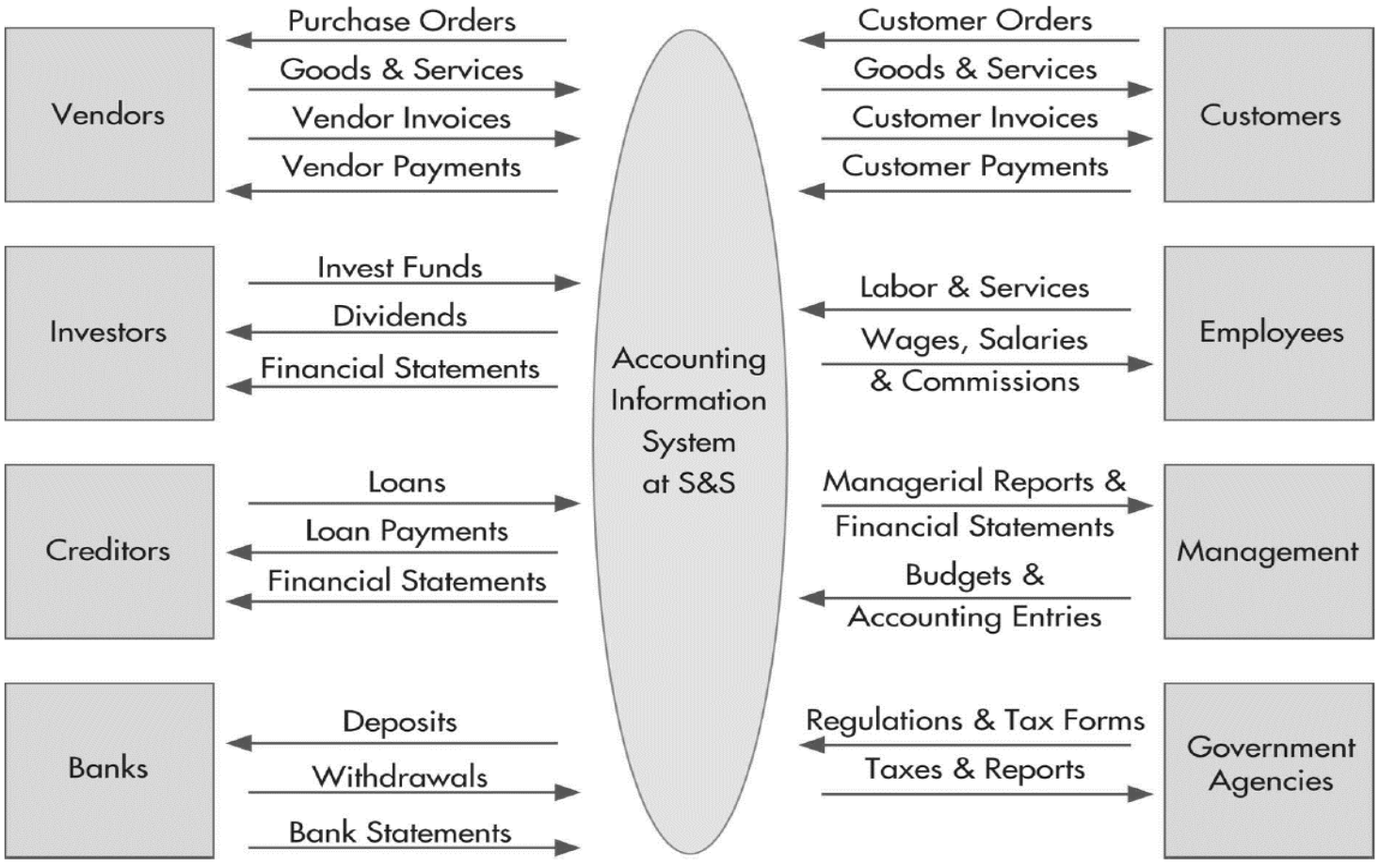
Business processes involve transactions

- **Transactions** are agreements between **two entities** to **exchange** goods, services, or any other event that can be measured in economic terms by an organization.
- **Transaction processing** is the procedure of capturing data and transforming it into an output (e..g financial statement)
- The flow of information between these users for the various business activities involves a **give-get exchange** grouped into **business processes** or **transaction cycles**.



Overview of transaction cycles

- **Revenue cycle**: give goods / give service—get cash
- **Expenditure cycle**: get goods / get service—give cash
- **Production cycle**: give labor and give raw materials—get finished goods
- **Payroll cycle**: give cash—get labor
- **Financing cycle**: give cash—get cash

An ERP system integrates activities across the entire organization (all cycles)

Advantages	Disadvantages
Integrated enterprise-wide single view of the organization's data streamlining information flow	Customizing or standard-izing a business process
Data captured once	User resistance
Greater visibility and monitoring capabilities for management	Significant amount of time to implement
Improve access of control of the data through security settings	Complexity
Standardization of procedures and reports	Costly
Improves customer service	
Increases productivity through automation	

II. Accounting Information Systems

If accounting if the language of business then AIS is its intelligence!

- **AIS** is a system that **collects, records, stores, and processes data** to produce information for decision makers.
- Components of an AIS:
  - **People** who use the system
  - **Processes** (procedures and instructions)
  - **Technology** (data, software, and IT infrastructure)
  - **Controls** to safeguard information

How can AIS improve decision making?

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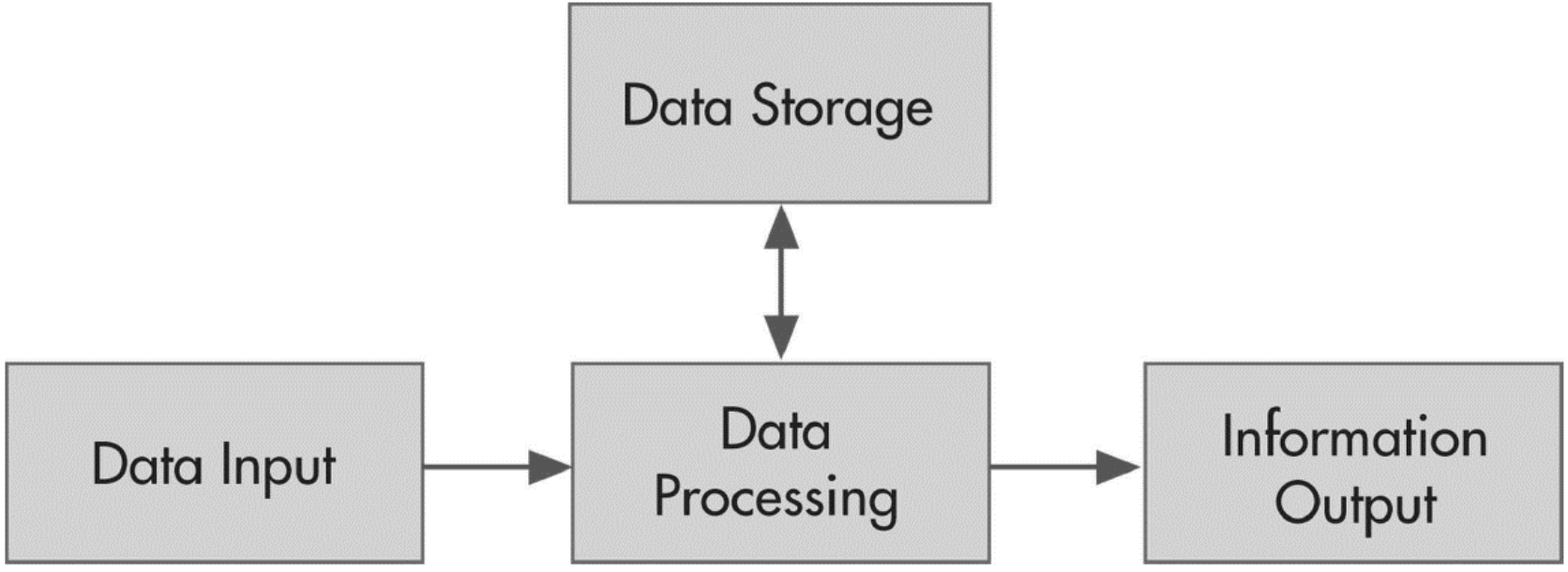
III. Data processing cycle

Data processing cycle: Overview



Data processing cycle: Data Input in three steps (1/3)

- Step 1: **Capture transaction data** triggered by an activity (event)
- Information collected for an activity includes:
  - **Activity of interest** (e.g., sale)
  - **Resources affected** (e.g., inventory and cash)
  - **People who participated in the activity** (e.g., customer and employee)
- Information comes from **source documents**

How is data captured automatically?

Food for thought…

More yet…

Source Documents capture data at the source when the transaction takes place (2/3)

- Paper source documents
- Turnaround documents
- Source data automation (machine readable data collection)

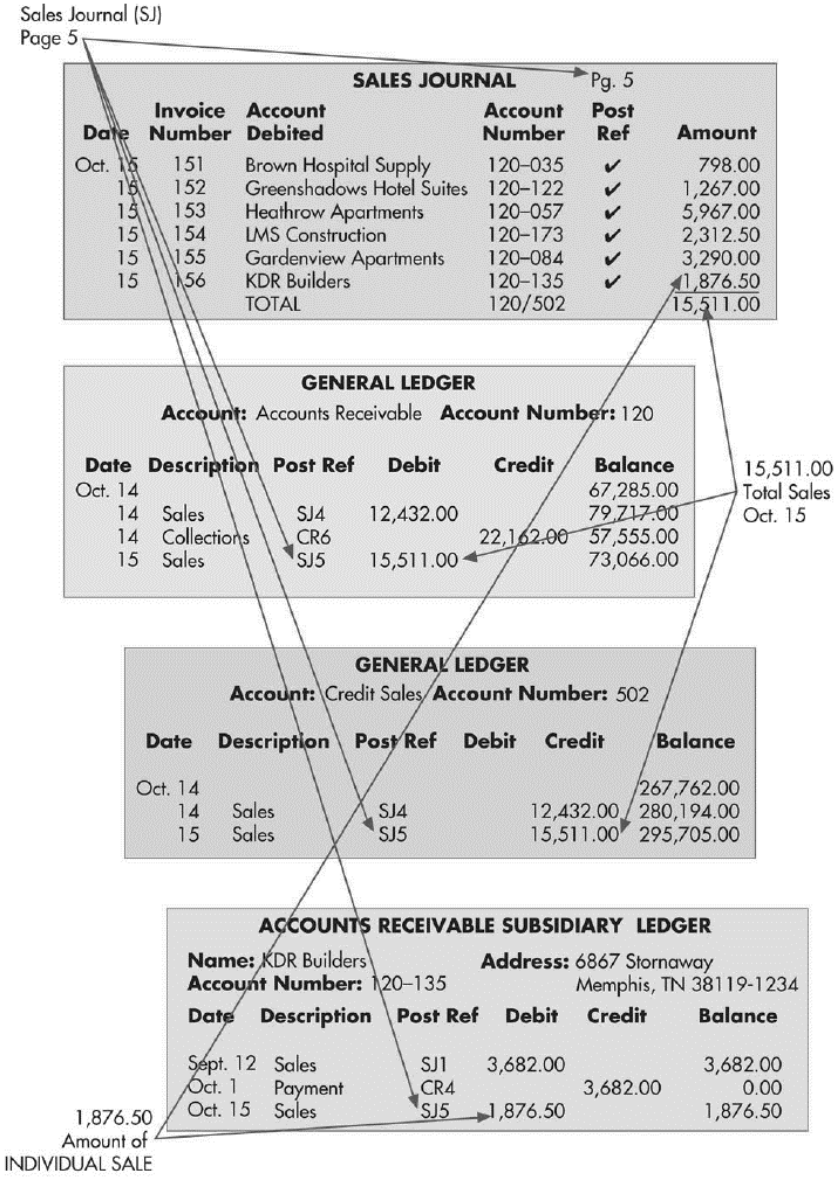
Data processing cycle: Data Input in three steps (3/3)

- Step 2: Make sure captured data are **accurate** and **complete**.
- Step 3: Ensure company **policies** are **followed** (e.g., approval of transaction).

Data processing cycle: Data storage (1/4)

How data is stored can have far reaching consequences, to trace data back to the source (i.e. audit trail)

- The **chart of account** is the coding scheme devised to anticipate management needs
- **Transaction journals** (e.g., Sales)
- **Subsidiary ledgers** (e.g., Accounts receivable)
- **The general ledger**



Data processing cycle: Data storage (2/4)

Example:

Audit trail for Invoice #156 for $1,876.50 sold to KDR Builders

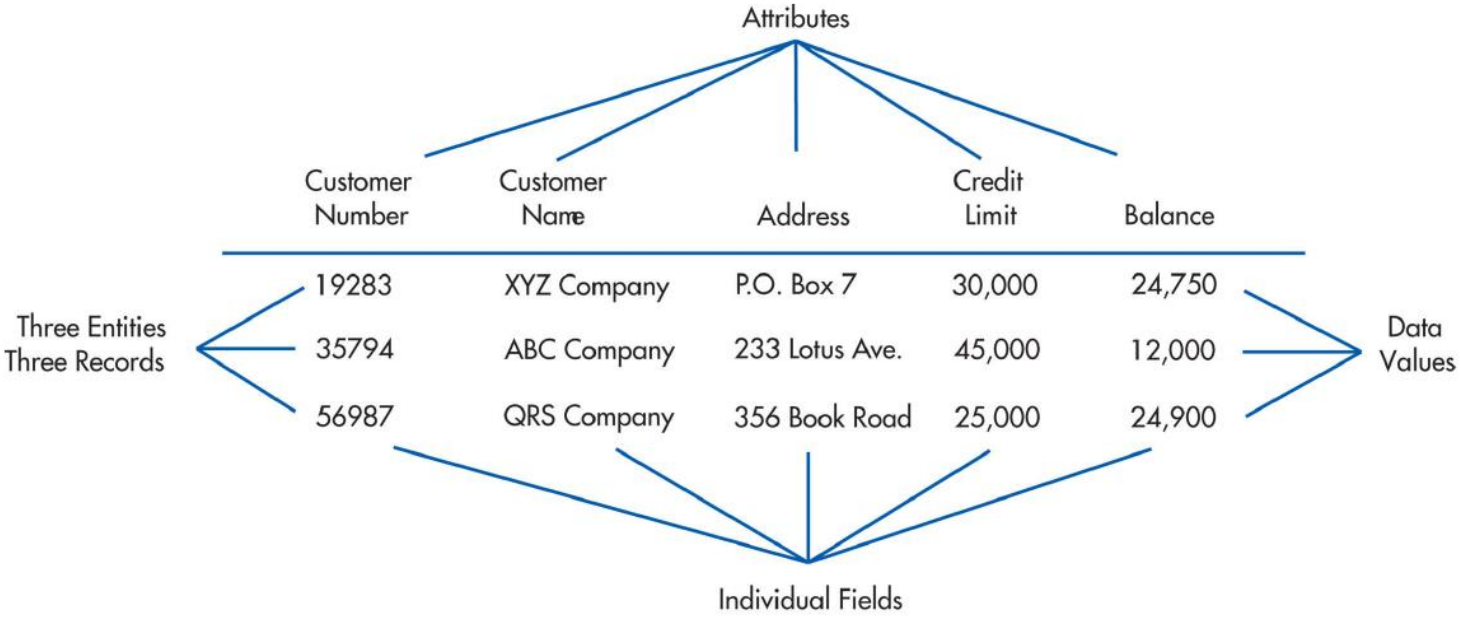
Data processing cycle: Data storage (3/4)

Coding techniques:

- **Sequence codes**—items numbered consecutively to account for all items (i.e., pre-numbered forms)
- **Block code**—blocks of numbers reserved for specific categories of data
- **Group codes**—two or more subgroups of digits used to code items (i.e., car vin #'s)
- **Mnemonic codes**—letters and numbers interspersed to identify an item (i.e. Dry300W05 is low end (300), white (W) dryer (DRY) made by AEG (05))

Data processing cycle: Data storage (4/4)

Overview of data storage elements



Data processing cycle: Data processing (1/1)

- Four types of processing (CRUD):
  - **C**reating new records (e.g., adding a customer)
  - **R**eading existing data
  - **U**pdating previous record or data
  - **D**eleting data
- Data can be **batch processed** (e.g., post records at the end of the business day) or in **real-time** (process as it occurs).

Data processing cycle: Information output (1/1)

Information output can be offline and online and take the following forms:

- **Document** (e.g., sales invoice)
- **Report** (e.g., monthly sales report)
- **Query** (question for specific information in a database, e.g., Which division had the most sales for the month?)

IV. System documentation

Why document a system?

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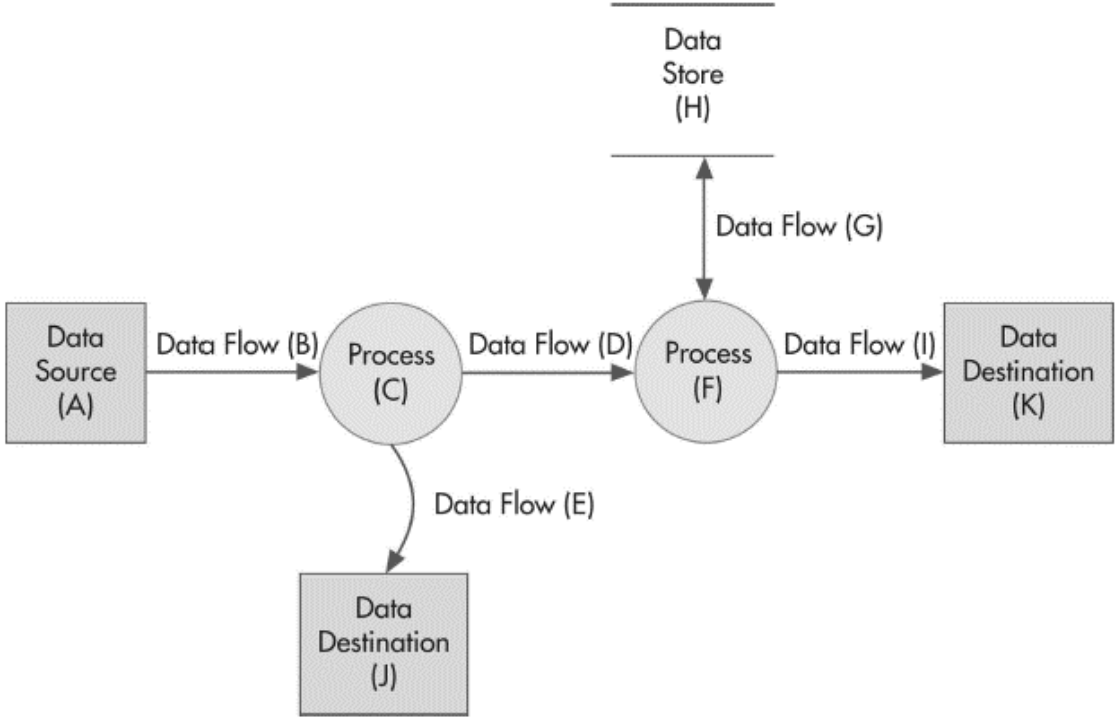
There are many documentation methods, we will look at the three most popular ones:

- Data flow diagrams
- Systems flowcharts
- Business process diagrams

DFDs are visually simple and can represent same processes at abstract or detailed level



Example customer payment process:

(A) Customer
(B) Customer payment
(C) 1. Process payment
(D) Remittance data
(E) Deposit
(F) 2.0 Update Receivables
(G) N/A
(H) Accounts receivables
(I) Receivables information
(J) Bank
(K) Credit Manager

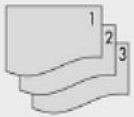
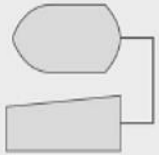
Guidelines for creating a DFD

- **Understand the system** that you are trying to represent.
- Consider what is **really needs** to be **included**.
- **Start** with a **high level** (context diagram) the drill down.
- **Identify and group** all the basic elements.
- Name data elements with **descriptive names**, use **action verbs** for processes (e.g., update, edit, prepare, etc.).
- Give **each process a sequential number** to help the reader navigate from the abstract to the detailed levels.
- **Edit/Review/Refine** to make it easy to read/understand

A flowchart uses a standard set of symbols to give clear, concise and logical depiction

- Describe an information system showing:
  - **Inputs and Outputs**
  - **Information activities (processing data)**
  - **Data storage**
  - **Data flows**
  - **Decision steps**
- Key strengths of flowcharts are that they can easily **capture control via decision points**, **show manual vs. automated** processes.

Flowcharts provide a higher level of detail

Symbol	Name	Explanation
Input/OutputSymbols		
	Document	An electronic or paper document or report
	Multiple copies of one paper document	Illustrated by overlapping the document symbol and printing the document number on the face of the document in the upper right corner
	Electronic output	Information displayed by an electronic output device such as a terminal, monitor, or screen
	Electronic data entry	Electronic data entry device such as a computer, terminal, tablet, or phone
	Electronic input and output device	The electronic data entry and output symbols are used together to show a device used for both
Processing Symbols		
	Computer processing	A computer-performed processing function; usually results in a change in data or information
	Manual operation	A processing operation performed manually

Symbol	Name	Explanation
Storage Symbols		
	Database	Data stored electronically in a database
	Magnetic tape	Data stored on a magnetic tape; tapes are popular back-up storage mediums
	Paper document file	File of paper documents; letters indicate file-ordering sequence: N = numerically, A = alphabetically, D = by date
	Journal/ledger	Paper-based accounting journals and ledgers
Flow and Miscellaneous Symbols		
	Document or processing flow	Direction of processing or document flow; normal flow is down and to the right
	Communication link	Transmission of data from one geographic location to another via communication lines
	On-page connector	Connects the processing flow on the same page; its usage avoids lines crisscrossing a page
	Off-page connector	An entry from, or an exit to, another page
	Terminal	A beginning, end, or point of interruption in a process; also used to indicate an external party
	Decision	A decision-making step
	Annotation	Addition of descriptive comments or explanatory notes as clarification

There are three types of flow charts

- **Document**: shows the flow of documents and data for a process, useful in evaluating internal controls
- **System**: depicts the data processing cycle for a process
- **Program**: illustrates the sequence of logic in the system process

Guidelines for creating a flowcharts

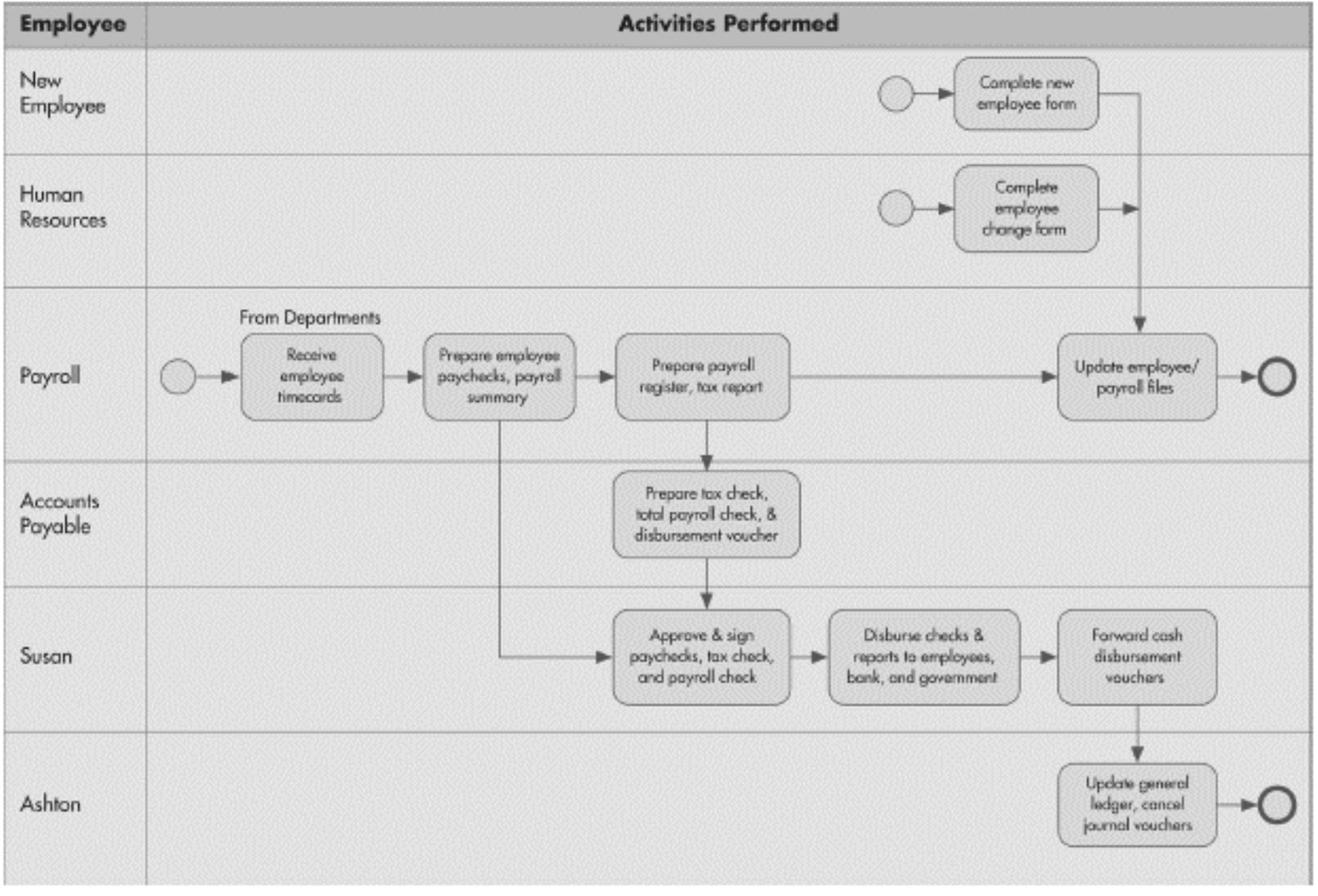
- **Understand the system** that you are trying to represent.
- **Identify** business processes, documents, data flows, and data processing procedures.
- Organize the flowchart so as it **reads from top to bottom and left to right.**
- Clearly label all symbols.
- **Use page connectors** (if it cannot fit on a single page).
- **Edit/Review/Refine** to make it easy to read/understand

Business process diagrams a visual way to represent the activities in a business process

- Intent is that **all business users** can easily **understand** the process from a standard notation (BPMN: Business Process Modeling Notation).
- Can **show** the **organizational unit performing** the activity.

Standard notations!

Symbol	Name	Explanation
	Start/Begin	The start or beginning of a process is represented by a small circle.
	End	The end of a process is represented by a small **bolded** circle.
	Activity in a process	An activity in a process is represented by a rounded-edge rectangle. An explanation of the activity is placed inside the rectangle.
	Decision	A decision made during the process is represented by a diamond. An explanation of the decision is placed inside the symbol.
	Flow	The flow of data or information is indicated by an arrow.
	Annotation information	Information that helps explain a business process is entered in the BPD and, if needed, a bolded dashed arrow is drawn from the explanation to the symbol.

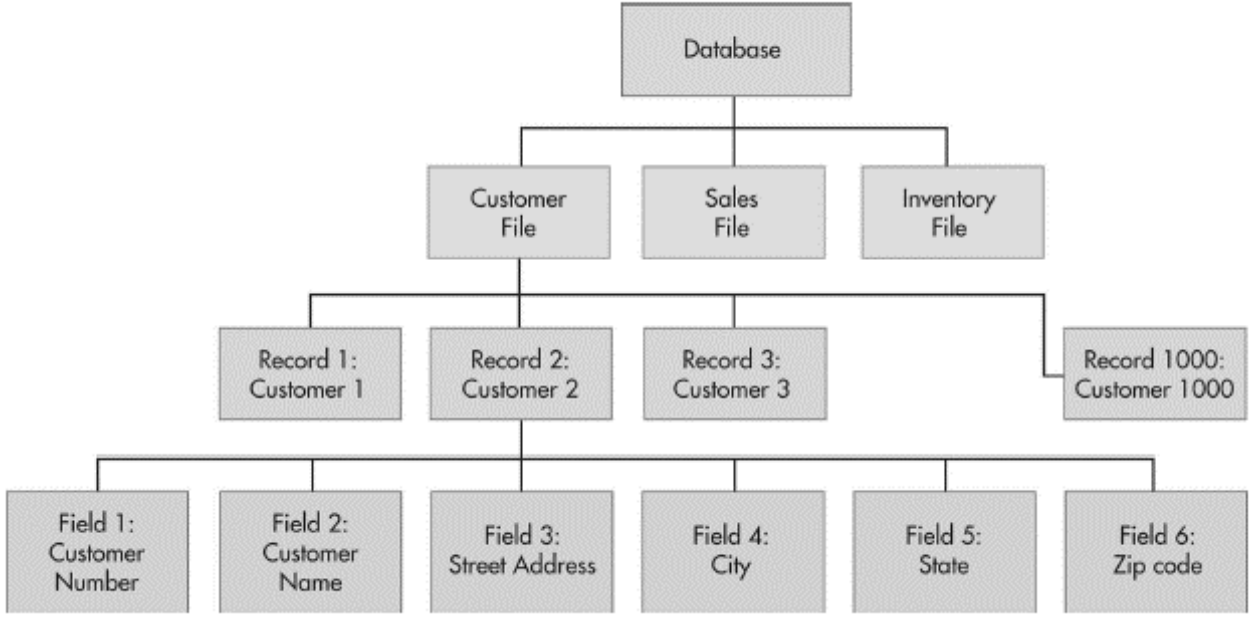

Employee
Activities Performed
New Employee
Complete new employee form
Human Resources
Complete employee change form
Payroll
From Departments
Receive employee timecards
Prepare employee paychecks, payroll summary
Prepare payroll register, tax report
Update employee/ payroll files
Accounts Payable
Prepare tax check, total payroll check, & disbursement voucher
Susan
Approve & sign paychecks, tax check, and payroll check
Disburse checks & reports to employees, bank, and government
Forward cash disbursement vouchers
Ashton
Update general ledger, cancel journal vouchers

Guidelines for drawing business process diagrams

- **Understand the system** that you are trying to represent.
- Decide the **level of detail**
- Organize diagram using **as many rows as needed** to explain process
- Enter each business process on the diagram **showing where it begins and ends**.
- **Edit/Review/Refine** to make it easy to read/understand

V. Relational databases

A database efficiently and centrally coordinates information for related files



- A file is a related group of records
- A record is a related group of fields
- A field is a specific attribute of interest for the entity (record)

Users and designers access databases differently

- Different **users** of the database information are at an **external level** of the database. These users have **logical views** of the data.
- At an **internal level** of the database is the **physical view** of the data which is how the data is actually physically stored in the system.
- Designers of a database need to understand user's needs and the conceptual level of the entire database as well as the physical view.

Database management languages differ by action

- **Data Definition Language** (DDL)
  - Builds the data dictionary and creates the database
  - Describes logical views for each user
  - Specifies record or field security constraints
- **Data Manipulation Language** (DML)
  - Changes the content in the database
  - Creates, updates, insertions, and deletions
- **Data Query Language** (DQL)
  - Enables users to retrieve, sort, and display specific data

Relational databases

- Represents the **conceptual** and **external** schema as if that “data view” were truly stored in two dimensional tables.
- Although the conceptual view appears to the user that this information is in one big table, it really is a set of tables that relate to one another.

Thank you!
Questions?