Discrete and Algorithmic Geometry

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Sheet 1

due on Monday, November 10, 2014

Reading

(1) Read Lectures 0,1,2 from Ziegler's *Lectures on Polytopes.*

(2) Read Sections 5.1, 5.2, 5.3 from Matoušek's *Lectures on Discrete Geometry.*

Writing

(1) Let P be a 3-dimensional polytope with n vertices. Prove or disprove: If the graph of P is complete (i.e., between every pair of points there is an edge on the convex hull), then $n = 4$, so that P is a tetrahedron.

Software

(1) Create a `github` account, clone the repository

`https://github.com:julian-upc/discrete-geometry.git` ,

and write around two paragraphs presenting yourself into the file `2014/participants.tex` . Commit your edits, push your commits to your clone, and issue a pull request so that your edits can be merged into the central repository.

(2) Create a public/private key pair for `gpg` and place the public key into `2014/public_keys` . Again, don't forget to commit and push your changes, and issue a pull request.

(3) Install `polymake 2.13` from `polymake.org` on your computer. and play around with it. For example, try to understand the (interactive) drawings that result from saying `cube(4)->VISUAL;` and `regular_120_cell()->VISUAL;` . Try to make sense of the output of `cube(3)->properties();` . The command `help("YourTopicHere")` is your friend, as is the documentation on `polymake.org`.