**6332 - Advanced algorithms, Spring 2015, CSE, OSU**
**Final project**
**Instructor:** Anastasios Sidiropoulos
**Due date:** April 24, 2015

**General instructions.** This document describes the available options for the final project. Each student has to declare their choice to me via email (at tasos@cse.ohio-state.edu) by April 10, 2015. The due date for the final project is April 24, 2015. Those of you who choose to present a paper will have to arrange for a date for the presentation. Each project may be done in a team of up to two students.

**Option 1: Implementation.** You may implement one of the algorithms that we discussed in class, or another algorithm that is of interest to you (upon approval by the instructor). The implementation should be evaluated experimentally. Ideally, the experiments should include real world data sets. For example, a graph algorithm could be evaluated on a social network graph such as Facebook. Comparisons with other methods are also encouraged. For example, an implementation of the approximation algorithm for Vertex Cover, can be compared with the fixed parameter algorithm for Vertex Cover.

If you choose this option, you should outline what exactly you intend to implement and what experiments you are going to perform.

**Option 2: Paper presentation.** You may choose one of the following papers to present. You may also suggest a different paper but it should be approved by the instructor. The presentation will be 30' long followed by 10-15' of questions. The time limits will be strict so you should make sure you do not run out of time. An ideal presentation should explain the main ideas in the paper. You should also understand the paper in depth and be able to explain technical details if necessary. You may discuss the paper with the instructor in advance to clarify any points that might be unclear.

1. N. Christofides. *Worst-case analysis of a new heuristic for the traveling salesman problem.* Report 388, Graduate School of Industrial Administration, Carnegie Mellon University (1976).

2. R. Hassin. *Maximum flow in* $(s, t)$ *planar networks.* Information Processing Letters 13 (1981), 107.

3. M. Held and R. M. Karp. *A dynamic programming approach to sequencing problems.* Journal of the Society for Industrial & Applied Mathematics 10.1 (1962): 196-210.

4. U. Manber and G. Myers. *Suffix arrays: a new method for on-line string searches.* First Annual ACM-SIAM Symposium on Discrete Algorithms (1990). pp. 319–327.

5. H. Alt and M. Godau, Michael, *Computing the Fréchet distance between two polygonal curves*, International Journal of Computational Geometry and Applications 5 (1-2): 75?91 (1995).

6. H. L. Bodlaender, J. R. Gilbert, Hjálmtyr Hafsteinsson, and Ton Kloks. *Approximating Treewidth, Pathwidth, Frontsize, and Shortest Elimination Tree.* J. Algorithms 18(2): 238-255 (1995).

7. D. R. Karger, K. Onak. *Polynomial approximation schemes for smoothed and random instances of multidimensional packing problems.* SODA 2007: 1207–1216.

8. T. Leighton and S. Rao. *Multicommodity max-flow min-cut theorems and their use in designing approximation algorithms.* Journal of the ACM (JACM) 46.6 (1999): 787-832.