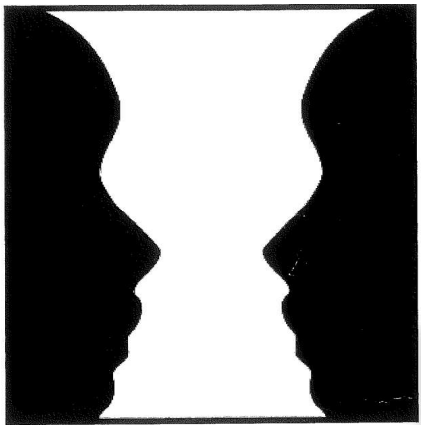
CS 787
Advanced Algorithms and Data Structures
Fall 2024



The figure-ground picture (vase or faces) illustrates duality, a key concept for our course.

Course description.

This course is a graduate-level introduction to discrete algorithms. We will emphasize both problem-solving techniques and connections to wider mathematical areas, such as optimization, abstract algebra, and probability theory. Examples to reflect these themes will be drawn from a variety of areas, such as operations research, cryptanalysis, scheduling, graph theory, etc.

Time/place.

MWF 9:55-10:45, 1325 CS.

Intructor.

Eric Bach (4391 CS, 262-7997, `famous baroque composer at cs dot wisc dot edu`). Office hours MWF 11:00-12:00 and by appointment.

Prerequisites.

No particular results from CS 577 will be assumed. You should, however, be familiar with data structures and big-O style algorithm analysis. Some facility with with combinatorial mathematics (discrete probability, finite sets, number theory, etc.) is also required.

Readings.

We will mainly use papers from the literature. These will be made available via the web.

Several useful texts on algorithms will be listed in a separate document.

There will be a course web page, at

pages.cs.wisc.edu/∼cs787-1 .

Homework, readings, and other course material will be on this page.

Grading.

Based on occasional homework, plus a take-home final exam.

Along with written work, class participation is required. This includes contribution to class discussions, and manifest intellectual engagement with the course material. I would also like each of you to come to office hours at least once during the term.

Musical Theme.

Our musical theme for this semester is Sinfonia in C Major, BWV 787, composed in 1723 by J. S. Bach (no relation).