

CSCI-GA.3033-004
Graphics Processing Units (GPUs): Architecture and Programming
Programming Assignment 3

In this lab, you are going to build a Sudoku solver in CUDA. For those of you who are not familiar with this game, here is a quick description.

Sudoku is a logic-based, combinatorial number-placement puzzle. The objective is to fill a **9×9 grid** with digits so that each column, each row, and each of the nine 3×3 sub-grids that compose the grid contains all of the **digits from 1 to 9**. The input is a partially completed grid. The output is a fully filled 9x9 grid that satisfies the aforementioned constraints.

Here is an input grid:

5	3			7				
6			1	9	5			
	9	8					6	
8				6				3
4			8		3			1
7				2				6
	6					2	8	
			4	1	9			5
				8			7	9

And here is the solution (with solution numbers in red):

5	3	4	6	7	8	9	1	2
6	7	2	1	9	5	3	4	8
1	9	8	3	4	2	5	6	7
8	5	9	7	6	1	4	2	3
4	2	6	8	5	3	7	9	1
7	1	3	9	2	4	8	5	6
9	6	1	5	3	7	2	8	4
2	8	7	4	1	9	6	3	5
3	4	5	2	8	6	1	7	9

- Write your program such that it reads a text file and outputs a text file. The format of the text file is a row of 81 digits, one row per line, with no spaces separating the digits. An empty spot is represented by 0. For example, the first grid above will be presented in a text file as :

530070000
600195000
098000060
800060003
400803001
700020006
060000280
000419005
000080079

- Your binary file must be called: **sudokusolver**
- The program will be called as: **./sudokusolver filename.in**
- It generates an output **filename.sol** (same filename as the input but different extension) that contains the solution.

Important: We will test your code with problems that have only one solution.

Have Fun!