Name:

E-mail:

Instructions:

- This is a closed book exam. No calculators or laptops are allowed. Absolutely no collaboration.

- Do all your work including scratch work on the pages of this exam.

- There are 16 pages in total, including this page.

- The exam is graded out of 100 points.

- If you use anything not proven in class, please provide a short explanation. Briefly explain any pseudocode you provide. Always state the running time of your algorithms.

- For this exam assume all mentioned graphs are undirected, simple (no duplicate edges and no self loops), connected and (unless stated otherwise) m and n are the number of edges and vertices respectively.

1 "Old" Problems

1. (5 pts)

2. (5 pts)

2 Data Structures

(a) (5 pts)

(b) (15 pts)

(c) (20 pts)

(d) [**Bonus**] (30pts)

3 Proof or "Spoof"

In this section you are required to check the correctness of a proof or an algorithm.

1. (5 pts)

2. (5 pts)

3. [**Bonus**] (10 pts)

4 Easy or Hard

1. (a) (15 pts)
   (b) (15 pts)

2. (10 pts)

3. (a) [**Bonus**] (5pts)
   (b) [**Bonus**] (25pts)

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