MPA International School

# YEAR 8

# COMPUTING

## Reference Resources Booklet (1)

Name : ……

ID : ……

Class : ……

2026-2027 Academic Year

# YEAR 8

# COMPUTING

## Reference Resources Booklet (1)

# Preface

At MPA International School, we are committed to nurturing learners who are not only knowledgeable but also capable of guiding their own learning journey. This booklet has been carefully prepared to support our students as a confident, curious, and independent learner by providing clear, structured notes that reinforce key concepts and offer guidance across all related topics.

Each section in this booklet connects directly to the topics of the textbook, offering:

- Clear explanations of key ideas
- Concept summaries for quick revision
- Supportive notes that encourage **self-study** and **personal reflection**

This resource is designed to help students' **review at their own pace**, explore topics more deeply, and strengthen what they've learned in class. Whether they're preparing for a quiz, completing homework, or simply curious to know more—this booklet is here to guide and support them. Most importantly, use it to grow as a **self-directed learner**—someone who learns with purpose, confidence, and curiosity.

This resource is not meant to replace active learning or classroom discussion but to empower students to revisit important content at their own pace—whether reviewing after a lesson, preparing for a quiz, or exploring further out of curiosity.

We hope this booklet empowers you to take ownership of your learning with purpose and pride.

**Academic Team**
**MPA International School**

**Content**

## Surveillance Technology

### What is Surveillance?

The observation of someone without their knowledge. Purposes:

- Data is collected and analyzed.
- Often used for security purposes.
- Helps monitor activities and behavior.

### What is Computer Surveillance?

Computer surveillance is the use of technology to monitor:

- Activities
- Movements
- Communications

without a person's knowledge.

### Why is Surveillance Used?

- Security and crime prevention
- Public safety
- Monitoring workplace activities
- Protecting property
- Investigations and law enforcement

### Types of Computer Surveillance

- **Hardware-based:** CCTV cameras, GPS trackers
- **Software-based:** Spyware, Keyloggers, Facial recognition
- **Network-based:** Internet and social media monitoring

## Facial Recognition

Facial recognition uses cameras and software to identify a person by their face.

### Advantages

- Fast identification
- Improves security
- Helps prevent crime

### Disadvantages

- May invade privacy
- Can make mistakes

## Smartphone Location Tracking

Smartphones use **GPS, Wi-Fi, and mobile networks** to find their location.

Uses:

- Maps and navigation
- Delivery services
- Emergency services
- Finding lost phones

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### Key Notes

- Surveillance helps keep people safe.
- It can also affect a person's privacy.
- CCTV and facial recognition are examples of computer surveillance.

## Type of Software

### What is Software?

Software is a set of **instructions** that tells a computer what to do.

### Types of Software

- **Application Software** – Helps users perform everyday tasks.
- **Operating System (OS)** – Manages the computer and hardware.
- **Utility Software** – Maintains and protects the computer.

### Application Software

Application software is used to help users complete **specific tasks**.

| Software Type | Used For | Key Features |
|---|---|---|
| **Word Processing** | Create documents | Type text, Format text |
| **Spreadsheet** | Calculations | Formulas, Charts |
| **Presentation** | Create slides | Images, Animations |
| **Database** | Store information | Search records, Update records |

### What is System Software?

System software **manages the computer hardware** and provides a platform for application software.

### Types of System Software

- **Operating System (OS)**
- **Utility Software**

## Operating System (OS)

An **Operating System (OS)** manages the computer and allows users to run applications.

## Key Roles of an Operating System

| Role | Function |
|---|---|
| **User Interface (GUI)** | Allows users to interact using icons and menus. |
| **Memory Management** | Manages memory for programs. |
| **Peripherals** | Controls devices such as printers and speakers. |
| **Multi-tasking** | Runs more than one application at the same time. |
| **Security** | Prevents unauthorized access to the computer. |

## Ways to Interact with an OS

| Interface | Description |
|---|---|
| **GUI** | Uses icons and menus. |
| **CLI** | Uses typed commands. |
| **Touch Screen** | Uses taps and swipes. |
| **Voice** | Uses spoken commands. |

## Utility Software

### What is Utility Software?

**Utility software** helps the computer **run smoothly, stay organized, and remain safe**.

### Main Jobs of Utility Software

| Job | Purpose |
|---|---|
| **Security** | Protects the computer from viruses and other threats. |
| **Disk Organization** | Organizes files to improve storage efficiency. |
| **Maintenance** | Removes unnecessary files and improves computer performance. |

## Connecting to the Internet

### Internet Connection Devices

| Device | Purpose |
|---|---|
| **Router** | Connects devices to the Internet and assigns IP addresses. |
| **Modem** | Connects a home or school network to the Internet. |
| **Switch** | Connects devices in a wired network. |
| **Wireless Access Point (WAP)** | Provides a Wi-Fi connection. |
| **Network Interface Card (NIC)** | Allows a device to connect to a wired or wireless network. |

## Network Packets

When data is sent over a network, it is divided into **packets**.

| Part | Purpose |
|---|---|
| **Header** | Contains the source and destination addresses. |
| **Body** | Contains the actual data. |
| **Footer** | Checks for errors and marks the end of the packet. |

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## Wireless Technologies

| Technology | Use |
|---|---|
| **Wi-Fi** | Connects devices to the Internet. |
| **Bluetooth** | Connects nearby devices (e.g., headphones). |
| **NFC** | Used for contactless payments and quick data transfer. |

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## Key Notes

- **IP Address** = A unique address for a device on a network.
- **Internet** = A worldwide network that connects computers and devices.
- **Router** = Connects devices to the Internet.
- **Packet = Header + Body + Footer.**
- **Bluetooth** = Short-range device connection.
- **NFC** = Contactless payment.
- Choose wireless technology based on **range, speed, and distance**.

## Internet & Cyber Security

### Internet

A worldwide network that connects computers and devices.

### World Wide Web (WWW)

A collection of websites that runs on the Internet.

### Key Terms of Internet

| Term | Meaning |
|---|---|
| **IP Address** | A unique address for a device on a network. |
| **ISP** | Provides Internet access. |
| **DNS Server** | Changes a website name into an IP address. |
| **Web Server** | Stores website files and sends them to users. |
| **Hosting** | Stores website files so they can be accessed online. |

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### How a Website Loads

1. Type a **URL** in a web browser.
2. **DNS** finds the website's IP address.
3. The browser connects to the **Web Server**.
4. The website is sent in **packets**.
5. The browser displays the website.

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## Cyber Attack

A **cyber-attack** is an attempt to damage a computer system or steal information.

**Examples**

- Computer viruses
- Phishing
- Stealing personal data
- Crashing websites

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## Data Breach

A **data breach** is when someone accesses private information **without permission**.

Examples of stolen data:

- Usernames and passwords
- Credit card details
- Personal information

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## Key Point

- **Internet** = Connects devices.
- **WWW** = Collection of websites.
- **IP Address** = Unique device address.
- **ISP** = Provides Internet access.
- **DNS** = Finds the website's IP address.
- **Cyber Attack** = Tries to damage or steal data.
- **Data Breach** = Unauthorized access to private data.

## Vector Graphics & Bitmap Graphics

### Vector Graphics

A **vector graphic** is made using **points, lines, curves, and shapes**. It is created using **mathematical coordinates**.

**Best for:** Logos, icons, diagrams

### Advantages

- Can be resized without losing quality.
- Small file size.
- Easy to edit.

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### Bitmap Graphics

A **bitmap graphic** is made up of **pixels** (tiny dots).

**Best for:** Photographs

### Advantages

- Good for realistic images.
- Shows many colours and fine details.

### Disadvantages

- Loses quality when enlarged (pixelated).
- Larger file size.

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## Vector vs Bitmap

| Feature | Vector | Bitmap |
|---|---|---|
| Made of | Shapes | Pixels |
| Best for | Logos, Icons | Photographs |
| File Size | Small | Large |
| Enlarging | No quality loss | Becomes pixelated |

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## Resolution

- **Resolution** is the **number of pixels** in an image.
- Measured in **Pixels Per Inch (PPI)**.
- **Higher PPI = Better image quality.**

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## Colour Depth

**Colour depth** is the **number of colours** an image can display.

- More **bits per pixel (bpp)** = More colours.

| Bits per Pixel | Number of Colours |
|---|---|
| 1 | 2 colours (Black & White) |
| 2 | 4 colours |
| 3 | 8 colours |
| 4 | 16 colours |
| 5 | 32 colours |
| 6 | 64 colours |
| 7 | 128 colours |
| 8 | 256 colours |

### Key Point

- Vector → Mathematical coordinates
- Bitmap → Pixels
- PPI → Pixels Per Inch
- Logos → Vector Graphics
- Photographs → Bitmap Graphics
- Enlarging a bitmap image makes it pixelated.

### Colour Depth and Binary Representation

### Binary Addition Rules

| Addition | Result |
|---|---|
| 0 + 0 | 0 |
| 0 + 1 | 1 |
| 1 + 1 | 10 (write 0, carry 1) |
| 1 + 1 + 1 | 11 (write 1, carry 1) |

### Example-1

```
   10101
+  00011
----------
   11000
```

### Example-2

```
   0110
+  0011
----------
   1001
```

## Programming Basic

## Your First Python Program

## Display (output)

***Code***

```
1  print("My name is Alex")
2  print("I am 13 years old")
3  print("I study Computing")
4
```

***Output***

```
My name is Alex
I am 13 years old
I study Computing
```

## Using Variables

- A variable stores data.
- The value of a variable can change during a program.
- Variables have a name and a value.

***Code***

```
1  name = "Alex"
2  age = 13
3  print(name)
4  print(age)
```

***Output***

```
Alex
13
```

## Common Data Types in programming

| Data Type | Description | Example |
|---|---|---|
| str | Text (String) | "Alice" |
| int | Whole number | 13 |
| float | Decimal number | 1.55 |
| bool | True or False | TRUE |

## Arithmetic Operators in programming

| Operator | Meaning | Example | Result |
|---|---|---|---|
| + | Addition | 5 + 3 | 8 |
| - | Subtraction | 8/2/2026 | 6 |
| * | Multiplication | 4 * 5 | 20 |
| ** | Power (Exponent) | 4**2 | 16 |
| / | Division | 10/2/2026 | 5 |
| % | Modulus (Remainder) | 10 % 3 | 1 |

***Code***

```
1  num1 = 12
2  num2 = 4
3  print("Addition =", num1 + num2)
4  print("Subtraction =", num1 - num2)
5  print("Multiplication =", num1 * num2)
6  print("Division =", num1 / num2)
```

***Output***

*Addition = 16*

*Subtraction = 8*

*Multiplication = 48*

*Division = 3.0*

## User input

**User input** is **data entered by the user** into a program while it is running.

The program receives the input and uses it to perform a task.

***Code***

```
1   name = input("Enter your name: ")
2
3   print("Hello", name)
4
5
6
```

***Input***

*Alice*

***Output***

*Hello Alice*

## Integer Input

***Code***

```
1   age = int(input("Enter your age: "))
2
3   print("Next year you will be", age + 1)
4
5
6
```

***Input***

*12*

***Output***

*Next year you will be 13*

## Make Power Calculator

Input

- Asks the user to enter their student name. (Input)
- Asks the user to enter a number. (Input)
- Asks the user to enter the power. (Input)

Calculation

- Calculate the result using the following calculation: Result = Number ** Power

***Code***

```
1  # Power Calculator
2
3  student_name = input("Enter your student name: ")
4  number = int(input("Enter a number: "))
5  power = int(input("Enter the power: "))
6
```

***Input***

```
Enter your student name: Alex
Enter a number: 5
Enter the power: 3
```

***Output***

```
Student Name: Alex
Result = 125
```

## References


- https://pearson.com
- **Teacher made worksheet**