

Selecting a Problem Solving Strategy

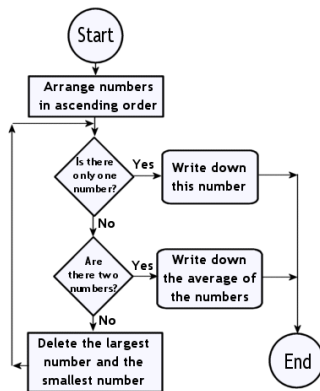
1 Algorithms

Problem-solving procedures or formulas that guarantee a correct outcome if correctly applied.

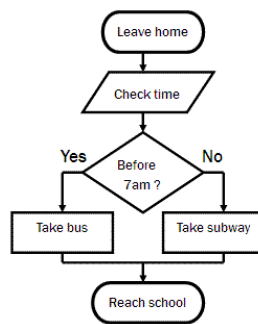
A common example are the troubleshooting steps to get a non-functioning printer to work

Examples:

Calculate the Median



Commute to School



http://www.studyfm.org.uk/restricted%20access/decision%20maths/Median_Flowchart.html#

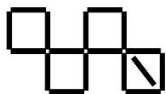
<http://philosophy.hku.hk/think/strategy/chart.php>

2 Heuristics

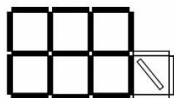
Heuristics are cognitive strategies used as shortcuts to solve complex mental tasks. Use of a heuristic may not lead to a correct solution. They have been developed over years of trial-and error solving of mathematical problems along with insightful introspection. Heuristics themselves do not solve problems. Instead they give pause to look at problems in different ways to find new insights

Example: Move 4 sticks from the initial condition to form 8 squares.

Initial



Final



Heuristic Used: Visualize the solution and work backwards

A list of frequently used heuristics is included, as well as example problems illustrating the use of each one.

<http://www.triz-journal.com/archives/2005/01/04.pdf>; <http://www.eph.com.sg/edutips.php?id=30>

Algorithms vs. Heuristics: Selecting an approach

Both approaches have their place, sometimes in different sections of same problem. From the above examples, it is clear that algorithms are better applied to quantitative problems that are best solved by formulas, such as math and some science problems. A heuristic approach is suited to solving problems that are broader and interpersonal. In engineering, we often begin with heuristics until the mathematical relationships are clear and then apply the equations as an algorithm.

