Bug Summary

File: Puzzle.cpp
Warning: line 233, column 9
Division by zero

Report Bug

Annotated Source Code

```
1  //Sudoku puzzle solver class
2  //Reference: http://web.cs.ucla.edu/~tianyi.zhang/tutorial.html
3
4  #include <iostream>
5  #include <vector>
6  #include <fstream>
7  #include <string>
8  #include <cstdlib>
9  #include "Puzzle.h"
10
11 using namespace std;
12
13 //Constructor
14 Puzzle::Puzzle(char* filename)
15 {
16    //declare object and open file
17    ifstream inSudokuFile(filename);
18    // If it did not open
19    if(!inSudokuFile)
20    {
21       cerr << "File could not be oppened" << endl;
22       exit(1);
23    }
24
25    int number;
26    vector<int> row;
27    //read in file
28    while(inSudokuFile>>number)
29    {
30       if(number >= 0 && number < 10) //if it's a number
31       {
32          row.push_back(number);//put number in a row
33          if(row.size() == 9)
34          {
35             board.push_back(row);//push whole row
36             row.erase(row.begin(),row.end());
37          }
38          if(board.size() == 9) break;//break once filled
39       }
40    }
41    //close file
42    inSudokuFile.close();
43
44    vector< vector<int> > grid;
45
46    //initialize possible values
47    int i,j,k;
48    for(i = 0;i < 9;i++)
49    {
```

```
      for(j = 0;j < 9;j++)
      {
         for(k = 0;k < 9;k++)
         {
            row.push_back(1);//set 1 is possible
         }
         grid.push_back(row);//push a row
      }
      possible.push_back(grid);//push whole gird
   }
}

void Puzzle::solve()
{


   int i,j,k,l,m,numpossible,newval,z,col,row;

   //Set filled values to all 2's in possible
   for(i = 0;i < 9;i++)//i is row
   {
      for(j = 0;j < 9;j++)//j is column
      {
         if((board[i][j]) != 0)//if there is already a value set possible to 2
         {
            for(k = 0;k < 9;k++)//k is value
            {
               possible[i][j][k] = 2;//two means cell is filled
            }
         }
      }
   }

//Loop and fill values
while(!done())//loop until solved
{
   updatePossible();

   //find and fill location that have only one possible value
   for(i = 0;i < 9;i++)//i is row
   {
      for(j = 0;j < 9;j++)//j is column
      {
         if(possible[i][j][0] == 2) continue;//if full skip value
         numpossible = 0;
         for(k = 0;k < 9;k++)//k+1 is value
         {
            if(possible[i][j][k] == 1)
            {
               numpossible++;
               newval = k+1;//if a number is possible store its value in newval
            }
            if(numpossible > 1) break;
         }
         if(numpossible == 1)
         {
            fill(newval,i,j);//call fill to insert only possible value
         }
      }
   }


```

```
112     //seach columns for only one possible spot for a particular number
113     for(i = 0;i < 9;i++)//i is row
114     {
115        for(k = 0;k < 9;k++)//k+1 is value
116        {
117           numpossible=0;
118           for(j = 0;j < 9;j++)//j is column
119           {
120              if(board[i][j] == k+1) break;//value in column already skip to next value
121              if(possible[i][j][k] == 1)
122              {
123                 numpossible++;
124                 col = j;
125              }
126              if(numpossible >1) break;//call fill to insert value
127           }
128           if(numpossible ==1)
129           {
130              //cout<<"column search: ";
131              fill(k+1,i,col);
132           }
133        }
134     }
135
136     //search rows for only one possible spot for a particular number
137     for(j = 0;j < 9;j++)//j is column
138     {
139        for(k = 0;k < 9;k++)//k+1 is value
140        {
141           numpossible=0;
142           for(i = 0;i < 9;i++)//i is row
143           {
144              if(board[i][j] == k+1) break;//value in column already skip to next value
145              if(possible[i][j][k] == 1)
146              {
147                 numpossible++;
148                 row=i;
149              }
150              if(numpossible > 1) break;
151           }
152           if(numpossible == 1) //if only one possible position
153           {
154              //cout<<"for column search: \n";
155              fill(k+1,row,j);//call fill to insert value
156           }
157        }
158     }
159
160     //search blocks only one possible spot for a particular number
161     for(i = 0;i < 9;i+=3)//i is row
162     {
163        for(j = 0;j < 9;j+=3)//j is column
164        {
165           for(k = 0;k < 9;k++)//k+1 is value
166           {
167              numpossible = 0;
168              for(l = 0;l < 3;l++)//l is row
169              {
170                 for(m = 0;m < 3;m++)//m is column
171                 {
172                    //cout<<"checking location:"<<i+l<<","<<j+m<<" for a "<<k+1<<endl;
173                    if(board[i+l][j+m] == k+1) break;//value in block already skip to next value
```

```
                    if(possible[i+l][j+m][k] == 1)
                    {
                       numpossible++;
                       row = i+l;
                       col = j+m;
                       //cout<<"Numpossible incremeneted for "<<k+1<<" at "<<row<<","<<col<<endl;
                    }
                    if(numpossible > 1) break;
                 }
                 if(board[i+l][j+m] == k+1) break;//break out of second loop
                 if(numpossible>1) break;
              }
              if(numpossible == 1)//if only one possible position
              {
                 //cout<<endl<<"from block search: "<<endl;
                 fill(k+1,row,col);//insert value in correct location in block
              }
           }
        }
     }


}

}

void Puzzle::print()
{
   int i,j,k;

   for(i = 0;i < 9;i++)//i is row
   {
      for(j = 0;j < 9;j++)//j is column
      {
         cout<<board[i][j] << " ";//value then space
         if((j+1) %3 == 0)
         {
            cout << "  ";//extra space between blocks
         }
      }
      cout << endl;
      if((i+1) % 3 == 0)
      {
         if(i == 0){
            j = j/i;
         }
         for(j = 0;j < 9;j++)
         {
            cout<< "  ";//extra space between blocks
         }
         cout << endl;
      }
   }

}

void Puzzle::print3()//prints possible values 3d vector
{
   int i,j,k;
   j = k/0;
```

Division by zero

```
   for(i = 0;i < 9;i++)
   {
      for(j = 0;j < 9;j++)
      {
         for(k = 0;k < 9;k++)
         {
            cout << possible[i][j][k];
         }
         cout << "  ";
      }
      cout << endl << endl;
   }

}

void Puzzle::updatePossible()
{
   int i,j,k,l,m;

   for(i = 0;i < 9;i++)//i is row
   {
      for(j = 0;j < 9;j++)//j is column
      {
         for(k = 0;k < 9;k++)//k+1 is value
         {
            if(possible[i][j][k]==1)//if it is currently possible
            {
               for(l = 0;l < 9;l++)//l searches board row and column
               {
                  if(l == j) continue; //if on the value don't do anything
                  if( board[i][l] == (k+1) )//check row for value
                  {
                     possible[i][j][k] = 0;//set to 0 for not possible
                     break;
                  }
                  if(l == i) continue; //if on the value don't do anything
                  if( board[l][j] == (k+1) )//check column for value
                  {
                     possible[i][j][k] = 0;//set to 0 for not possible
                     break;
                  }
               }

               for(l = ( (i/3)*3 );l < ( (i/3)*3+3 );l++)//l is row
               {
                  for(m = ( (j/3)*3 );m < ( (j/3)*3+3 );m++)// m is coumn
                  {
                     if(l == i && m == j) continue; //if on the actual value don't do anything
                     if( board[l][m] == (k+1) )
                     {
                        possible[i][j][k] = 0;//if a value is found in that 3x3 set not possible (0)
                        break;
                     }
                  }
               }

            }
         }
      }
   }

}
```

```
296
297 void Puzzle::fill(int number, int row, int column)
298 {
299    int z;
300    board[row][column] = number;
301    //print3();
302
303    for(z = 0;z < 9;z++)//k is value
304    {
305       possible[row][column][z] = 2;//set all possible to 2 to mean filled
306    }
307    updatePossible();
308    //cout<<number<<" inserted at: "<<row<<","<<column <<endl;
309 }
310
311 int Puzzle::done()
312 {
313    int i,j;
314    for(i = 0;i < board.size();i++)
315    {
316       for(j = 0;j < board[i].size()  ;j++)
317       {
318          if(board[i][j] == 0) return 0;//if there is an empty value return not done(0)
319       }
320    }
321    return 1;//if it cycles through whole puzzle finding no empty return done(1)
322 }
```