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#include <stdio.h>

#include <math.h>

//Global variables for the ships actual location

int shipX = -1;

int shipY = -1;

int gridSize = 10;

//Compares random values for X and Y within the grid to the ship's location.

//Prints the ship's location when found and the number of locations checked.

void randomSearch(int gridSize);

//Sequentially counts up the grid comparing X and Y to the ship's actual location. Looped using recursion.

//Prints the ship's location when found and the number of locations checked.

void gridSearch(int gridSize, int gridLocationsTried);

void main()

{

//Set the ship's actual location randomly.

shipX = rand() % 9;

shipY = rand() % 9;

printf("The ship is located at %d, %d.\n\n", shipX, shipY);

printf("Random search\n---------------------------\n");

randomSearch(gridSize);

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

int gridLocationsTried = 0;

printf("Grid search\n---------------------------\n");

gridSearch(gridSize, gridLocationsTried);

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

printf("\n\n====================NEW GRID====================\n\n");

//grid size is 7

shipX = rand() % 6;

shipY = rand() % 6;

printf("The ship is located at %d, %d.\n\n", shipX, shipY);

printf("Random search\n---------------------------\n");

randomSearch(7);

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

gridLocationsTried = 0;

printf("Grid search\n---------------------------\n");

gridSearch(7, gridLocationsTried);

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

}

void randomSearch(int gridSize)

{

int found = 0; //will be used to end loop in while loop.

int locationsTried = 0;

//delcare.

int randX = -1;

int randY = -1;

while (found == 0) //loop until ship is found.

{

//generate random numbers for X and Y

randX = rand() % (gridSize - 1);

randY = rand() % (gridSize - 1);

locationsTried++;

if (randX == shipX && randY == shipY) //compare random X Y to actual location.

{

//when the ship is found...

found = 1; //make sure the loop will end

printf("The ship was found at %d, %d.\n", randX, randY); //and print location and number of tries.

printf("%d locations were tried.", locationsTried);

}

}

}

void gridSearch(int gridSize, int gridLocationsTried)

{

//find current X and Y

int X = -1;

int Y = -1;

X = gridLocationsTried % gridSize;

Y = floor(gridLocationsTried / gridSize);

if (X == shipX && Y == shipY) //compare current X and Y to ship's actual location.

{

printf("The ship was found at %d, %d. :)\n%d locations were tried.", X, Y, gridLocationsTried);

return;

}

gridLocationsTried++;

gridSearch(gridSize, gridLocationsTried); //send to next loop with new locations tried.

//Sending the locations tried variable allows the program to find the next X and Y in the sequence.

}

