Study Guideline- Grade 8

Written part: (25 marks)

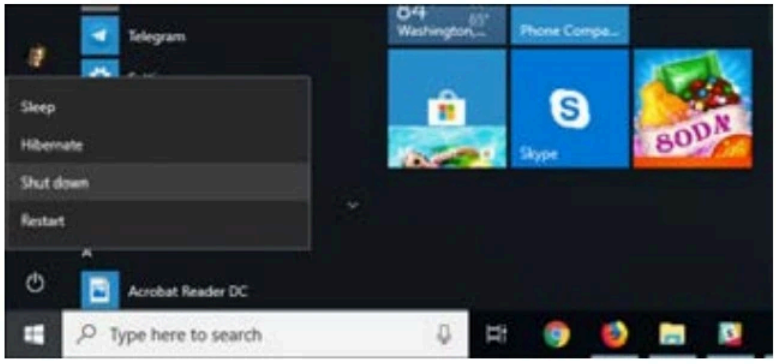
1. Basic computer operations (input, output, process, storage).
2. General questions about Excel sheet.
3. Arduino parts.

Practical part: (15 marks)

Two questions:

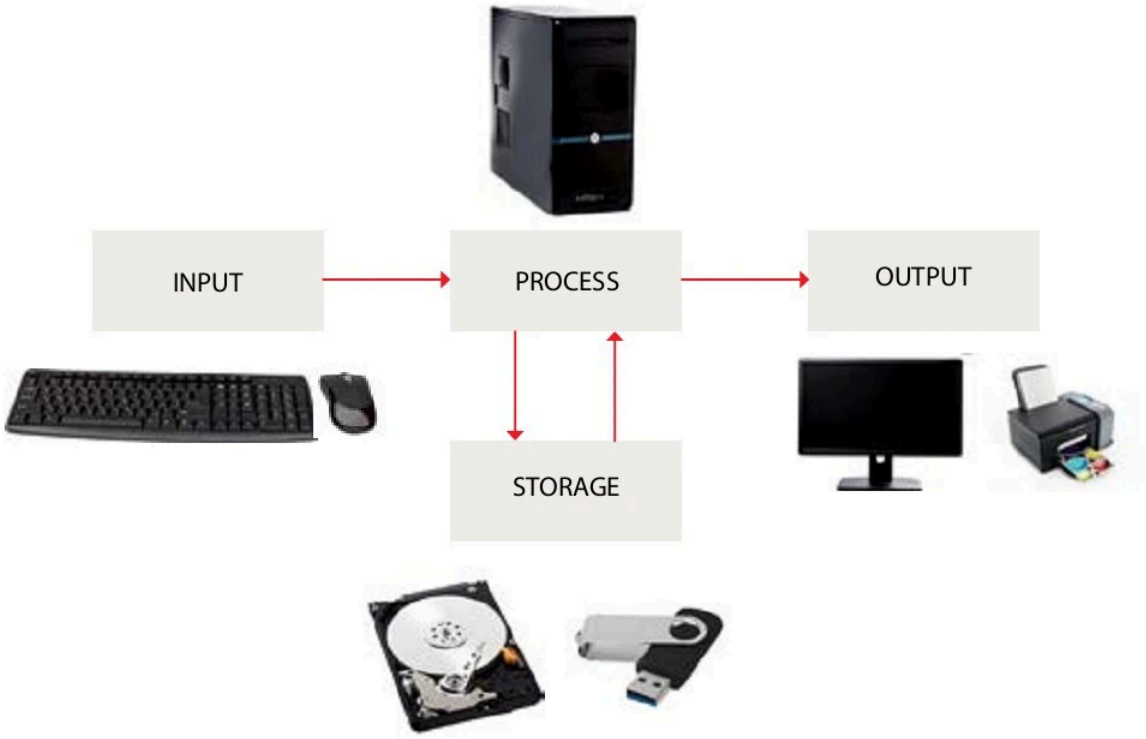
1. Question Writing Arduino code.
2. Question using Excel sheet.

3. Click on the "Shut down" option from the menu



1.5.1 Basic operations of a computer

The four basic operations of a computer are **INPUT**, **PROCESS**, **OUTPUT** and **STORAGE**.



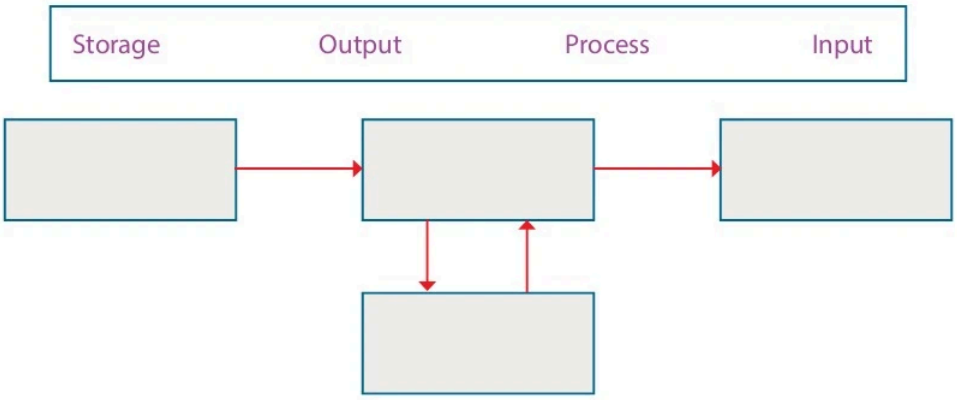
Example of INPUT-PROCESS-OUTPUT-STORAGE

To calculate the sum of 2 numbers.

25 + 19 = 44			
Input	**Process**	**Output**	**Storage**
25, 19	+	44	Save the result (44)

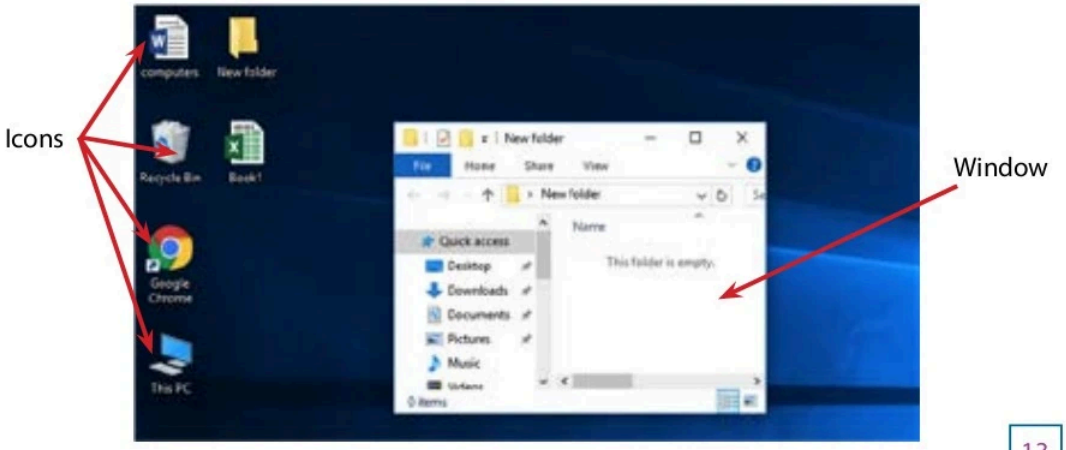
Quick Test 6

1. Label the diagram below with the following words.



1.5.2 Exploring the desktop

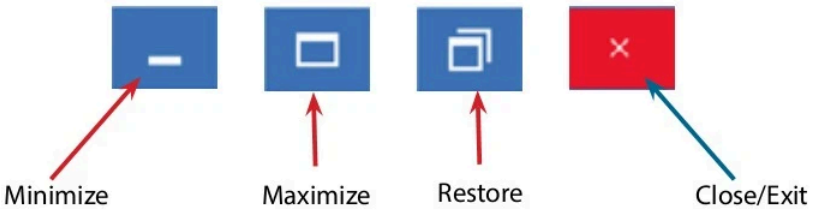
A desktop is the first window that appears when the computer is switched on. It displays icons and other windows.



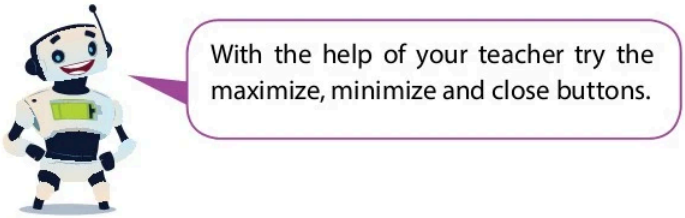
Windows Start Menu

When the Start Menu is clicked, a list of programs installed on the computer is displayed, as shown below.

The Minimize/ Maximize / Close buttons



Minimize Button	This button hides the application currently appearing on the screen to the taskbar.
Maximize/Restore Button	This button increases the size of a window to fill the whole screen or window. Clicking it again restores the window.
Close/Exit Button	This button closes the window / program.



Quick Test 8

1. Match the following:

Hardware	Computer programs.
Internal hardware	Parts connected to the system unit from outside.
Software	All the parts of the computer that can be touched.
External hardware	Parts found inside the system unit.

2. Fill in the blanks with the following words:

Internal	keyboard	hardware	external	software	MS Paint

(a) _____ is an example of hardware.

(b) _____ hardware is found outside the system unit.

(c) _____ hardware is found inside the system unit.

(d) _____ is an example of software.

(e) The computer needs both _____ and _____ to function properly.

3. Read the following sentences carefully and state whether they are True or False:

(a) The mouse can be touched, therefore, it is a piece of hardware.

(b) A computer game is an example of hardware.

(c) A computer game is an example of software.

(d) Internal hardware is found outside the system unit.

(e) Computer programs are called software.

UNIT 4 Spreadsheet

Learning Objectives

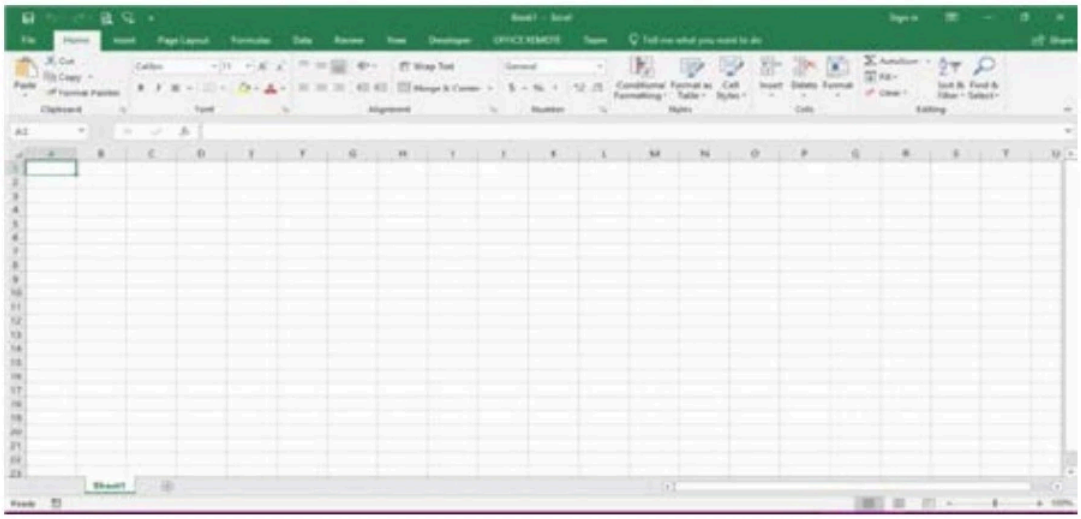
By the end of Unit 4, learners should be able to:

- Enter text and numbers into appropriate cells
- Perform simple calculations with a spreadsheet software
- Present data in the form of charts

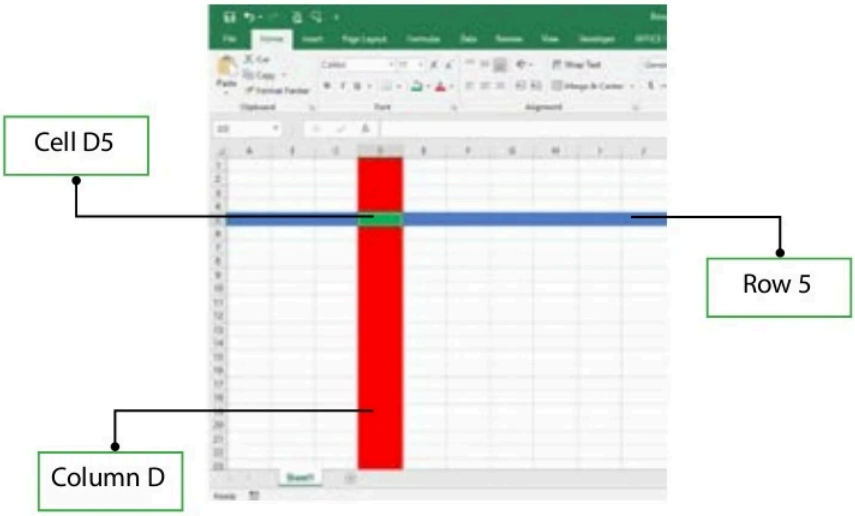
Microsoft Excel is an example of a spreadsheet software.

4.1 Spreadsheet

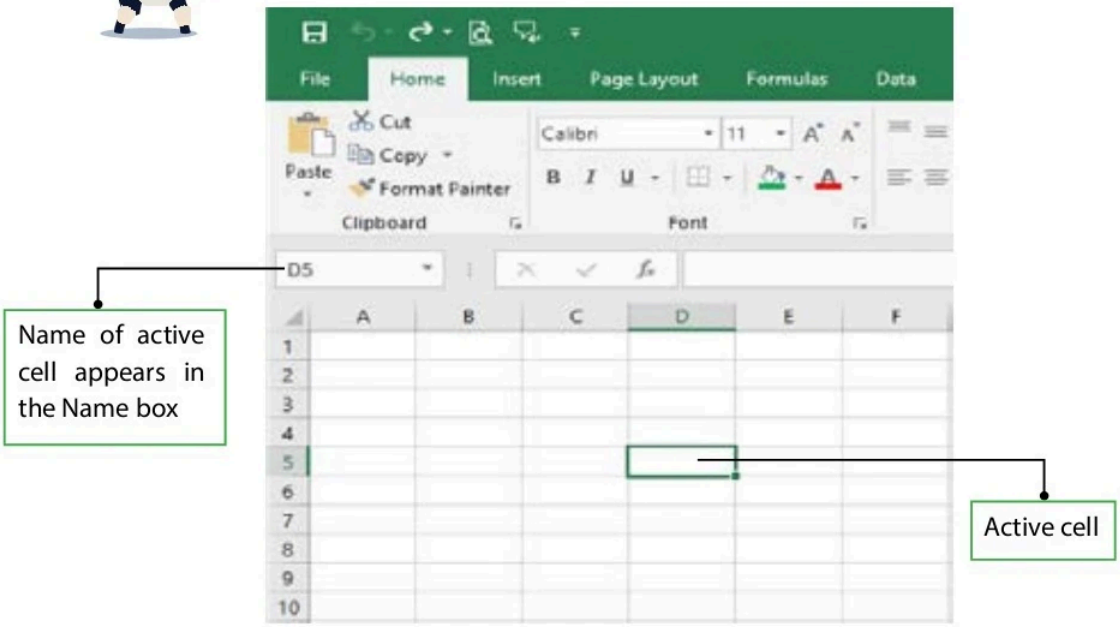
A spreadsheet is a computer program that displays a grid made up of rows and columns.



Columns are identified by letters (A, B, C, D….) and rows by numbers (1,2,3,4…).
A cell is the intersection between a row and a column.
It has an address made up of a column letter and a row number.
For example, A1, C3, F7 ….
The picture below shows a Microsoft Excel worksheet.



An active cell is the cell that is currently selected.
It has a thick border.
Only one cell can be active at a time.

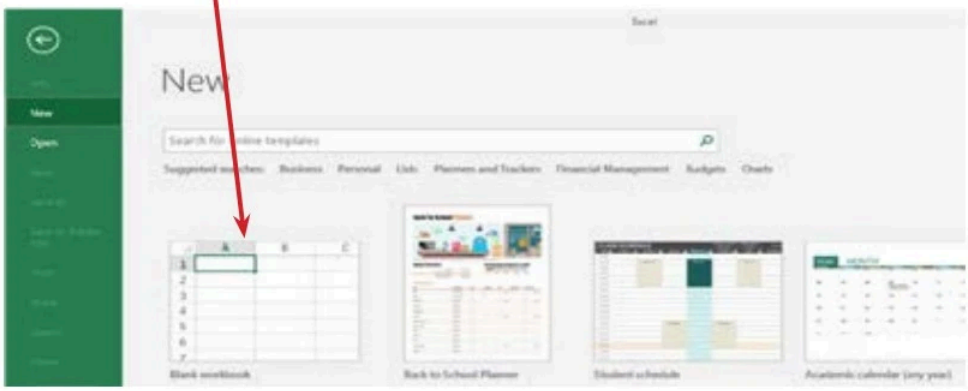


ACTIVITY 1: ENTERING TEXT AND NUMBERS

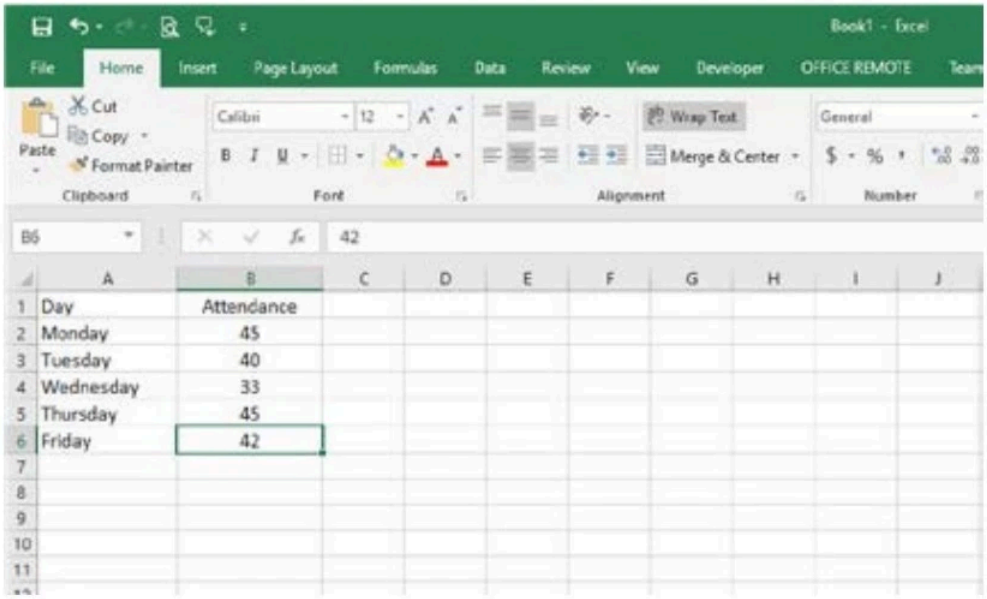
1. Click on the 

icon to start Microsoft Excel

2. Click on "**Blank Worksheet**" to open a new worksheet



3. Enter the following data in the worksheet as shown below:



4.2 Using formulas to perform simple calculations in a spreadsheet

Formulas are used to perform calculations in a spreadsheet.
A formula always starts with an equal to sign (=).
It may contain any mathematical symbols.

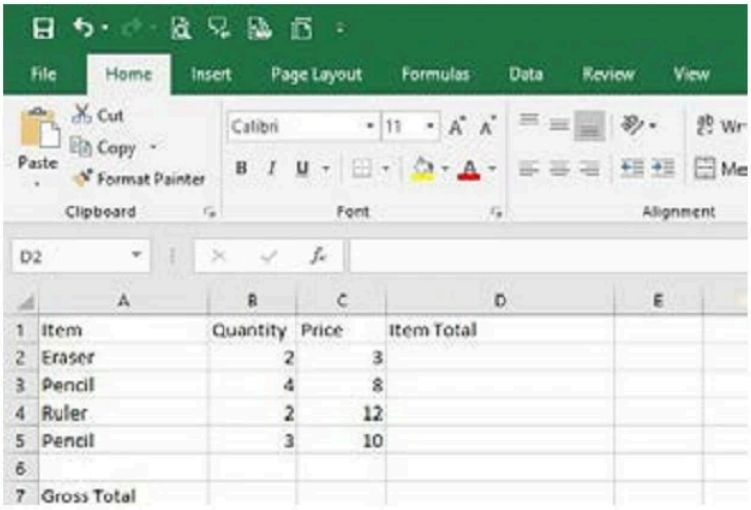
For example:

= A1+B1
= C2-B2
= D7*F2
= G9/C1

ACTIVITY 2: USING FORMULAS TO PERFORM CALCULATIONS

Shopping List

Setup a spreadsheet as shown below:



	A	B	C	D	E
1	Item	Quantity	Price	Item Total	
2	Eraser	2	3		
3	Pencil	4	8		
4	Ruler	2	12		
5	Pencil	3	10		
6					
7	Gross Total				

To calculate the Item total for Rubber.

- In cell D2 type the formula = B2*C2
- Press enter to see the result

To calculate the Item total for Pencil.

- In cell D3 Type the formula = B3*C3
- Press enter to see the result

Type the formula to calculate Item Total for Ruler and Pencil.

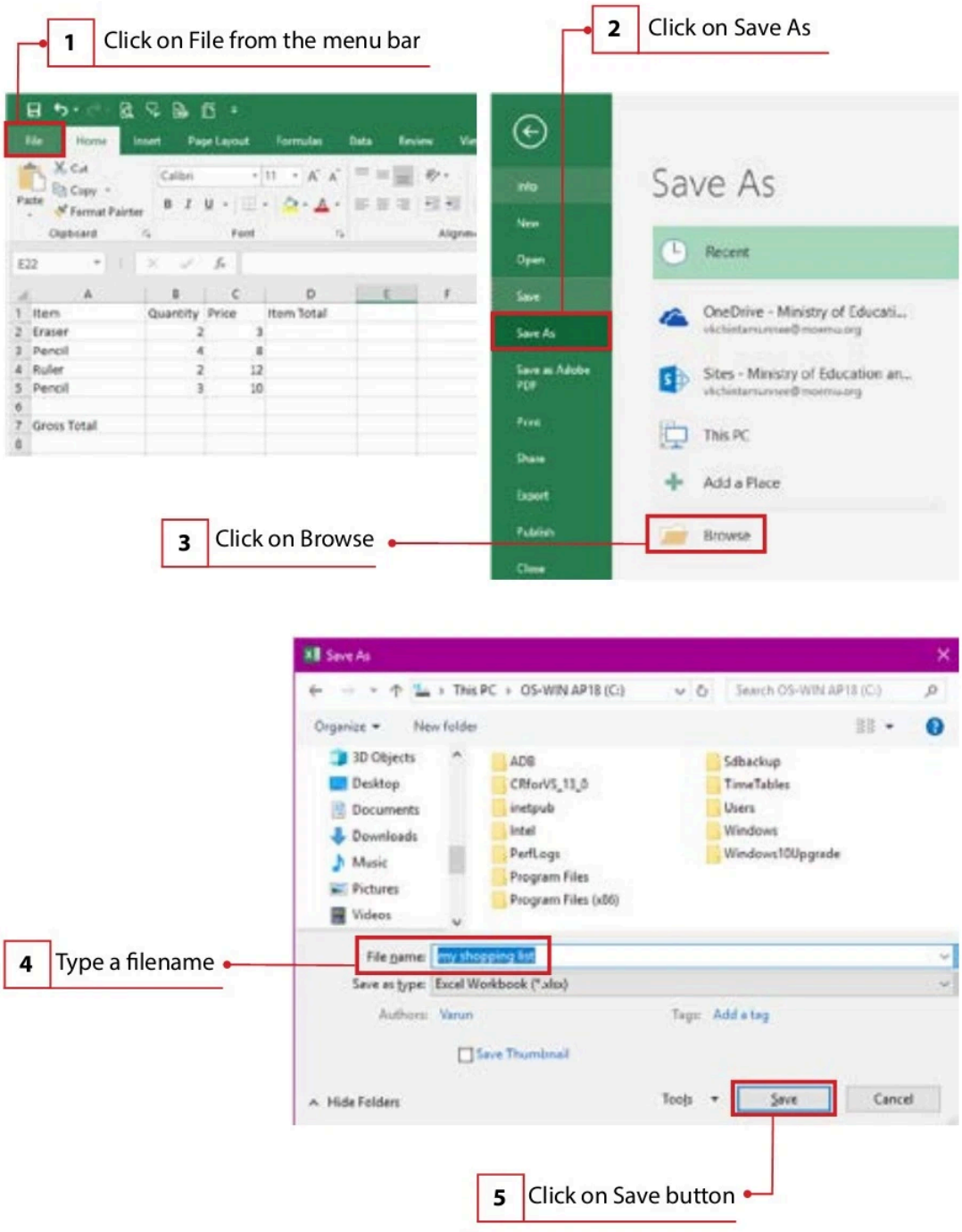
The Gross Total will be displayed in Cell D7.

To calculate the Gross Total, we must add the Item totals for Rubber, Pencil, Ruler and Pen.

What is the formula to calculate the Gross Total? _____

Saving the spreadsheet

Follow the following steps to save the spreadsheet.



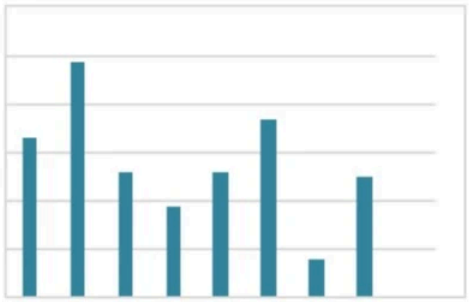
4.3 Present data in the form of charts

In this part of the chapter you will learn how to use Excel 2016 to create charts

A **chart** is a visual display of information.

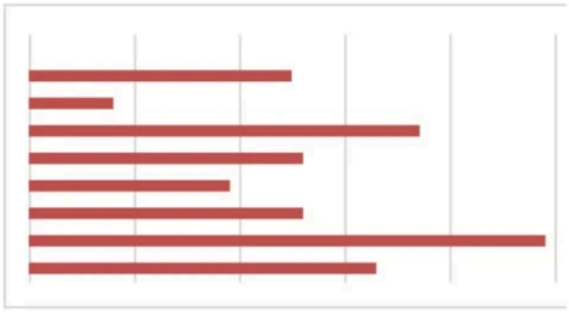
Types of Charts

Column chart



Information is shown as columns (vertical bars).

Bar chart



Information is shown as horizontal Bars.

Pie chart

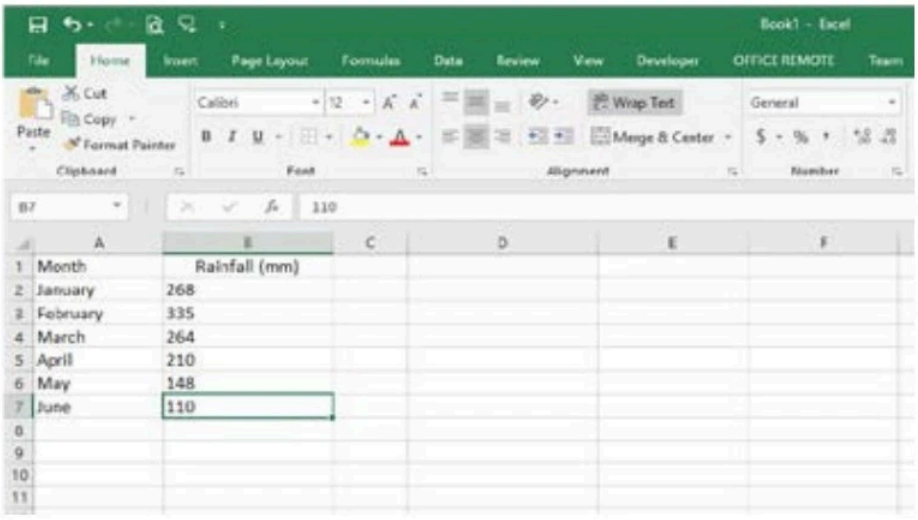
Information is shown as slices of a Pie.

Line chart

A line chart displays information as data points connected by straight lines.

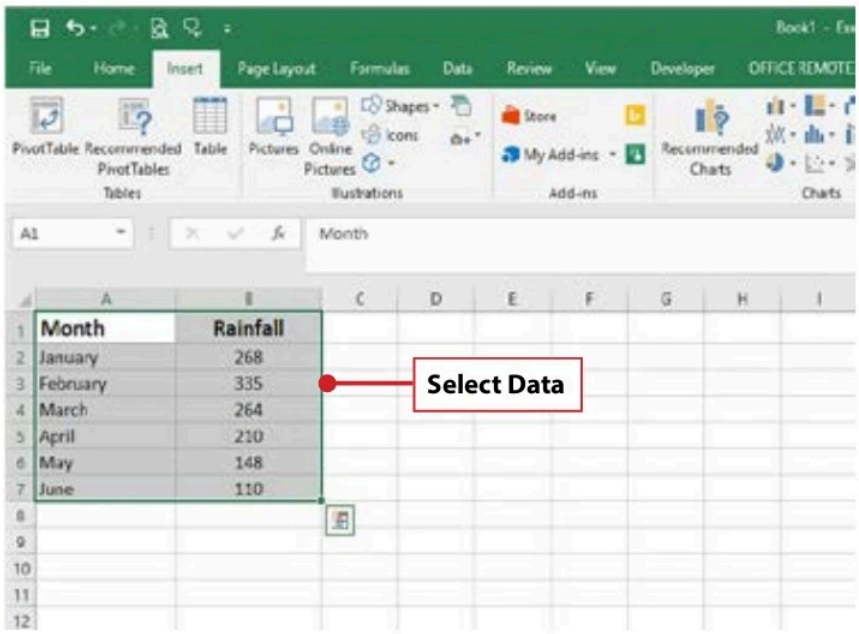
ACTIVITY 3: CREATING CHARTS IN EXCEL

1. Start Excel and open a new worksheet.
2. Type the following rainfall data.

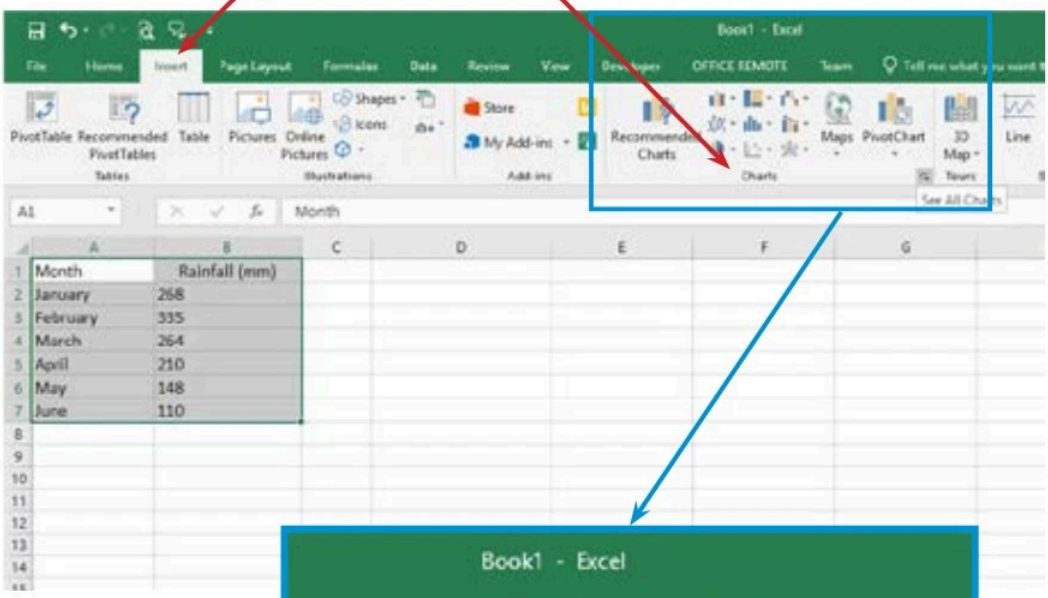


The table shows the amount of rainfall over Mauritius for the first 6 months of 2018.

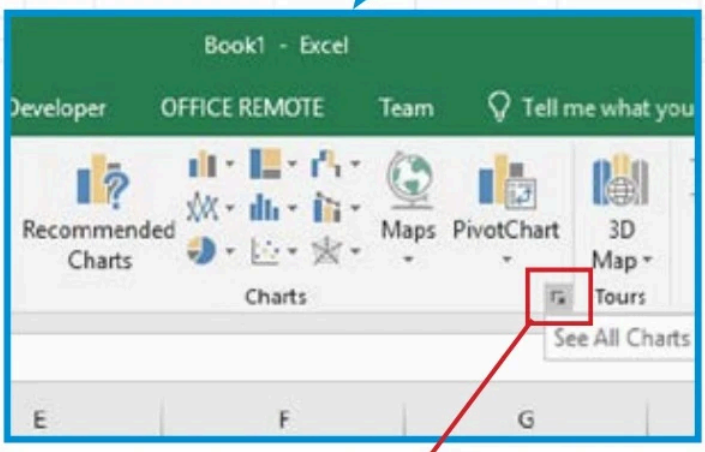
3. Select the data in the cell range A1: B7

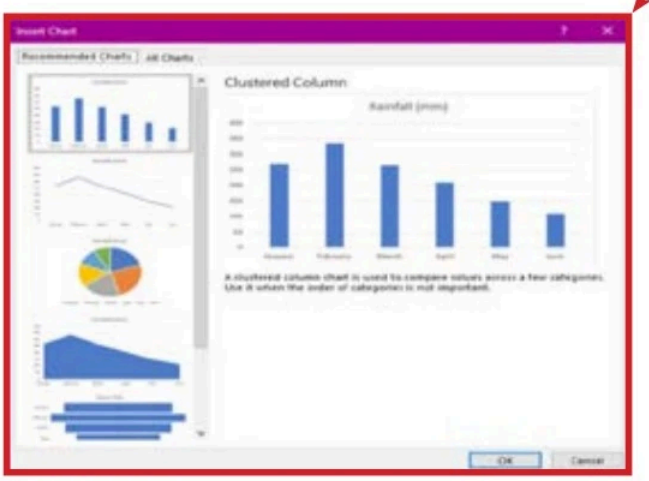


4. Click on the **Insert tab** and observe the **Charts** group.



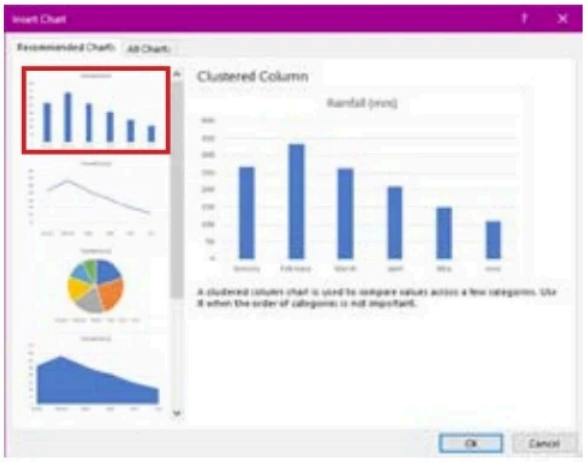
Charts Group Enlarged



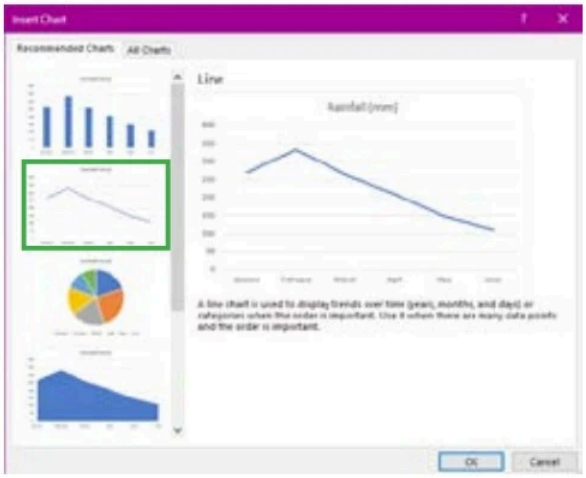


Insert Chart Window

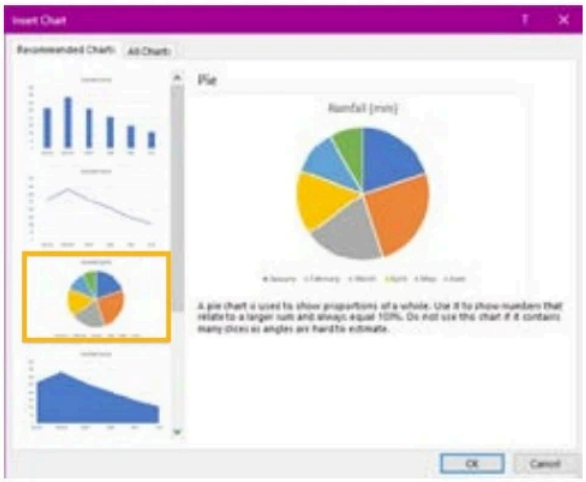
The Insert Chart Window allows us to choose which type of chart we want to insert. We can choose from:



Column Chart

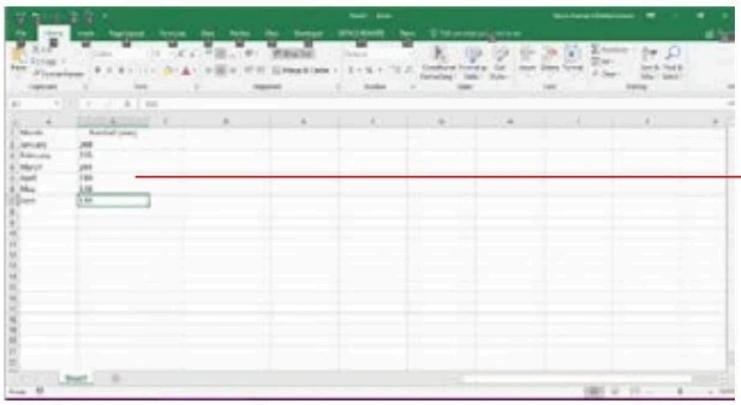


Line Chart

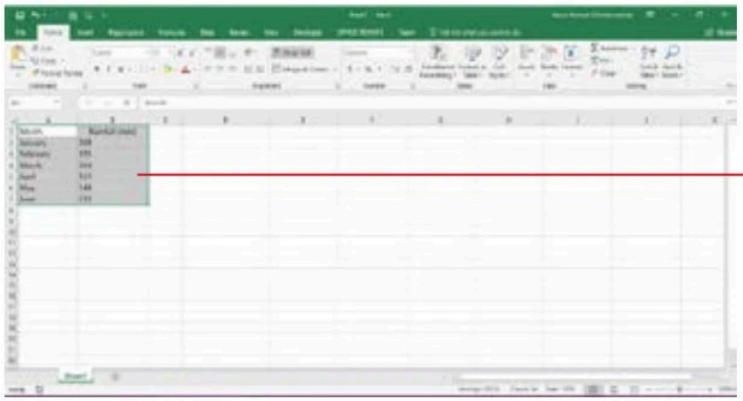


Pie Chart

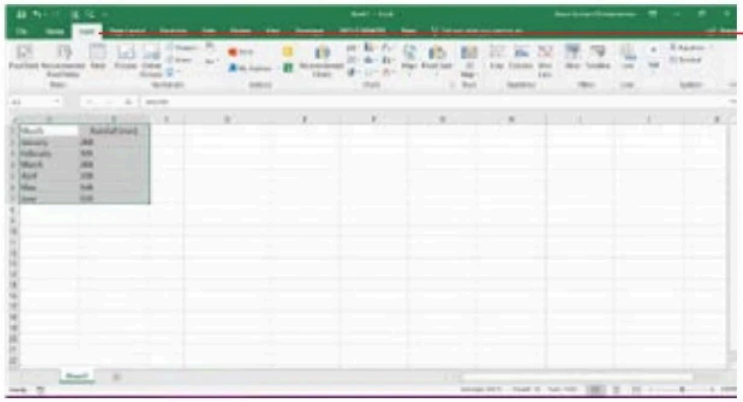
Steps to create a chart



1 Type your data

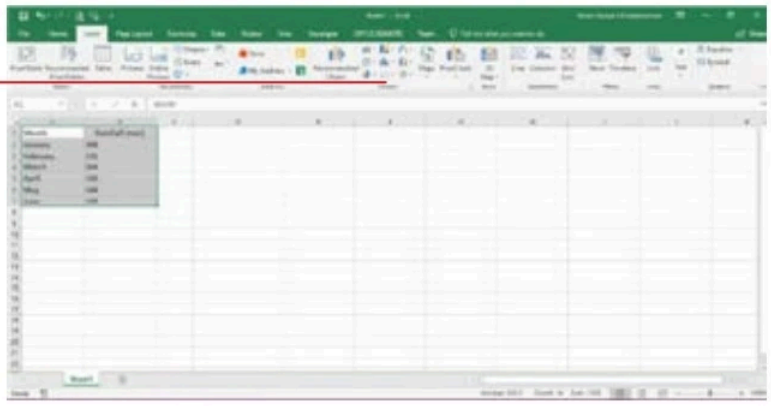


2 Select data



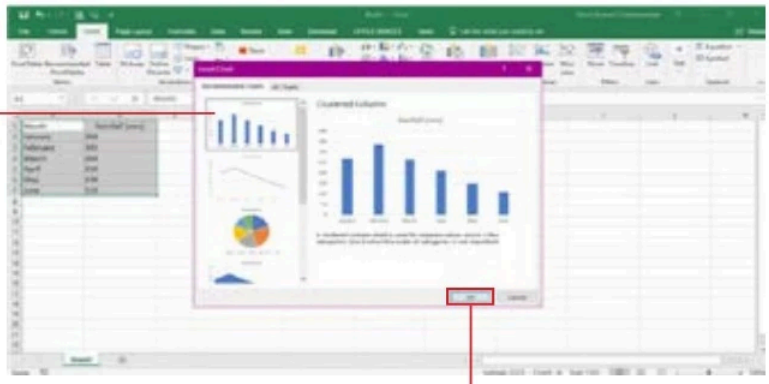
3 Click on Insert Tab

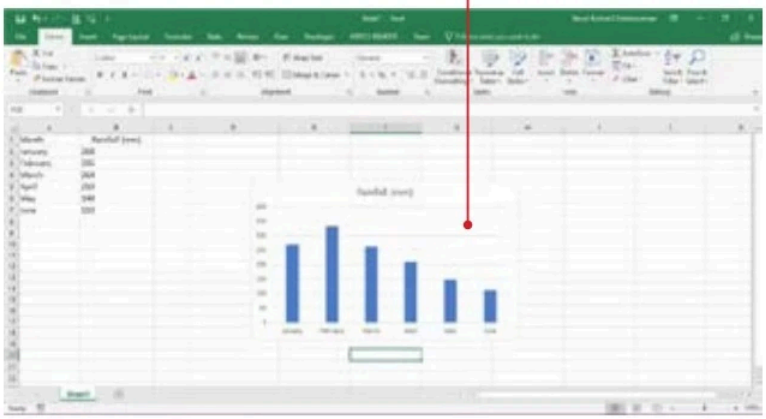
4 Click on See All Charts

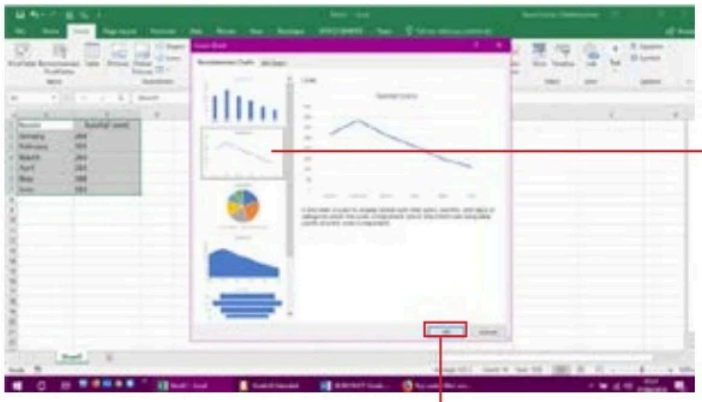


Click on Column and OK to insert a column chart

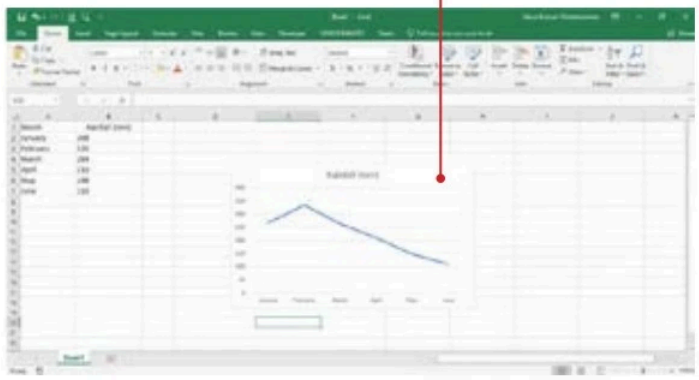
5

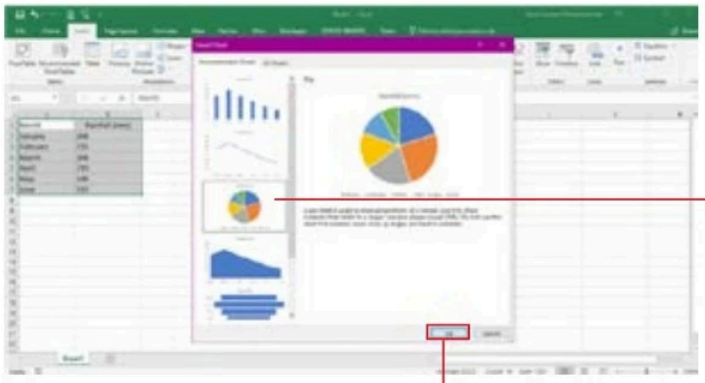




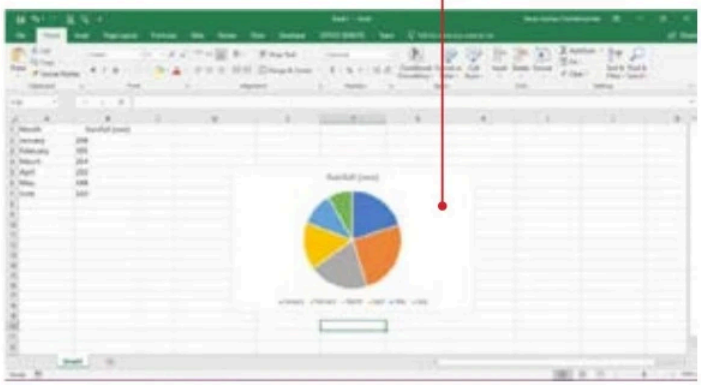


6 Click on Line and OK to insert a Line chart



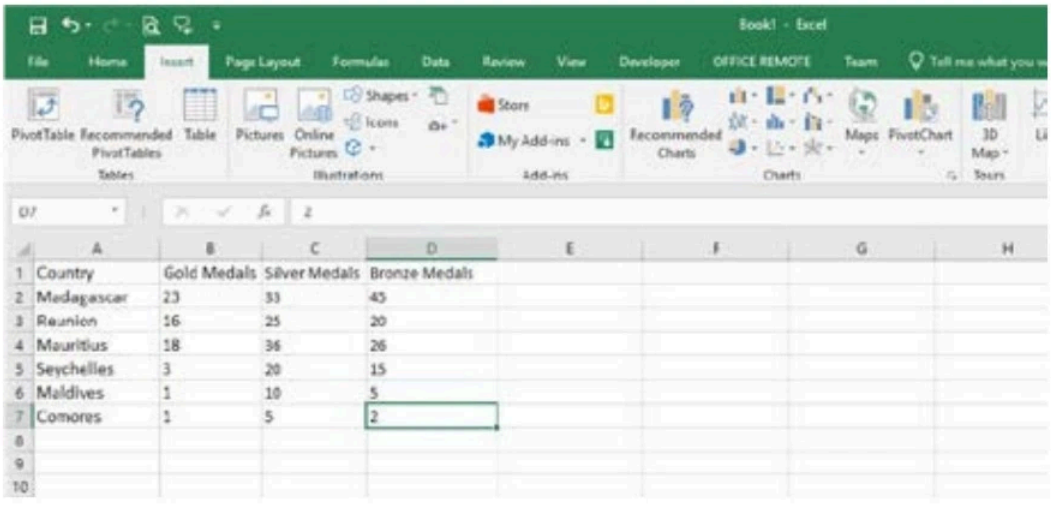


7 Click on Pie and OK to insert a Pie chart



ACTIVITY 4:

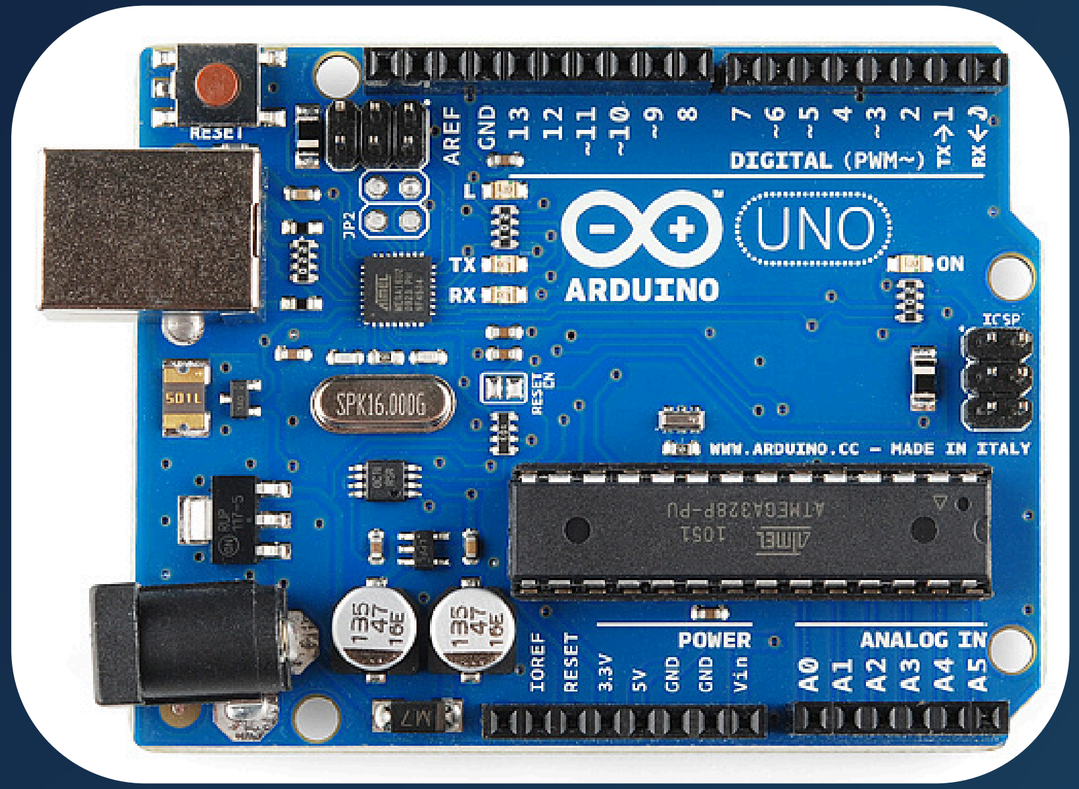
Setup a spreadsheet with the following data.



	A	B	C	D
1	Country	Gold Medals	Silver Medals	Bronze Medals
2	Madagascar	23	33	45
3	Reunion	16	25	20
4	Mauritius	18	36	26
5	Seychelles	3	20	15
6	Maldives	1	10	5
7	Comores	1	5	2

Use the data to insert a Column chart in the spreadsheet.

Arduino



Rose Barakat

ABOUT

Arduino as an open-source electronics platform that consists of both hardware (the board) and software (the IDE)

Purpose:

To create interactive projects.

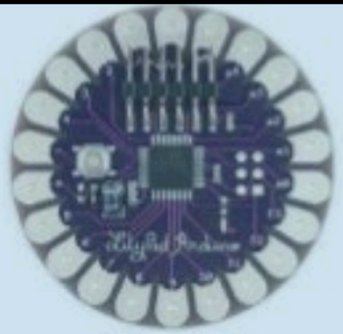
APPLICATIONS OF ARDUINO

- Robots
- Weather stations
- Smart home devices

ARDUINO BOARDS

UNO

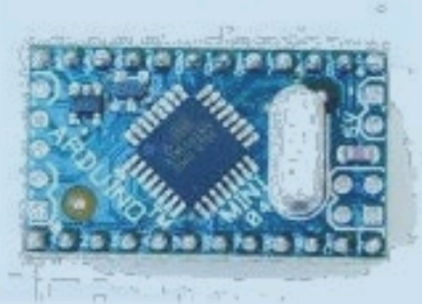
Mega



LilyPad

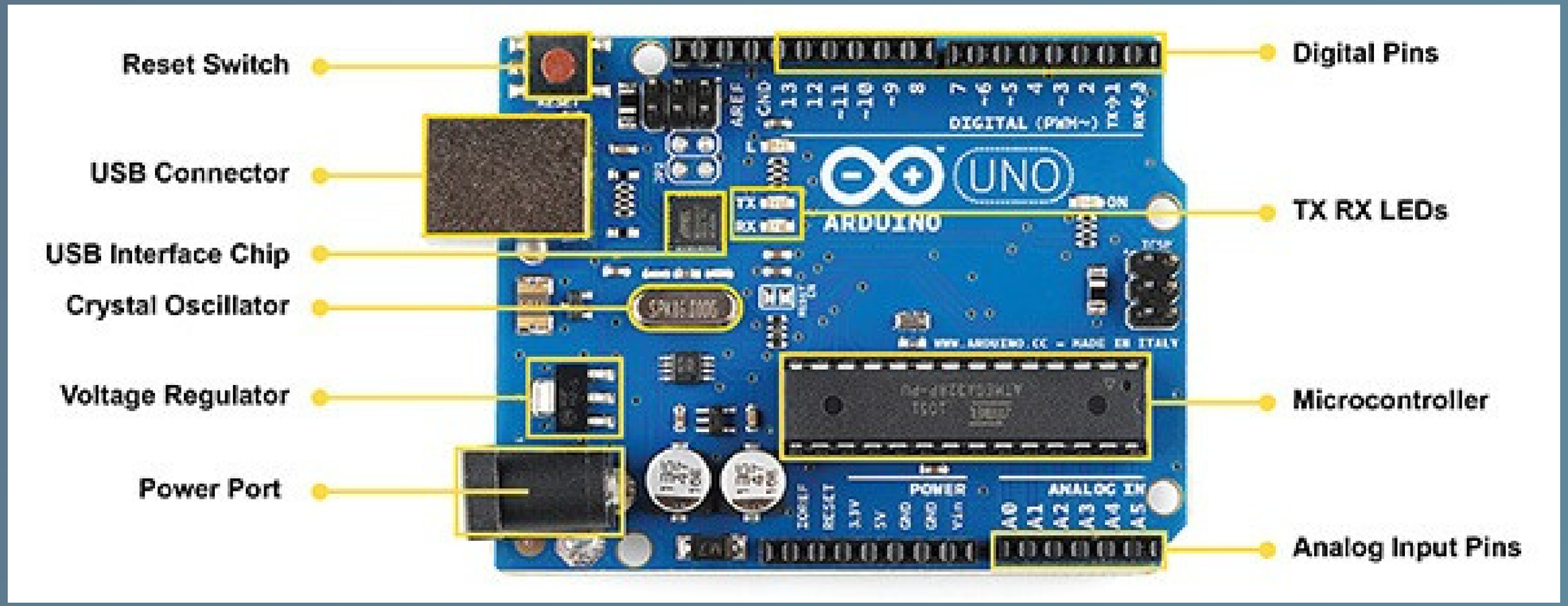
Arduino BT

Arduino Nano



Arduino Mini

Types of Arduino Boards


Reset Switch
USB Connector
USB Interface Chip
Crystal Oscillator
Voltage Regulator
Power Port
Digital Pins
TX RX LEDs
Microcontroller
Analog Input Pins
UNO
ARDUINO
DIGITAL (PWM~)
POWER
ANALOG IN

Here’s a recap of the uses of the main parts on an Arduino board:

1. Microcontroller

- Function: The brain of the Arduino that executes code and controls the board's functions.

2. Digital Pins

- Function: Used to read or send digital signals (0 or 1).
- Uses:
  - Turning LEDs on/off.
  - Reading the state of buttons and switches.
  - Controlling motors.

Here’s a recap of the uses of the main parts on an Arduino board:

3. Analog Pins

- Function: Used to read varying voltage levels, which represent continuous signals.
- Uses:
  - Reading sensor values (e.g., temperature, light, potentiometers).
  - Input from analog sensors.

4. Power Supply

- Function: Provides power to the board and connected components.
- Includes:
  - USB connection (for powering via computer).
  - Barrel jack (for external power supply).
  - Voltage regulator (to maintain consistent voltage).

Here’s a recap of the uses of the main parts on an Arduino board:

5. Ground Pins (GND)

- Function: Connects to the ground of the circuit.
- Uses: Completes the circuit by providing a return path for electric current.

6. LED Indicator

- Function: Shows the status of the board.
- Uses:
  - Typically, there’s a built-in LED (often labeled "L") that can be programmed to blink, indicating that the board is functioning.
-

7. Reset Button

- Function: Resets the microcontroller.
- Uses:
  - Restarting the program without needing to unplug the board.

Here’s a recap of the uses of the main parts on an Arduino board:

8. **USB Port**
   - Function: Used for programming the board and powering it from a computer.
   - Uses:
     - Uploading code from the Arduino IDE.
     - Providing power during development.

9. **Voltage Regulator**
   - Function: Ensures that the board receives a consistent voltage level.
   - Uses:
     - Converts the input voltage (from the USB or external power supply) to the required levels for the microcontroller.
   -

10. **Crystal Oscillator**
    - Function: Provides a clock signal for the microcontroller.
    - Uses:
      - Keeps the timing for operations, ensuring that processes happen at the right intervals.

SUMMARY

Each component on the Arduino board works together to allow users to create a wide variety of electronic projects, from simple LED blinking to complex robotics. Understanding these parts is essential for effective programming and building with Arduino!

1. The setup() Function

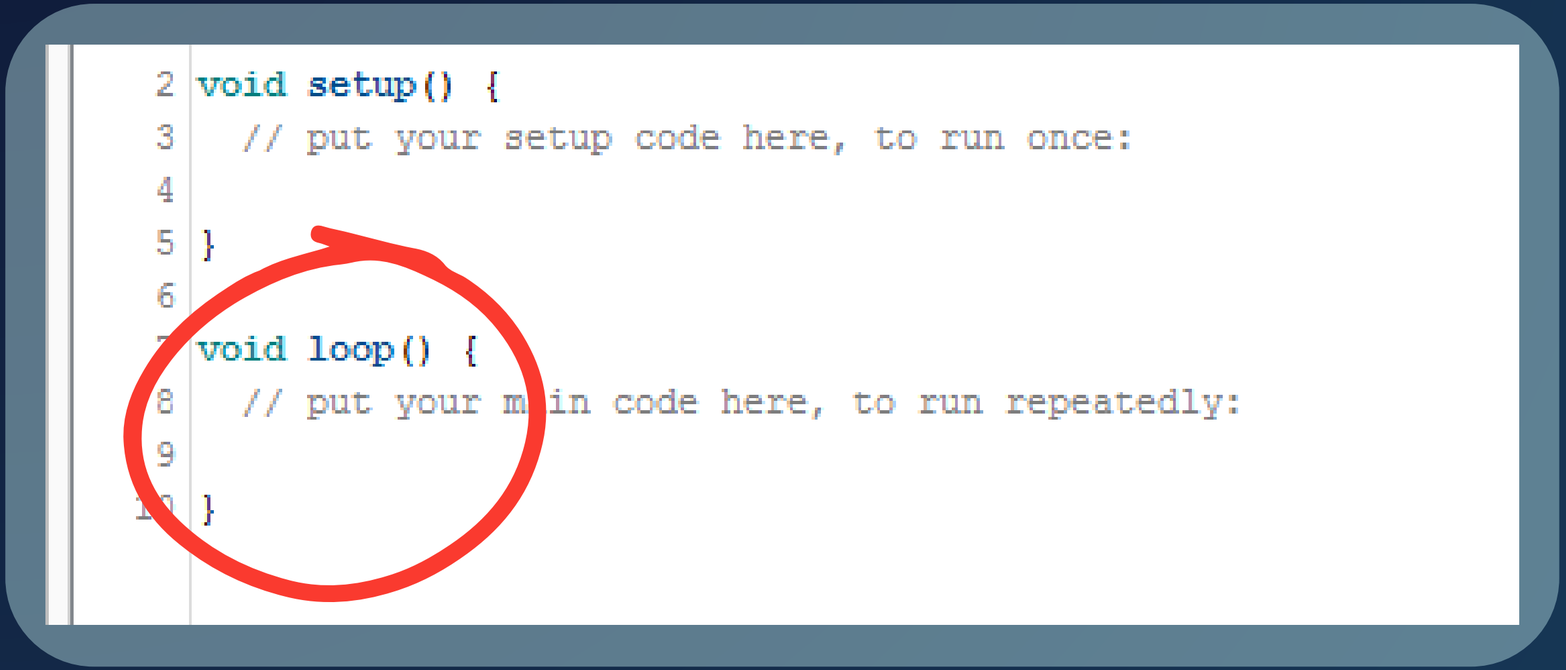
```
2  void setup() {
3    // put your setup code here, to run once:
4
5  }
6
7  void loop() {
8    // put your main code here, to run repeatedly:
9
10 }
```

- The setup() function runs once when the Arduino is turned on or reset.
- It is used to set up everything you need, like setting pins as inputs or outputs and starting communication (e.g., with the serial monitor).

Why is it important?

- This function prepares everything for the program to work properly.

1. The loop() Function



- The loop() function runs over and over as long as the Arduino is powered.
- It is where most of the actions happen — this function keeps running your code, like reading sensors or turning on/off devices.

Why is it important?

- This function allows your Arduino to repeat tasks continuously without stopping.

Example:

```
void setup() {
 pinMode(13, OUTPUT);  // Set pin 13 as an output pin
}

void loop() {
 digitalWrite(13, HIGH);  // Turn the LED on
 delay(1000);             // Wait for 1 second
 digitalWrite(13, LOW);   // Turn the LED off
 delay(1000);             // Wait for 1 second
}
```

What is pinMode?

- **pinMode() is a function used to set a pin on the Arduino board as either an input or an output.**
- **Input means the Arduino will read data from that pin (e.g., from a sensor or a button).**
- **Output means the Arduino will send data to that pin (e.g., to turn on an LED or control a motor).**

Synatex:

pinMode(pin, mode);

- pin: The pin number (e.g., 13, A0, etc.).
- mode: The mode you want to set for the pin:
- INPUT: For reading data.
- OUTPUT: For sending data.

What is Digital vs Analog Pins

Digital Pins: These pins can be set as either input or output and handle on/off signals (HIGH or LOW).

- Example: Pins 0 to 13 on most Arduino boards.

Analog Pins: These pins can read a range of values, from 0 to 1023, typically from sensors that give varying voltage (e.g., a temperature sensor).

- Example: Pins A0 to A5 on most Arduino boards.

digitalWrite()

- **Purpose: This function is used to send a HIGH or LOW signal to a digital pin (turn it on or off).**

```
digitalWrite(13, HIGH); // Turn on the LED connected to pin 13
digitalWrite(13, LOW); // Turn off the LED
```

digitalRead()

Purpose: This function reads the state of a digital pin (either HIGH or LOW).

```
int state = digitalRead(pin);
```