Algorithms, Flowcharts and Pseudocode

An Algorithm: Baking a Cake

Algorithm: A predetermined series of instructions for carrying out a task in a finite number of steps.

1. Heat oven to 325°F
2. Gather the ingredients: Flour, Butter, Sugar, Milk, Eggs
3. Mix ingredients thoroughly in a bowl
4. Pour the mixture into a baking pan
5. Bake in the oven 50 minutes
6. Repeat: Bake 5 minutes more until cake top springs back when touched in the center
7. Cool on a rack before cutting

Flowchart Symbols
Flowchart: A graphic representation of an algorithm, often used in the design phase of programming to work out the logical flow of a program.

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Use in flowchart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oval</td>
<td><img src="oval.png" alt="Image" /></td>
<td>Denotes the beginning or end of a program.</td>
</tr>
<tr>
<td>Flow line</td>
<td><img src="flowline.png" alt="Image" /></td>
<td>Denotes the direction of logic flow in a program.</td>
</tr>
<tr>
<td>Parallelogram</td>
<td><img src="parallelogram.png" alt="Image" /></td>
<td>Denotes either an input operation (e.g., INPUT) or an output operation (e.g., PRINT).</td>
</tr>
<tr>
<td>Rectangle</td>
<td><img src="rectangle.png" alt="Image" /></td>
<td>Denotes a process to be carried out (e.g., an addition).</td>
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<tr>
<td>Diamond</td>
<td><img src="diamond.png" alt="Image" /></td>
<td>Denotes a decision (or branch) to be made. The program should continue along one of two routes (e.g., IF/THEN/ELSE).</td>
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**An Example - showing flowchart solution**

A flowchart illustrates the steps in a process. By visualizing the process, a flowchart can quickly help identify bottlenecks or inefficiencies where the process can be streamlined or improved.

**Example: Two Flowcharts for a Common Process**

Suppose your research revealed that you always want fries and a drink with your burger. You decide to streamline your process by ordering the combo meal, which automatically includes fries and a drink. The two flowcharts show at a glance that you omit two decisions and two order steps by using the streamlined order process.
Basic Flowchart

A basic flowchart identifies the starting and ending points of a process, the sequence of actions in the process, and the decision or branching points along the way.
Pseudocode Example:

This is the pseudocode for a Game of Monopoly, including one person's move as a procedure:

Main Procedure Monopoly_Game

Hand out each player's initial money.
Decide which player goes first.
Repeat

Call Procedure Monopoly_Move for next player.
Decide if this player must drop out.

Until all players except one have dropped out.
Declare the surviving player to be the winner.

Procedure Monopoly_Move
Begin one's move.
Throw the dice.
Move the number of spaces on the board shown on the dice.
If the token landed on "Go to Jail,"
then go there immediately.
Else if the token landed on "Chance" or "Community Chest,"
then draw a card and follow its instructions.
Else
follow the usual rules for the square (buying property,
paying rent, collecting $200 for passing "Go", etc.).
End one's move.

Here is Monopoly Flowchart