Grade 12 A/L ICT · Lesson 1

1.1 Data and Information: Life Cycle, Value and Big Data

Syllabus 1.1. Everything in ICT starts with **data**. Data are raw facts, like numbers, words, pictures or sounds. When we **process** data, we get **information** – something that has meaning and helps us decide. In this part you learn the life cycle of data, the difference between data and information, what makes information valuable, and why we now need special tools for **big data**.

1. What are data?

Data are raw, unprocessed facts and figures. On their own they have little meaning. Example: 72, 85, 64 – we do not know what these numbers are.

Form of data	Example	Characteristic
Numeric	Marks, prices, temperature	Can be calculated
Text (alphanumeric)	Names, addresses	Letters, digits and symbols
Image	Photos, X-rays	Made of pixels
Audio	Voice, music	Sound waves stored digitally
Video	CCTV, lessons	Many images plus sound

2. Life cycle of data

Data have a life, just like a living thing. They are **created**, then **managed** (stored, used, shared, protected and updated), and finally old data that are no longer useful are **removed** (obsolete data).



Life cycle of data: creation, management and removal of obsolete data.

Data creation
New data are typed, scanned, sensed or recorded. E.g. a new student is registered.

Management
Data are stored, backed up, kept correct, kept secure and shared with the right people.

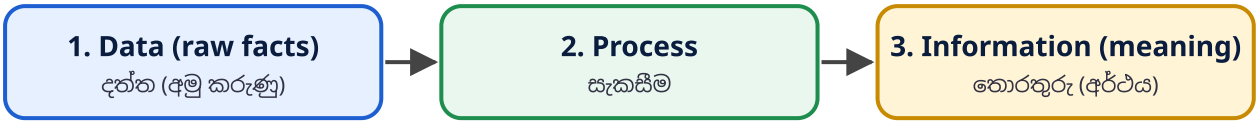
© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved

Removal of obsolete data
Data that are out of date are deleted or archived safely. E.g. records of students who left 20 years ago.

💡 Think of milk: it is produced (creation), kept in a fridge and used (management), and thrown away after the expiry date (removal). Old data are like expired milk – they can give wrong answers.

3. Data, process and information

Information is processed data that is meaningful and useful for making decisions. We always need a **process** (such as sorting, calculating, comparing or summarising) to change data into information. So data, process and information are strongly linked: no data – no information; no process – no information.



Data become information through a process.

🧱 **Worked example: Marks 72, 85 and 64 (data) → find the average (process) → information**
Average = (72 + 85 + 64) ÷ 3 = 221 ÷ 3 = **73.67**. Using the grade scale (A 75+, B 65–74, C 50–64, S 35–49, W below 35) the student gets **B**. Now the numbers have meaning: "this student's average is a B pass".

Data	Information
Raw, unprocessed facts	Processed, organised facts
Little meaning on its own	Has meaning in a context
Input to a process	Output of a process
E.g. 36.9, 38.5, 39.1	E.g. "The patient's fever is rising"

💡 Information produced by one process can become data for another process. A class average (information for the teacher) becomes data when the principal compares all classes.

4. Quality data

Good information needs good data ("garbage in, garbage out"). Quality data are **accurate** (correct), **complete** (nothing missing), **consistent** (the same everywhere), **up to date**, **relevant** to

© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved

the purpose, and **valid** (in the correct format and range).

5. Characteristics of valuable information



Five characteristics of valuable information in the syllabus.

Characteristic	Meaning	Example
Timeliness	Available when it is needed	A flood warning before the flood, not after
Accuracy	Free from errors	The correct balance in a bank account
Presented within the context	Related to the user's situation and purpose	"30" means little; "30 °C in Colombo now" is clear
Enhanced understandability	Easy to understand, e.g. by charts	A bar chart of monthly sales
Less uncertainty	Reduces doubt when deciding	A weather forecast helps a farmer decide when to plant

The **value of information** is how much it helps us make a better decision. Example: a fisherman who gets an accurate storm warning in time saves his boat and his life – that information is very valuable. The same warning one day late has no value.

6. Big data – large volumes and complexities of data

Today phones, sensors, social media, shops and banks create huge amounts of data every second. **Big data** means data sets that are so large, so fast and so varied that normal software cannot store or analyse them easily. We need special tools (many computers working together, cloud storage, data analytics) to find useful patterns.

© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved



The Vs of big data.

- **Volume** – the amount is huge (terabytes and more).
- **Velocity** – data arrive very fast, often every second.
- **Variety** – many types: text, images, video, sensor readings.
- **Veracity** – some data may be wrong or doubtful, so they must be checked.
- **Value** – the useful information we finally get from the data.

🧮 **Worked example: How much data do 1,000 sensors create in one day if each sends a 4-byte reading every second?**
Seconds in a day = 24 × 60 × 60 = 86,400. Bytes = 1,000 × 4 × 86,400 = **345,600,000 bytes** = **345.6 MB** (1 MB = 1,000,000 bytes). In one year this becomes far more – this is why big data needs special storage.

Big data analysis examples: supermarkets find which goods are bought together, the weather department predicts rain, hospitals spot disease outbreaks, and banks detect unusual card payments (fraud).

🚀 **Beyond the syllabus (2026 update)** *Not required for the exam – read for interest.* **AI analytics.** In 2026 most big data is analysed with artificial intelligence and machine learning. The computer learns patterns from millions of past records and then predicts – for example, which customers may leave a mobile network, or which roads will have traffic jams. Data engineers and data scientists are among the fastest-growing jobs.

Key Words

Data – Raw, unprocessed facts and figures.	**Information** – Processed data that is meaningful and useful for decisions.
Process – Actions such as sorting or calculating that change data into information.	**Life cycle of data** – The stages of creation, management and removal of data.

© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved

Obsolete data – Old data that are no longer useful or correct.

Timeliness – Information is available at the time it is needed.

Accuracy – Information is correct and free from errors.

Context – The situation that gives information its meaning.

Uncertainty – Doubt about what will happen or what to decide.

Quality data – Data that are accurate, complete, consistent and up to date.

Big data – Data sets too large, fast and varied for normal software.

Velocity – The speed at which new data arrive.

Variety – The many different types of data, such as text and video.

Sample Q&A

1. Define data and information.

> **Answer:** Data are raw, unprocessed facts. Information is data that has been processed so that it is meaningful and useful for decisions.

2. Name the three stages of the life cycle of data.

> **Answer:** Data creation, management, and removal of obsolete data.

3. Why do we need a process to get information?

> **Answer:** Raw data alone have little meaning. A process such as sorting, calculating or summarising organises the data and gives them meaning.

4. List the five characteristics of valuable information given in the syllabus.

> **Answer:** Timeliness, accuracy, presented within the context, enhanced understandability and less uncertainty.

5. What is big data? Give one use.

> **Answer:** Data sets so large, fast and varied that normal software cannot handle them easily. Use: a bank analyses card payments to detect fraud.

6. Why should obsolete data be removed?

> **Answer:** They waste storage, slow down searches, can give wrong results and may break privacy rules if kept too long.

© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved

MCQ

1. Which of these is data, not information?

A. Sales fell by 10% this month
B. The patient’s fever is rising
C. The numbers 36.9, 38.5, 39.1
D. Class average is 62
E. Nimal got grade B

2. Which stage of the life cycle of data includes backing up and updating?

A. Output
B. Validation only
C. Creation
D. Removal
E. Management

3. A flood warning that arrives after the flood fails mainly in:

A. Timeliness
B. Context
C. Accuracy
D. Volume
E. Variety

4. The average of 72, 85 and 64 is:

A. 71.5
B. 74.33
C. 85
D. 73.67
E. 221

5. Changing “30” into “30 °C in Colombo now” improves:

A. Obsolescence
B. Volume
C. Presentation within the context
D. Velocity
E. Data creation

6. Which V of big data is about the speed at which data arrive?

A. Veracity
B. Velocity
C. Variety
D. Value
E. Volume

© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved

7. 1,000 sensors each send 4 bytes every second. Data per day?

A. 345.6 MB
B. 3,456 MB
C. 4 MB
D. 86.4 MB
E. 5.76 MB

8. “Garbage in, garbage out” means:

A. Output is always correct
B. Computers make waste
C. Poor data give poor information
D. Data need no checking
E. Delete all old files

9. Which is NOT a characteristic of quality data?

A. Accurate
B. Consistent
C. Complete
D. Up to date
E. Duplicated in many places

10. A weather forecast helps a farmer decide when to plant. This shows information:

A. Has no value
B. Reduces uncertainty
C. Is always obsolete
D. Is raw data
E. Increases volume

11. Information from one process can be:

A. A process itself
B. Never used again
C. Only printed
D. Hardware
E. Data for another process

12. Which form of data is made of pixels?

A. Text
B. Audio
C. Sensor time
D. Image
E. Numeric

© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved

13. Which term means: “Raw, unprocessed facts and figures”?

A. Context
B. Big data
C. Process
D. Data
E. Timeliness

14. Which term means: “Processed data that is meaningful and useful for decisions”?

A. Information
B. Uncertainty
C. Accuracy
D. Life cycle of data
E. Velocity

15. Which term means: “Actions such as sorting or calculating that change data into information”?

A. Process
B. Variety
C. Quality data
D. Context
E. Obsolete data

16. Which term means: “The stages of creation, management and removal of data”?

A. Uncertainty
B. Big data
C. Data
D. Timeliness
E. Life cycle of data

17. Which term means: “Old data that are no longer useful or correct”?

A. Accuracy
B. Obsolete data
C. Velocity
D. Information
E. Quality data

18. Which term means: “Information is available at the time it is needed”?

A. Context
B. Process
C. Timeliness
D. Big data
E. Variety

© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved

19. Which term means: “Information is correct and free from errors”?

A. Data
B. Accuracy
C. Velocity
D. Uncertainty
E. Life cycle of data

20. Which term means: “The situation that gives information its meaning”?

A. Obsolete data
B. Information
C. Variety
D. Context
E. Quality data

Structured Questions

1. (a) Define data. (b) Define information. (c) Give one example that shows data becoming information. *(3 marks)*

> (a) Raw unprocessed facts; (b) processed data that is meaningful; (c) marks 72, 85, 64 averaged to 73.67, grade B

2. Describe the life cycle of data using a school student record. *(3 marks)*

> Creation: the student’s details are entered at admission; management: the record is stored, updated each year, backed up and kept secure; removal: after the student leaves and the retention time ends, the record is archived or deleted

3. Explain three characteristics of valuable information with an example for each. *(3 marks)*

> Timeliness – a cyclone warning given a day before; accuracy – correct exam results; less uncertainty – a sales report helps a shop decide how much to order

4. A city has 1,000 traffic sensors. Each sends 4 bytes every second. (a) Calculate the data per day in MB. (b) Name two Vs of big data shown here. *(3 marks)*

> (a) 1000 × 4 × 86,400 = 345,600,000 bytes = 345.6 MB; (b) volume (large amount); velocity (every second)

5. Explain why the relationship between data, process and information is strong. *(3 marks)*

> Information cannot exist without data; data give no meaning without a process; the quality of information depends on the quality of data and the correctness of the process

© 2026 schoolict.net (Ruwan Mangala Suraweera) · All rights reserved

Summary

- Data are raw facts; information is processed, meaningful data.
- Life cycle: creation → management → removal of obsolete data.
- A process is always needed to turn data into information.
- Valuable information: timely, accurate, in context, understandable, less uncertain.
- Big data: huge volume, high velocity, wide variety – needs special tools.
- Quality data are accurate, complete, consistent and up to date.

MCQ answer key – 1.1

1. **C** – Bare numbers with no meaning are data.
2. **E** – Storing, backing up, updating and sharing are management.
3. **A** – It was not available when it was needed.
4. **D** – 221 ÷ 3 = 73.67.
5. **C** – Context gives the number meaning.
6. **B** – Velocity means speed.
7. **A** – 1000 × 4 × 86,400 = 345,600,000 bytes.
8. **C** – Quality of output depends on quality of input.
9. **E** – Duplication causes inconsistency.
10. **B** – Valuable information reduces doubt.
11. **E** – Output of one process may be input of the next.
12. **D** – Images are grids of pixels.
13. **D** – Data – Raw, unprocessed facts and figures.
14. **A** – Information – Processed data that is meaningful and useful for decisions.
15. **A** – Process – Actions such as sorting or calculating that change data into information.
16. **E** – Life cycle of data – The stages of creation, management and removal of data.
17. **B** – Obsolete data – Old data that are no longer useful or correct.
18. **C** – Timeliness – Information is available at the time it is needed.
19. **B** – Accuracy – Information is correct and free from errors.
20. **D** – Context – The situation that gives information its meaning.

© 2026 schoolict.net (Ruwan Mangala Suraweera). All rights reserved.