G.C.E. O/L Grade 11 ICT · Lesson 2

2.1 Information Systems: Components, Input, Process and Output

Syllabus 11.1. Every day you use systems without noticing: the school admission system, the library, the supermarket bill counter, the railway e-ticket app and the O/L results website. In this note you will learn what a **system** is, its parts (**input, process, output**, with **storage, feedback and control**), the difference between **manual** and **computer-based** systems, the difference between **data** and **information**, and why good information helps people make good decisions. You will also draw a simple **data flow diagram**.

1. What is a system?

A **system** is a set of parts that work together to reach a **goal**. Your body, a bus route, a school and a mobile phone are all systems. If one part stops, the whole system is affected. For example, a school canteen is a system: the students order (input), the staff prepare food (process) and the students get their meal (output).

> 💡 Think of a rice cooker. Rice and water go in (input), it cooks (process), cooked rice comes out (output). The switch and timer **control** it, and the light that turns to “warm” is **feedback**.

2. Components of a system

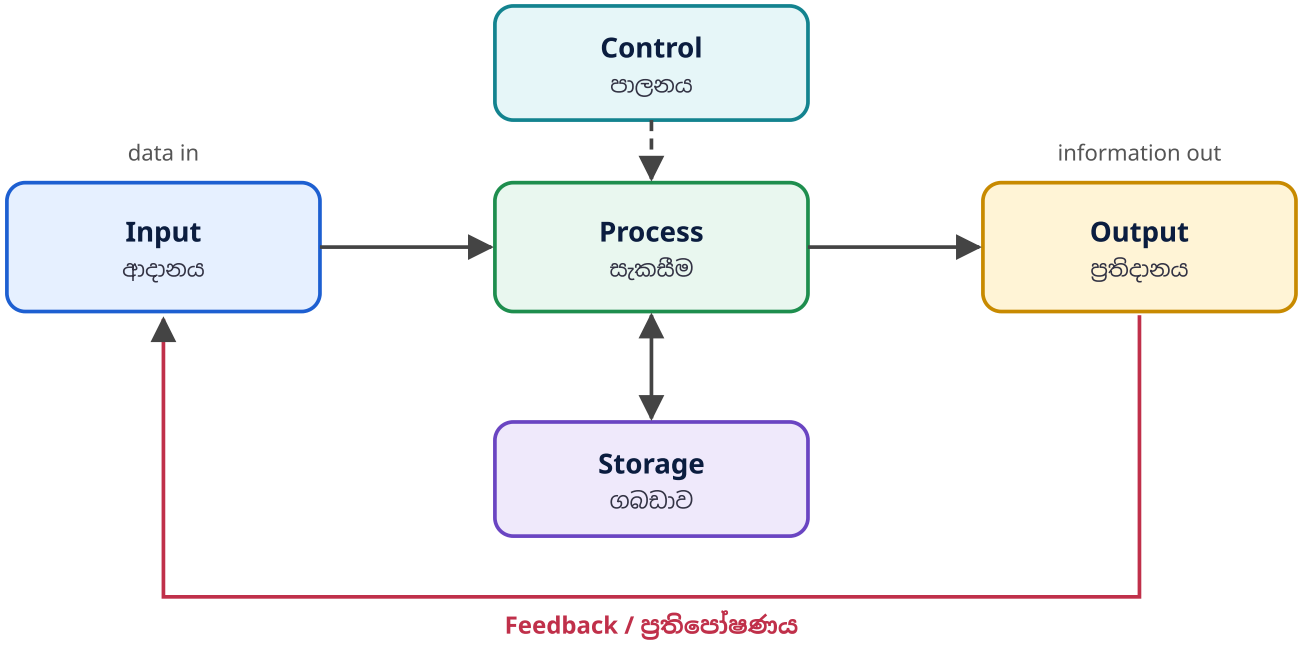


Figure 2.1 – The parts of a system: input, process, output, with storage, control and feedback.

Component	Meaning	Library example

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Input	Data that goes into the system	Member ID and book barcode
Process	Work done on the data	Record the loan, work out the due date
Output	Information that comes out	Receipt with the due date
Storage	Keeping data to use later	Books, Members and Loans tables
Feedback	Output used to check and improve the system	Many overdue books → send SMS reminders
Control	Rules that keep the system working correctly	Only 2 books per student; 14-day loan

3. Manual and computer-based systems

A **manual system** is done by people using paper, pens, registers and files. A **computer-based system** uses computers, software, networks and databases to do the same work. Many schools are moving their library from book cards to a computer system.

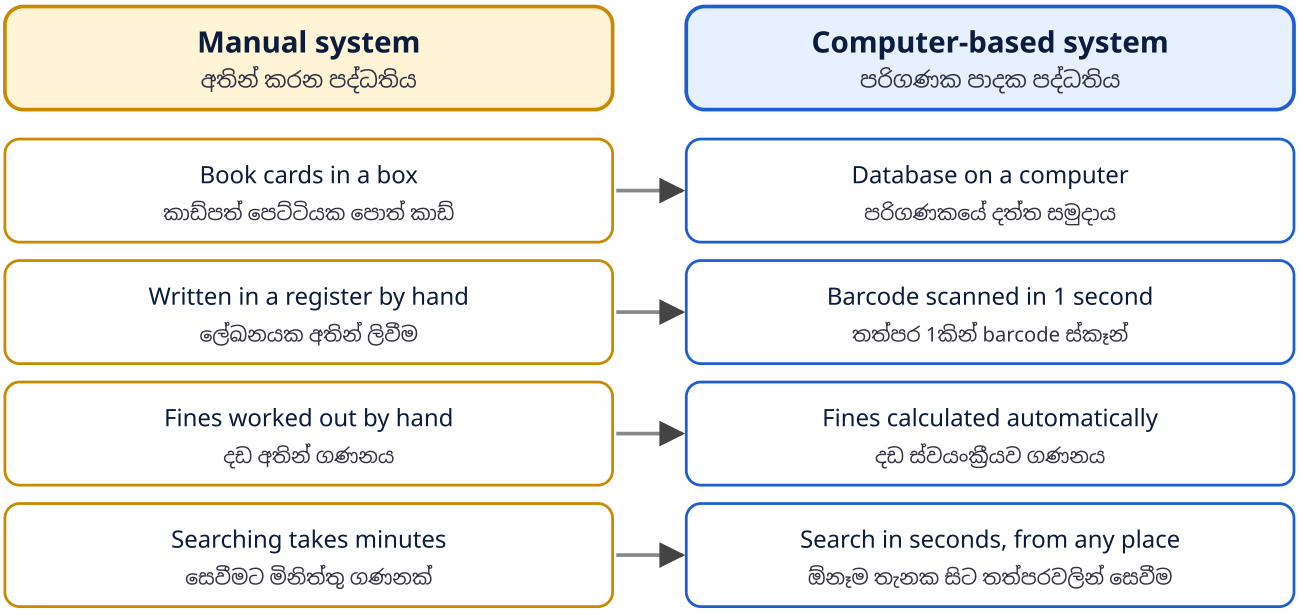


Figure 2.2 – The same library as a manual system and as a computer-based system.

Point	Manual system	Computer-based system
Speed	Slow	Very fast
Accuracy	Human errors are common	Accurate if the data entered is correct
Storage	Needs a lot of space for files	Large amounts on a small disk or the cloud
Searching	Slow, by hand	Fast search and sorting
Cost to start	Low	High (computers, software, training)
Needs electricity / skills	No	Yes

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4. Data and information

Data are raw facts with no meaning by themselves, such as 72, 45, 88. **Information** is data that has been **processed** so it has meaning and is useful, such as “Nimal’s average is 68.3 and he passed”. An **information system** is a system that collects data, processes it, stores it and gives out information to help people make decisions.

Data
දත්ත

Processing
සැකසීම

Information
තොරතුරු

Decision
තීරණය

5. Information and decision making

Managers, teachers, doctors and even students make better decisions when they have good information. A principal uses attendance information to find students who need help; a supermarket manager uses POS sales information to decide what to order; the Ministry uses O/L results to plan A/L classes. Bad information leads to bad decisions.

Quality of good information	Meaning
Accurate	No mistakes
Complete	Nothing important is missing
Timely	Available when it is needed
Relevant	Useful for the decision
Easy to understand	Clear and simple to read
Cost-effective	Worth more than the cost of producing it

6. Sri Lankan information systems

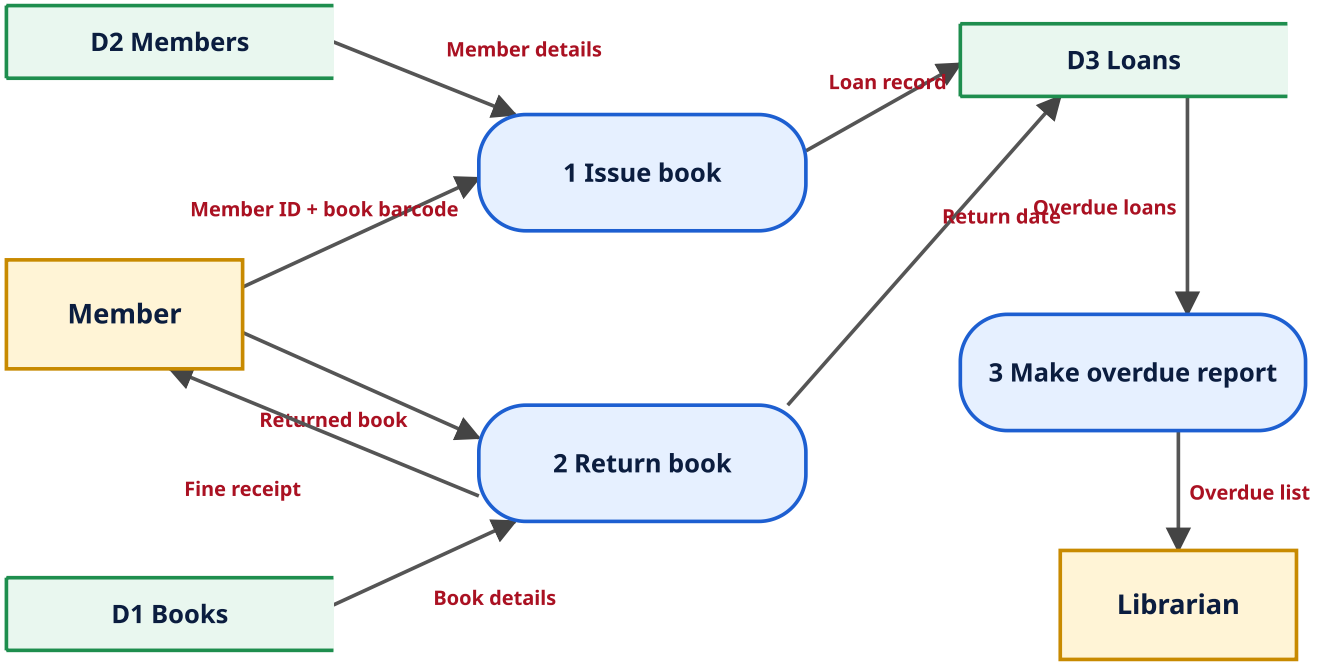
System	Input	Process	Output
School admission system	Application form, birth certificate, distance	Check rules, give marks, rank	Selected list
School library system	Member ID, book barcode	Record loan, find due date, fines	Receipt, overdue list
Supermarket POS	Barcode scans, loyalty card	Find price, add total, update stock	Bill, stock report
Railway e-ticketing	Route, date, seats, payment	Check seats, reserve, take payment	e-ticket with QR code / SMS

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e-channelling (doctor booking)	Doctor, hospital, date, patient details	Find free slot, give number	Appointment number SMS
Exams Department results system	Index number, marks from examiners	Combine marks, give grades	Results online (doenets.lk) and result sheets

7. Data flow diagrams (DFD)

A **data flow diagram** shows how data moves through a system. It uses four symbols: an **external entity** (a person or organisation outside the system, such as a Member), a **process** (work that changes data, such as “Issue book”), a **data store** (where data is kept, such as Loans) and a **data flow** (an arrow with the name of the data).



Rectangle = external entity · rounded box = process · open box = data store · arrow = data flow

Figure 2.3 – A simple data flow diagram of the school library system.

- **External entities (2):** Member, Librarian.
- **Processes (3):** 1 Issue book, 2 Return book, 3 Make overdue report.
- **Data stores (3):** D1 Books, D2 Members, D3 Loans.
- **Data flows (9):** every arrow is named, e.g. “Member ID + book barcode”, “Overdue list”.

NEW 2026 **2026:** Most Sri Lankan systems are now online and on phones – railway e-tickets with a QR code, e-channelling a doctor by app, O/L results by index number on doenets.lk, and school admission applications online. More data means personal data must be protected under the **Personal Data Protection Act No. 9 of 2022 (PDPA)**.

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Key Words

System – A set of parts working together to reach a goal.

Input – Data that goes into a system.

Process – Work done to change data into information.

Output – The information a system gives out.

Storage – Keeping data and information to use later.

Feedback – Using output to check and improve the system.

Control – Rules that make sure the system works correctly.

Data – Raw facts with no meaning by themselves.

Information – Processed data that is meaningful and useful.

Information system – A system that collects, processes, stores and gives out information.

Manual system – A system run by people using paper and files.

Data flow diagram – A diagram showing how data moves between entities, processes and stores.

Sample Q&A

1. What is a system?

> **Answer:** A set of parts that work together to reach a goal.

2. Name the three main components of a system.

> **Answer:** Input, process and output.

3. What is the difference between data and information?

> **Answer:** Data are raw facts; information is processed data that has meaning and is useful.

4. Give two advantages of a computer-based system over a manual system.

> **Answer:** It is faster and searches quickly; it stores large amounts of data in little space (also: fewer errors).

5. Give the input, process and output of a supermarket POS.

> **Answer:** Input: barcode scans; process: find prices and add the total, update stock; output: the bill.

6. Name the four symbols of a data flow diagram.

> **Answer:** External entity, process, data store and data flow.

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MCQ

1. A set of parts that work together to reach a goal is a…

A. system
B. printer
C. program only
D. database field

2. In a library system, scanning a book barcode is…

A. output
B. feedback
C. input
D. storage

3. The receipt showing the due date is…

A. input
B. control
C. output
D. a data store

4. Using the output to check and improve a system is called…

A. feedback
B. storage
C. coding
D. input

5. The rule “only 2 books per student” is an example of…

A. output
B. control
C. feedback
D. data

6. Which of these is data, not information?

A. Nimal’s average is 68.3
B. Class 11A has the highest average
C. Book BK-101 is 3 days late
D. 72, 45, 88

7. Information is…

A. always on paper
B. a type of hardware
C. processed data that is meaningful
D. raw facts only

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8. Which is an advantage of a manual system?

A. Very fast searching
B. Low cost to start
C. Stores millions of records in little space
D. No human errors

9. Information that arrives after the decision was made is not…

A. timely
B. accurate
C. printed
D. stored

10. In a DFD, "D3 Loans" is a…

A. process
B. data flow
C. data store
D. external entity

11. In the library DFD, the Member is a…

A. data store
B. control
C. process
D. external entity

12. In a DFD, a named arrow shows a…

A. data flow
B. process
C. data store
D. printer

13. For the railway e-ticketing system, the output is…

A. the route and date chosen
B. an e-ticket with a QR code
C. the payment card number
D. the train engine

14. The Department of Examinations results system gives out…

A. doctor appointments
B. supermarket bills
C. train seats
D. results by index number

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15. Sri Lanka's law that protects personal data is the…

A. Education Ordinance of 1939
B. Personal Data Protection Act No. 9 of 2022
C. Copyright Act of 1880
D. Motor Traffic Act

Structured Questions

1. (i) Define a system. (1 mark)
(ii) Name the three main components of a system and give a library example of each. (3 marks) *(4 marks)*

> (i) A set of parts working together to reach a goal (1). (ii) Input – member ID and book barcode (1); process – record the loan and find the due date (1); output – receipt with the due date (1).

2. Explain the difference between data and information with an example from a school. (3 marks) *(3 marks)*

> Data are raw facts, e.g. marks 72, 45, 88 (1). Information is processed data that is meaningful (1), e.g. "average 68.3 – pass" (1).

3. Give two advantages and one disadvantage of changing a school library from a manual system to a computer-based system. (3 marks) *(3 marks)*

> Advantages: faster issuing and searching; fines calculated automatically; less storage space (any two, 2). Disadvantage: high start-up cost / needs electricity and trained staff (1).

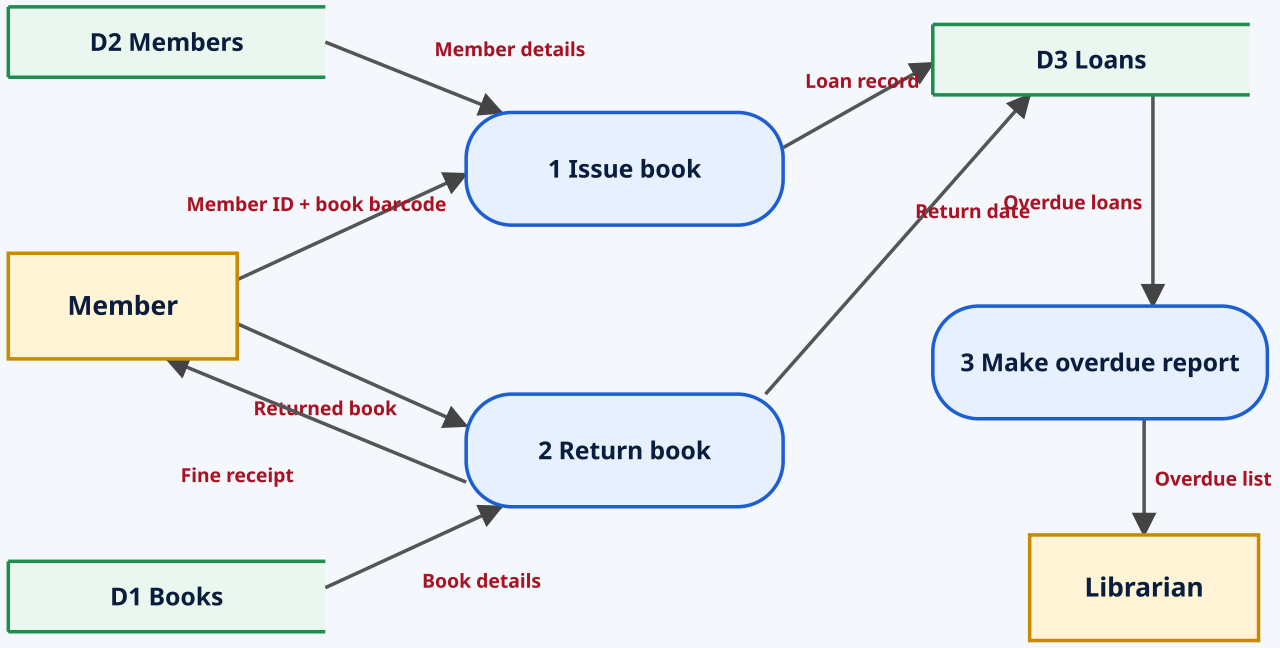
4. List four qualities of good information and explain why one of them matters for a principal's decision. (5 marks) *(5 marks)*

> Accurate, complete, timely, relevant, easy to understand, cost-effective (any four, 4). E.g. attendance information must be timely so the principal can help a student before the exam (1).

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5. Look at the library DFD (Figure 2.3). (i) Name one external entity, one process and one data store. (ii) Which data flows from "3 Make overdue report" to the Librarian? (4 marks) *(4 marks)*

(i) Member or Librarian (1); 1 Issue book / 2 Return book / 3 Make overdue report (1); D1 Books / D2 Members / D3 Loans (1). (ii) Overdue list (1).



Rectangle = external entity · rounded box = process · open box = data store · arrow = data flow

Figure 2.3 – Library DFD.

Summary

- System = parts working together for a goal.
- Input → Process → Output, with storage, feedback and control.
- Manual = paper; computer-based = faster, accurate, costly to start.
- Data = raw facts; information = processed, meaningful data.
- Good information: accurate, complete, timely, relevant, clear, cost-effective.
- Good information → good decisions.
- DFD: entity, process, data store, data flow.
- Sri Lankan IS: admission, library, POS, e-ticket, e-channelling, results.

MCQ answer key – 2.1

1. **A** – That is the definition of a system.
2. **C** – Data goes into the system.
3. **C** – Information comes out.
4. **A** – Feedback loops back.
5. **B** – Rules control the system.

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6. **D** – Raw numbers with no meaning.
7. **C** – Data + processing = information.
8. **B** – No computers to buy.
9. **A** – Good information is timely.
10. **C** – D = data store.
11. **D** – Outside the system.
12. **A** – Arrows carry data.
13. **B** – The ticket comes out.
14. **D** – Results are its output.
15. **B** – PDPA 2022.

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