/\*EE231002 Lab06 Finding Sudoku Solutions

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#include <stdio.h>

#define TRUE 1

#define FALSE 0

int mat[9][9]; //a matrix to store sudoku puzzle

int count=1; //count the number of solutions

int flag; //to record wheather a number is okay

void read (void); //function to read the .dat file

void fill (int i,int j,int mat[9][9]); //to fill the 0's from 1 to 9

int check(int a,int b); //check numbers by rules of sudoku

void print (void); //print solution

int main (void)

{

read(); //start reading

fill(0,0,mat); //fill 0's

printf("Solution %d :\n",count); //print result

print(); //...

return 0;

}

void read (void)

{

int i,j; //declare looping index

char temp; //used to covert data type

for(i = 0;i < 9;i++){

for(j = 0;j < 9;j++){

scanf(" %c",&temp);

if(temp == '.') //that's because we use"."to represent 0

mat[i][j] = 0; //...

else mat[i][j] = temp -'0';

}

}

}

int check (int a,int b){

int i,j,p,q; //declare local variables

for (i=0;i<9;i++){

if (i!=a && mat[a][b]==mat[i][b])//check row for not being repeated

return FALSE;

}

for (j=0;j<9;j++){

if (j!=b && mat[a][b]==mat[a][j])//check column for not being repeated

return FALSE;

}

p=a/3; //check 3\*3 cube for not being repeated

q=b/3;

for(i=0;i<3;i++){

for(j=0;j<3;j++){

if (mat[p\*3+i][q\*3+j]==mat[a][b])

return FALSE;

}

}

return TRUE; //the number is not repeated

}

void fill (int i,int j,int mat[9][9])

{

int k=1;

if(k<=9){

if(mat [i][j]==0){ //find where the space is

mat[i][j]=k; //fill blank from 1

flag=check(i,j); //call check function

if (flag==FALSE){ //when the number is fault,check

k++ ; //next one

return;

}

if (flag==FALSE && mat[i][j]==9){//when the blank is filled

if (j==8) i+=1,j=0; //with 9 go back to the former one

if (j==0) i-=1,j=8;

else j--;

}

if (flag==TRUE){ //when the number is okay

if (j==8) i+=1,j=0; //go to next one blank

if (j==0) i-=1,j=8;

else j++;

}

}

}

}

void print(void)

{

int i=0,j,k=0;

while(k<9){

for(i=k;i<k+3;i++){

for(j=0;j<9;j+=3){

printf("%2d%2d%2d",mat[i][j],mat[i][j+1],mat[i][j+2]);

if(j<6) printf(" |");

}

printf("\n");

}

k=i;

printf("-------|-------|------\n");

}

}