CIS 22C
Data Abstractions and Structures
Honors Project

Find the number of "objects" in a "park"

200 Points

Given a "park" represented by a square matrix, write a program that determines the number of "objects" and the area of each "object" (area = number of squares). By definition the "objects" are placed inside the park (the outside boundaries of the matrix do not contain any objects). An "object" consists of adjacent squares. Squares that touch only at a diagonal point belong to different objects.

	a	b			F	q	1	e			A	A	A			$		
	d	c			5			&		1					~	%	^	
					9			4	3	2								

Object1 = 4 squares
Object2 = 11 squares
Object 3 = 3 squares
Object 4 = 4 squares

The input file for the above example is given below

test.txt

```
5 19
0000000000000000000
0ab00Fq1e00AAA00&00
0dc00500&010000~%^0
0000090043200000000
0000000000000000000
```

The "objects" in a "park" are represented by any characters except '0'. The matrix should be dynamically allocated (5 rows and 19 columns). Your output shows the object number and its area (see above).

Test your program using the following files:
`test.txt, t0.txt, t1.txt, t2.txt, t3.txt, t4.txt, t5.txt`

Requirements: Give two solutions:

A. recursive
B. iterative (use stacks – the stack ADT from Homework#2).

Write a report (2 – 3 pages) to describe each solution (using diagrams and charts) and also compare the two solutions (advantages, disadvantages, which one is your preferred solution and why).