

## Problem Set 5

**Due dates:** Electronic submission of .tex and .pdf files of this homework is due on **10/23/2018 before 11:00am** on csnet.cs.tamu.edu, a signed paper copy of the pdf file is due on **10/23/2018** at the beginning of class.

**Name:** (put your name here)

**Resources.** (All people, books, articles, web pages, etc. that have been consulted when producing your answers to this homework)

On my honor, as an Aggie, I have neither given nor received any unauthorized aid on any portion of the academic work included in this assignment. Furthermore, I have disclosed all resources (people, books, web sites, etc.) that have been used to prepare this homework.

**Signature:** \_\_\_\_\_

**Problem 1** Problems P1–P3 from the lecture notes on perusall.com are meant to give some general background on undirected graphs. You are encouraged to solve more problems from the lecture notes.

**P 1** (10 points). Read Chapter 14 on graphs on perusall.com. Make at least 5 insightful comments (these are automatically graded. Spread them out over the chapter and do not make them too short, the system penalizes for that). Endorse other comments if they are helpful. The system monitors your active reading time. You will not get full credit for this exercise if you do not read this chapter carefully.

**P 2** (10 points). Solve Exercise 14.2 in the lecture notes on graphs (Chapter 14) in perusall.com.

**Solution.**

**P 3** (10 points). Solve Exercise 14.21 in the lecture notes on graphs (Chapter 14) in perusall.com.

**Solution.**

**Problem 2 (BFS)** The following problems are all from our [CLRS] textbook.

**P 4.** (10 points) Exercise 22.2-5 on page 602.

**Solution.**

**P 5.** (20 points) (a) Exercise 22.2-8 on page 602.  
(b) Prove that your algorithm returns the correct result.

**Solution.**

**Problem 3 (DFS)**

**P 6.** (10 points) Exercise 22.3-5 on page 611.

**Solution.**

**P 7.** (10 points) Exercise 22.3-8 on page 611.

**Solution.**

**P 8.** (20 points) Prove that a directed graph  $G$  has a cycle if and only if  $\text{DFS}(G)$  reveals a back edge. [You can use this property to make DFS-based topological sorting robust against common user errors.]

**Solution.**

Discussions on ecampus are always encouraged, especially to clarify concepts that were introduced in the lecture. However, discussions of homework problems on ecampus should not contain spoilers. It is okay to ask for clarifications concerning homework questions if needed.

**Checklist:**

- Did you add your name?
- Did you disclose all resources that you have used?  
(This includes all people, books, websites, etc. that you have consulted)
- Did you sign that you followed the Aggie honor code?
- Did you solve all problems?
- Did you submit (a) your latex source file and (b) the resulting pdf file of your homework?
- Did you submit (c) a hardcopy of the pdf file in class?