

Using AMPL inside C

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What is AMPL?

AMPL Stands for **A Mathematical Programming Language**.
In short, it is a relatively human readable way of asking a computer to solve optimization problems for us.

What is Sudoku?

Insert image of sudoku grid

Sudoku as an Integer Program

$$\sum_{i=1}^9 x_{ijk} = 1, \quad 1 \leq jk \leq 9 \quad (\text{each number } k \text{ appears in each column})$$

$$\sum_{j=1}^9 x_{ijk} = 1, \quad 1 \leq ik \leq 9 \quad (\text{each number } k \text{ appears in each row})$$

$$\sum_{q,r=0}^2 x_{i+q,j+r,k} = 1, \quad i,j = 1,4,7, 1 \leq k \leq 9 \quad (\text{each } k \text{ appears once in each box})$$

$$\sum_{k=1}^9 x_{ijk} = 1, \quad 1 \leq ij \leq 9 \quad (\text{each cell contains exactly one number})$$

$$x_{ijk} \in \{0, 1\}, \quad 1 \leq ijk \leq 9$$

$$x_{ijk} = 1, \quad \text{When the initial board has number } k \text{ in cell } (i,j).$$

Use Case For External File Creation

- Hard problems
- Running on a cluster with no GUI or very high latency
- Only part of what you are trying to solve

Requirements

- AMPL installation accessible to your user
- A list of AMPL commands inside a text file

Example AMPL Files

Insert screenshot of the AMPL IDE with these files