Bharathidasan University Centre for Differently Abled Person Tiruchirappalli Tamil Nadu	
Programme Name	Bachelor of Computer Applications (BCA)
Course Name	Computer Fundamentals and Internet Applications
Course code	20UCA1CC1
SEM	I
Unit	II
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ALGORITHM & FLOWCHART

Data Representation

- **Binary System**: Computers use binary (0s and 1s) to represent and process data.
- **Bits and Bytes**:
  - 1 bit = a single binary digit (0 or 1).
  - 1 byte = 8 bits (a basic unit of data storage).

Algorithm and Flowchart are two essential tools in computer science and problem-solving.

Unit - II – Algorithm and Flow Chart

Algorithm

- An algorithm is a plan
- It is a set of step-by-step instructions to resolve a problem

Characteristics of Algorithm

- It receives an input
- It works on a set of inputs
- The steps must be precisely defined
- The result of each step should depend on the results of previous steps
- It stops after a finite number of instructions
- It produces the desired output
- Example: Write algorithm to find the greater number between two numbers

Step1: Start

Step2: Read/input A and B

Step3: If A greater than B then C=A

Step4: if B greater than A then C=B Step5: Print C

Step6: End

Representation of Algorithm

- Two main ways that algorithms can be represented
  - Pseudocode
    - Pseudocode is not a programming language
    - It is a simple way of describing a set of instructions
    - That does not have to use specific syntax
  - Flowcharts
    - The step by step solution of a problem in a picture form
    - Helps to understand program more easily
    - Two types
      - System Flowchart
      - Program Flowchart

Algorithm

An **algorithm** is a step-by-step procedure or formula for solving a problem. It's a set of instructions that can be followed to accomplish a task.

Characteristics of an Algorithm

1. **Finiteness**: It must have a finite number of steps.
2. **Definiteness**: Each step must be clear and unambiguous.
3. **Input**: Takes zero or more inputs.
4. **Output**: Produces at least one output.
5. **Effectiveness**: Steps must be simple and basic enough to execute.

Example of an Algorithm

Problem: Find the sum of two numbers.

```
Step 1: Start
Step 2: Input two numbers (A and B)
Step 3: Add A and B, store in a variable
(SUM)
Step 4: Output SUM

Step 5: Stop
```

Flowchart

A **flowchart** is a diagrammatic representation of an algorithm. It uses various symbols to represent the steps and flow of the process.

Common Flowchart Symbols

1.Oval (Ellipse): Represents the start or end of a process.

2.Rectangle: Represents a process or instruction.

3.Diamond: Represents a decision point (yes/no or true/false).

4.Arrow: Indicates the flow of the process.

Example of a Flowchart

Problem: Find the sum of two numbers.

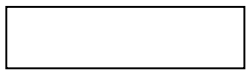
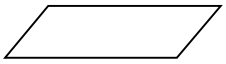
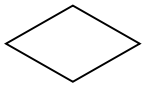
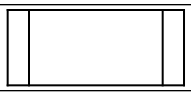
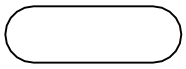
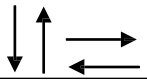
```
(START) --> [Input A, B] --> [SUM = A + B]
--> [Output SUM] --> (STOP)
```

Visual Representation:

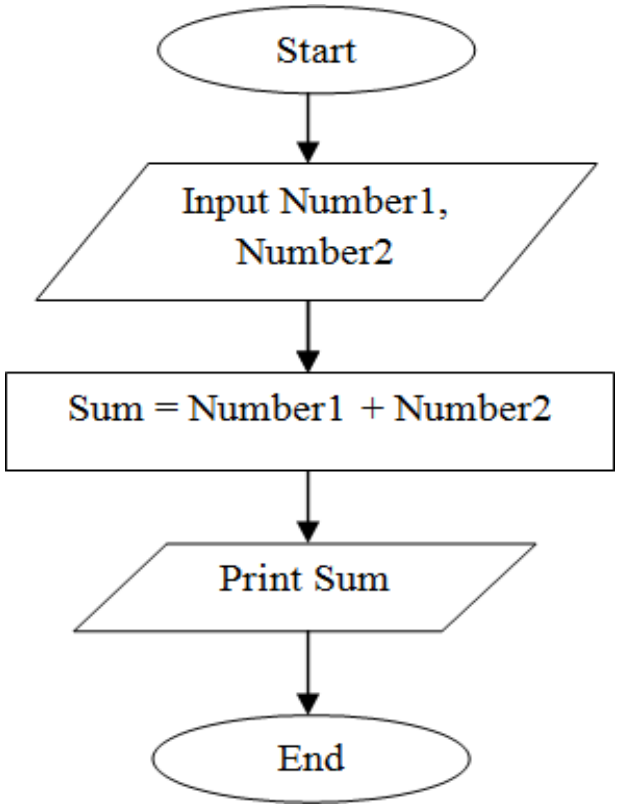
```
    OVAL: Start
        ↓
RECTANGLE: Input A, B
        ↓
RECTANGLE: SUM = A + B
        ↓
RECTANGLE: Output SUM
        ↓
    OVAL: Stop
```

Flowchart Symbols

- There are 6 basic symbols commonly used

Symbol	Name	Function
	Process	Internal Operation
	Input / Output	Input / Output Operation
	Decision	Ask a Question
	Connector	Allows to draw without reverse flow
	Predefined Process	Invoke Subroutine
	Terminal	Starting or Ending
	Flow Lines	Direction of Flow

Example:



Levels of Flowchart

- Macro Level or Workflow diagrams
- Mini Level or Swim Lane Flowchart
- Micro level or Process Flowchart

Rules for Flowchart

- All boxes of the flowchart are connected with Arrows
- Symbols have an entry point on the top
- The exit point is on the bottom except for the Decision symbol
- The Decision symbol has two exit points
- Connectors are used to connect breaks in the flowchart
- Subroutines have their own and independent flowcharts

Advantages of Flowchart

- Communication
- Effective analysis
- Documentation of Program/System
- Efficient Program Maintenance
- Coding of the Program

Limitations of Flowchart

- It cannot replace all types of logic
- It takes long time to represent
- It is not suitable for big problem

Types of Program errors

- Syntax errors
- Runtime errors
- Logic errors

Syntax error

- These are errors where the compiler finds something wrong with your program
- Syntax errors are the easiest to find and correct
- The compiler will tell you where it got into trouble, and its best guess as to what you did wrong.

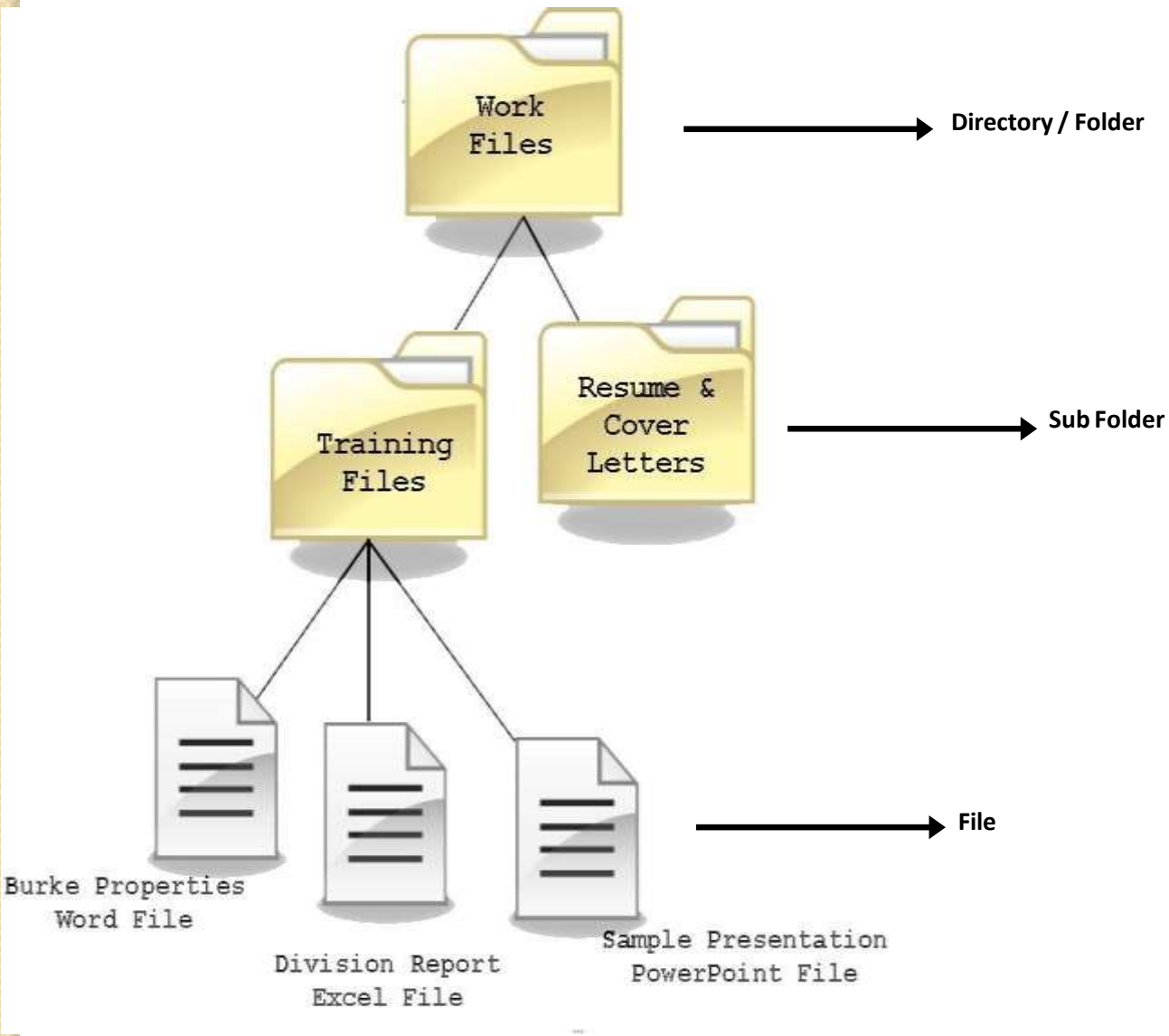
Logic error

- A logic error, is when your program compiles and runs, but does the wrong thing

FILES & FOLDERS

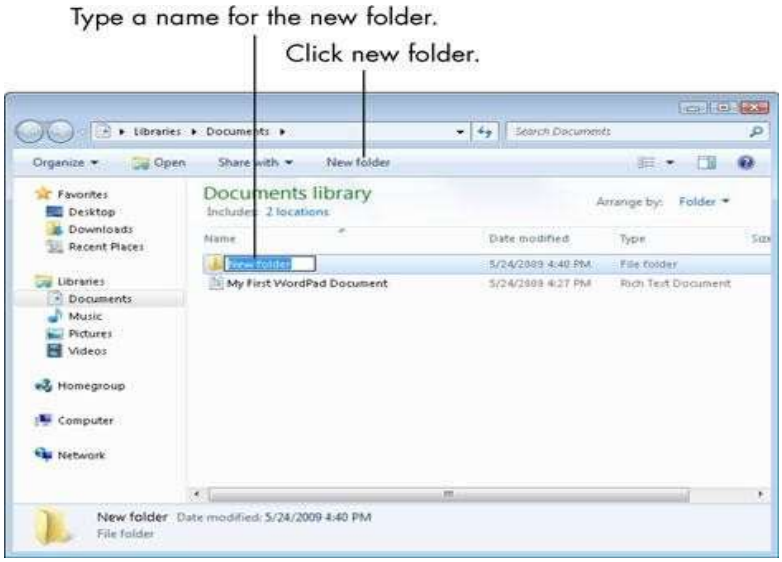
Folder and File System

- Folders are areas on a computer storage drive
- Used to save and organize files
- It can also contain other folders
- Also called as Directory



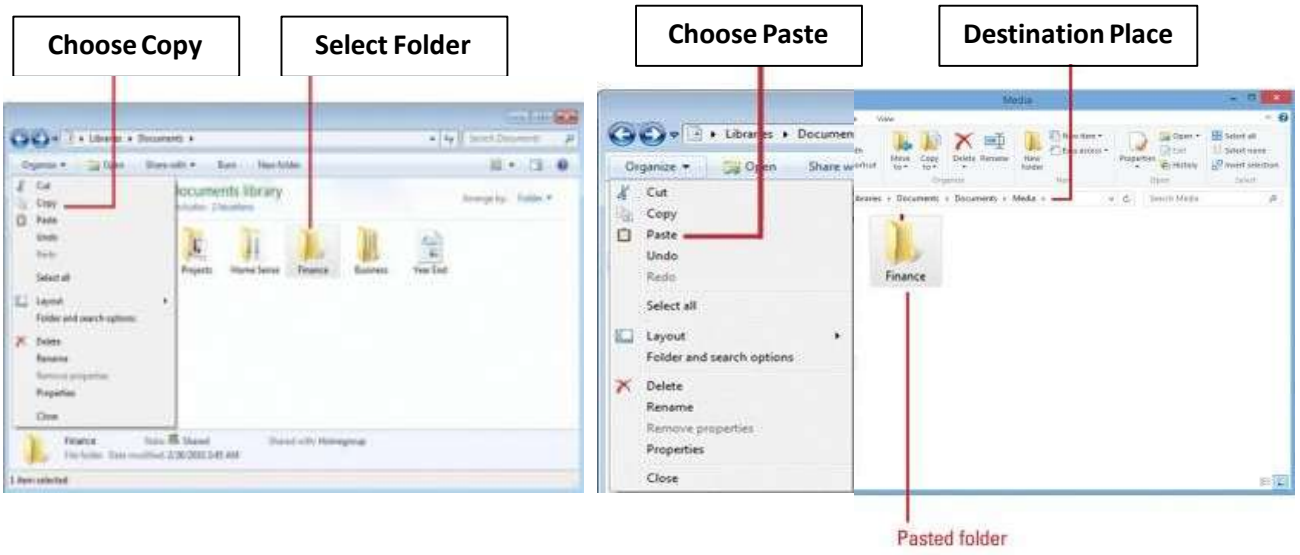
Create a New Folder

- There is a New folder button near the top of the window



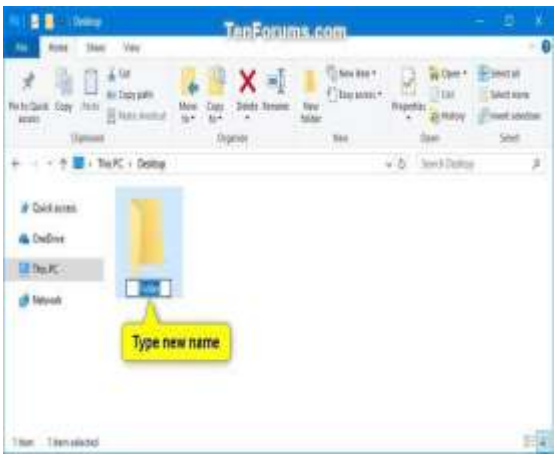
Copy Folder

- Select the folder
- Press Ctrl+C or choose Copy from the drop-down menu
- Open the destination place
  Press Ctrl+V or choose Paste from the drop-down menu



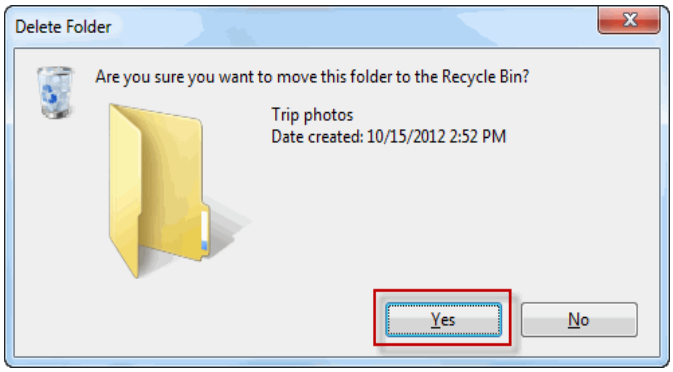
Rename a Folder

- Changing the name



Delete a Folder

- Changing the name



Recycle bin

- It is a Folder
- The deleted files are temporarily stored
- It allows users to recover deleted files

Recycle bin with deleted files

Empty Recycle bin

Booting Process

- booting is the process of starting a computer
- It can be initiated by hardware such as a button press, or by a software command
- After it is switched on, a computer's central processing unit (CPU) has no software in its main memory
- So some process must load software into memory before it can be executed
- This may be done by hardware or firmware in the CPU

Basic DOS Commands

- Dir - Displays information about files and directories
- Md - Create a new directory
- Cd - Switch directories
- Copy - Copy one or more files to an alternate location
- Del - Delete files from a computer
- Edit - View, create, or modify any text file
- Move - Transfer files or directories from one directory to another
- Ren - Change the name of files and directories
- Cls - Clear all the contents on the screen
- Format - Erase information from a computer diskette or fixed drive

Differences Between Algorithm and Flowchart

Aspect	Algorithm	Flowchart
Definition	Step-by-step instructions for solving a problem.	Graphical representation of a process.
Representation	Written in text form.	Uses symbols and arrows.
Complexity	Can be hard to visualize complex problems.	Easy to understand and visualize.
Usage	Used during the planning or coding phase.	Used to explain the process visually.

Thank you