

Preparation

Print out all handouts. On Soda Sort, number the pages for the sorting activity.

Running the activity

- (1) Euler circuits handout (around 30 minutes)
- (2) Blackboard discussion about Euler cycles and degrees of vertices. (around 5 minutes)
- (3) Direct students to draw a graph (**NO DOUBLE EDGES, NO LOOPS**), and to trade graphs with someone else. Then they compute the degree of every vertex, and show that there are always two vertices of equal degree. Prove this with pigeonhole principle. (around 15 minutes)
- (4) Where do graphs appear in life? Short classroom discussion about networks, directed graphs, the internet, subway networks. Which graphs are better for which purpose? (15 min)

We then tried the following, and it did not go as well. The SodaSort activity was too complex for younger students, and did not work with the large classroom size. In the future, we should simplify the SodaSort algorithm, and avoid it in the case of larger classrooms. Perhaps split the students into smaller groups and have them discuss what the algorithm does?

- (1) Sway conversation in direction of programs, discuss algorithms.
- (2) Do the SodaSort activity: align students in a line, and have them pair up and follow the flow chart. (30 minutes).

- (3) If all of this does not fill up the time, try to write an algorithm that checks whether a number is prime.
- (4) Wrap up with short statement about how graph theory can be used in science and technology and real life.