**Introduction**

Sudoku is a puzzle of 9x9 numbers. There are 9 columns and 9 rows in a Sudoku. The Sudoku is further divided in to 9 equal boxes. To solve a Sudoku, each column, row and box should have a permutation of numbers from 1 to 9. There are different algorithms to solve a Sudoku such as: Backtrack solver, Rule based solver, and Boltzman machine.

**Definitions**

**Cell**: Cell is the smallest square in the Sudoku puzzle. There are  
81 cells in the puzzle.

**Box:** A box is a square consisting of 9 cells (3x3). There are 9 boxes in the puzzle.

**Poss:** Possibility of numbers in a cell which will not conflict with row, column or the box which the cell is in.

**Algorithm**

* Insert the Sudoku. In place of empty cell insert a zero.
* Call Read function: Read the Sudoku
* Call Validate function: Validates the input Sudoku(su\_in)
* Check the conflicts of possible numbers in boxes, rows and columns.
* Call Display function: Displays the input Sudoku.
* Solve function: Initialize all possibilities in an empty cell.
  + Call Eliminate function: Eliminate all conflict possibilities.
  + Call Assign function: Assigns possibility if only one possibility is present in a cell, row or a box.
  + Call Check function: Check whether the Sudoku is solved. If true return to main function else continue the loop.
  + Loop (while time<10 sec):

a. Call the Guess function: Find the best cell with least possibilities.

b. Call Backup function: Back up the initial state of the Sudoku with possibilities, before performing the guess.

c. Perform the guess: Assign the first possibility of the best cell to output Sudoku (su\_out).Guess\_No++;

d. Loop while 10 times: Eliminate function, Assign function.

e. Loop until Conflict function: returns 0:

1.Guess\_No--;

2.Call Backtrack function:

a) Call Restore function:

b) Eliminate the failed possibility.

f. Call Check function: If it returned 1, break.

* Check the output. If solved>Display function: output. Else display> not solved.

**Run The Code**

* Firstly, install codeblocks IDE using the link : [www.codeblocks.org](http://www.codeblocks.org)
* Setup the codeblocks IDE using the video : <https://youtu.be/GWJqsmitR21>
* Paste the code from the Sudoku.cpp file and run the code on codeblocks IDE.