

Fifth written examination of
Algoritmos e Estruturas de Dados

December 19, 2016

Duration: no more than 45 minutes

Name:

Student number:

- 6.0 1: Explain how the union-find algorithm works. What problem does it solve? Is it efficient?

Answers:

8.0 **2:** Consider the following adjacency matrix (empty entries means no connection):

from\to	A	B	C	D	E
A		3		2	
B	4		2		
C		1	5		
D			4		1
E	3			7	

2.0 **2a)** Draw the graph.

1.0 **2b)** Is the graph connected? Is it directed? Is it simple?

2.0 **2c)** Represent the same graph using adjacency lists.

3.0 **2d)** Without repeating **edges**, enumerate all cycles, and enumerate all paths that start at vertex D and that end at vertex A.

Answers:

- 6.0** **3:** The Dijkstra's algorithm computes the shortest path between vertices in a graph. Explain how it works. (You can base your answer in an example; if so try to use the graph of the previous exercise and compute the shortest distance between vertices E and C.)