

Algorithms and flowcharts

A typical programming task can be divided into two phases:

- a problem-solving phase which produces an ordered sequence of steps that describes the problem solution. This sequence of steps is called an **algorithm**;
- an **implementation** phase which implements the program in some programming language called **pseudo code**.

A **flowchart** shows the logic of an algorithm. It is a sort of diagram that represents the separate steps of a process in sequential order with a series of boxes of various kinds, connected with **arrows**.

This representation illustrates a solution model to a given problem. Flowcharts are used in analysing, designing, documenting or **managing** a process or program in various fields.

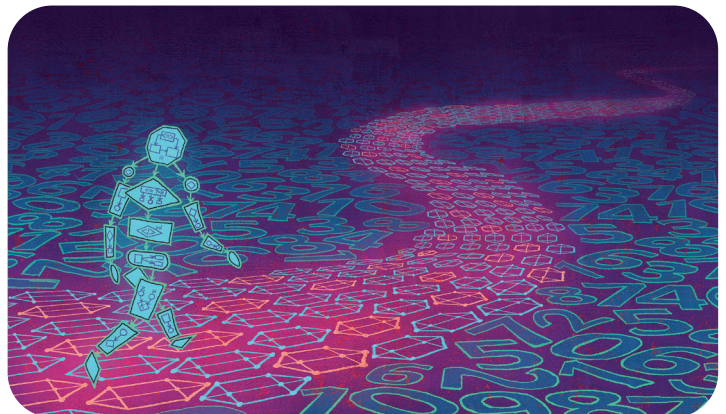
Elements that may be included are: sequences of actions, materials or services entering or leaving the process (inputs and outputs), decisions that must be made, people who are involved, time involved at each step and/or process measurements.

The process described can be anything: a manufacturing process, an administrative or service process, a project plan. It is a generic **tool** that can be adapted for a wide variety of purposes.

A flowchart is used:

- to plan a project;
- to develop understanding of how a process is done;
- to study a process for improvement;
- to communicate to others how a process is done;
- to document a process.

The American National Symbols Institute (ANSI) set standards for flowcharts and their symbols in the 1960s. The International Organizations for Standardization (ISO) adopted the ANSI symbols in 1970. The current standard was revised in 1985. Generally, flowcharts flow from **top** to **bottom** and left to right.












arrow: freccia
bottom: fondo

implementation: applicazione
to manage: gestire

tool: strumento
top: cima

Commonly Used Symbols in Detailed Flowcharts

ANSI/ISO SHAPE	NAME	DESCRIPTION
	Flow line	Shows the program's order of operation.
	Terminal	Beginning or ending of a program or sub-process.
	Process	Set of operations that change value, form, or location of data.
	Decision	Conditional operation determining which of two paths the program will take. The operation is commonly a yes/no question or true/false test.
	Input / Output	Input and output of data, as in entering data or displaying results.
	Annotation	Additional information about a step in the program.
	Predefined Process	Named process which is defined elsewhere.
	On-page Connector	A labelled connector replaces long or confusing lines on a flowchart page.
	Off-page Connector	A labelled connector for use when the target is on another page.

1 Match each word with the correct definition.

1. Diagram	<input type="checkbox"/>	a. Why you do something or why something exists.
2. Algorithm	<input type="checkbox"/>	b. An occasion when something gets better.
3. Process	<input type="checkbox"/>	c. A simple plan that represents a system, often drawn, to explain how it works.
4. Purpose	<input type="checkbox"/>	d. A sign, shape, or object that is used to represent something else.
5. To Plan	<input type="checkbox"/>	e. A series of actions that you take in order to achieve a result.
6. Improvement	<input type="checkbox"/>	f. A pattern or model that is generally accepted.
7. Standard	<input type="checkbox"/>	g. A set of decisions about how to do something in the future.
8. Symbol	<input type="checkbox"/>	h. A sequence of steps that describes the solution to a problem.

2 Complete the sentences.

1. A flowchart represents the different steps of a process with
2. Flowcharts can be used in different fields to
3. The sequence of actions, materials or services entering or leaving the process
4. A flowchart could be adapted to a variety of
5. If you want to improve a process,
6. If you wanted to communicate to others details about the process,
7. The standards for flowcharts and their symbols were
8. Flowcharts should be read

3 Complete the flowchart with these statements in the correct order.

1. Are there any error messages?
2. Turn the computer monitor on.
3. Computer is fine.
4. Does the computer turn on?
5. Check the computer power cord.
6. Is the computer power light on?
7. Perform a search for the error message.

