Assessing the computational adequacy of the General Problem Solver model

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Abstract: Problem solving is a core cognitive ability. Human performance varies widely in solving different types of problems. Ideally, cognitive models of problem solving should explain these variations in two ways: (1) the model should reproduce the sequences of actions applied by humans during problem solving (empirical adequacy), and (2) the time required by the model should match that required by humans, i.e., the model should be fast (slow) when humans are fast (slow) (computational adequacy). The former can be assessed by traditional psychological experiments; however, the latter requires the application of techniques from computational complexity theory. In this poster, we describe the first formal assessment of the computational adequacy of Newell and Simon's General Problem Solver model. We also discuss how our results can be used in both designing new psychological experiments and refining models of human problem solving.