Team Members

- Jory Anderson (V00843894)
- Note: My original team of 3 disbanded due to the challenges presented by CoViD-19. I have decided to complete the project regardless.

Requirements

- JDK 11 (Cannot guarantee successful compilation on other versions)
- minisat (Available on UVic Linux machines)

Documentation / Building

1. After extracting the contents of the tarball, compile all java files in the archive by performing the following in command line / terminal

   ```
   javac *.java
   ```

   - Ensure your working directory in terminal/cmd is set to the 'subid' folder of the submission (i.e., 'jba')

2. Once completed, take a properly formatted puzzle.txt file (see project.pdf), and perform the following command:

   ```
   java sud2sat < puzzles/puzzle.txt > puzzle.cnf
   ```

   - Note: sud2satextended can be used in a manner identical to sud2sat. Simply substitute the command.

   This will use "puzzle.txt" as the input (i.e., the file containing the incomplete sudoku puzzle), and create a new file called "puzzle.cnf" as the output. This file contains the DIMACs-formatted file used with

   ```
   minisat
   ```

3. Using the newly created "puzzle.cnf" file, perform the following:

   ```
   minisat puzzle.cnf assign.txt > stat.txt
   ```

   After executing the above, you will receive two files, "assign.txt" and "stat.txt"

   - "assign.txt": A file generated by minisat. Contains one or two lines determining satisfiability.
   - "stat.txt": The output of minisat. Will contain statistics pertaining to solving.

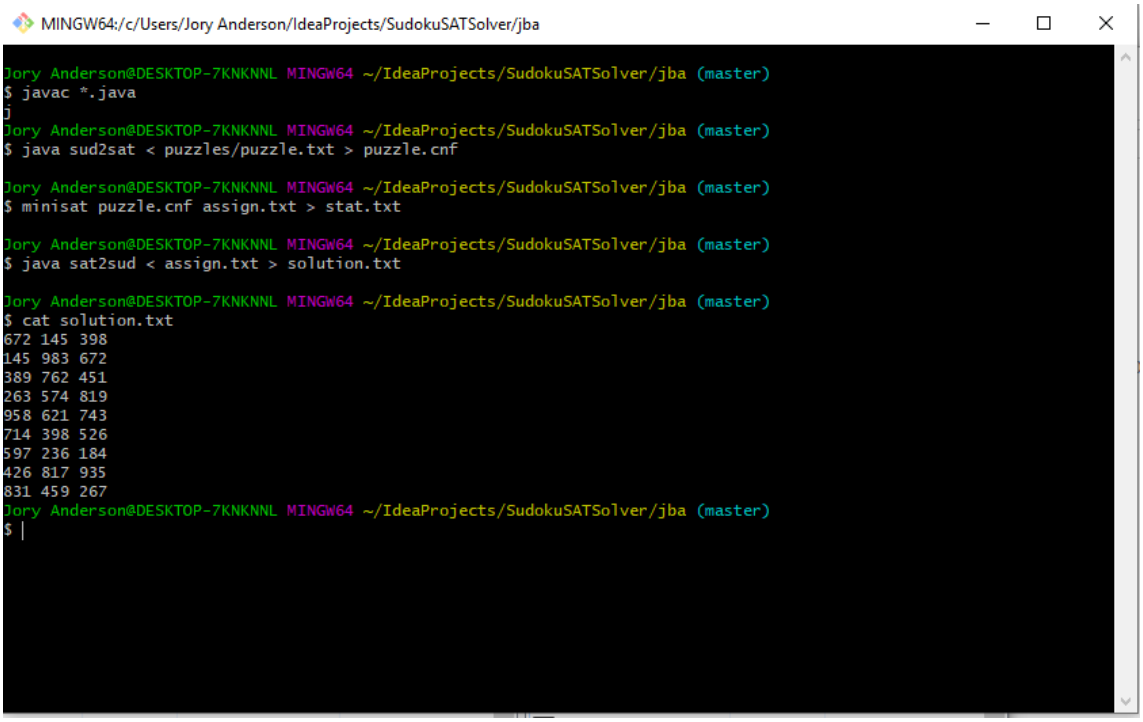
4. To solve, run the provided "sat2sud" command like so:

   ```
   java sat2sud < assign.txt > solution.txt
   ```

sat2sud takes the file generated by minisat, formats the completed sudoku problem, and outputs it into solution.txt

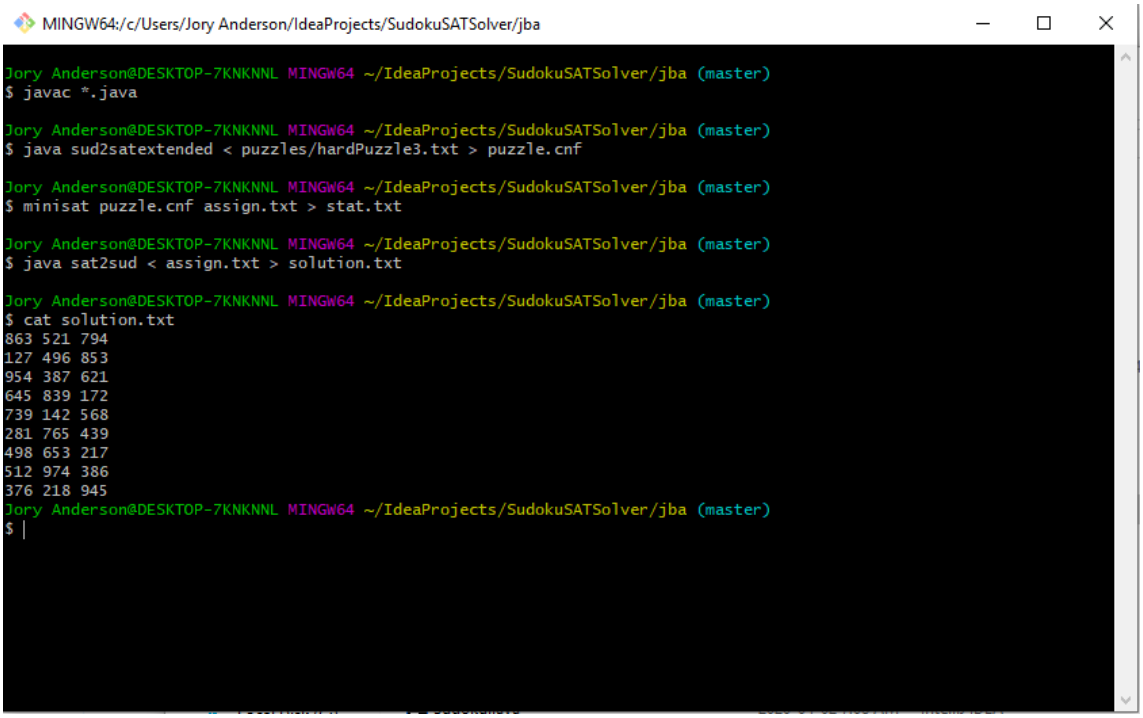
Example Build / Execution (Simple)

```
javac *.java
java sud2sat < puzzles/puzzle.txt > puzzle.cnf
minisat puzzle.cnf assign.txt > stat.txt
java sat2sud < assign.txt > solution.txt
```



Example Build / Execution (Extended)

```
javac *.java
java sud2satextended < puzzles/hardPuzzle2.txt > puzzle.cnf
minisat puzzle.cnf assign.txt > stat.txt
java sat2sud < assign.txt > solution.txt
```


MINGW64:/c/Users/Jory Anderson/IdeaProjects/SudokuSATSolver/jba
Jory Anderson@DESKTOP-7KNKNNL MINGW64 ~/IdeaProjects/SudokuSATSolver/jba (master)
$ javac *.java
Jory Anderson@DESKTOP-7KNKNNL MINGW64 ~/IdeaProjects/SudokuSATSolver/jba (master)
$ java sud2satextended < puzzles/hardPuzzle3.txt > puzzle.cnf
Jory Anderson@DESKTOP-7KNKNNL MINGW64 ~/IdeaProjects/SudokuSATSolver/jba (master)
$ minisat puzzle.cnf assign.txt > stat.txt
Jory Anderson@DESKTOP-7KNKNNL MINGW64 ~/IdeaProjects/SudokuSATSolver/jba (master)
$ java sat2sud < assign.txt > solution.txt
Jory Anderson@DESKTOP-7KNKNNL MINGW64 ~/IdeaProjects/SudokuSATSolver/jba (master)
$ cat solution.txt
863 521 794
127 496 853
954 387 621
645 839 172
739 142 568
281 765 439
498 653 217
512 974 386
376 218 945
Jory Anderson@DESKTOP-7KNKNNL MINGW64 ~/IdeaProjects/SudokuSATSolver/jba (master)
$