Name: _____

Student ID: _____

This mid-term quiz is worth 5% of the final mark for the course.

All questions have equal weight: 1 point.

Answer directly on these pages.

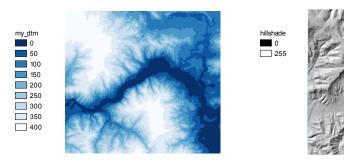There is only one good answer for multiple choice questions.

This is an open-book exam, only paper is allowed. No computer/phone/etc, a calculator is fine.
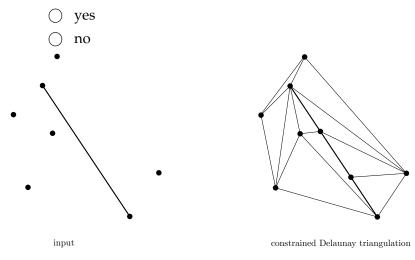
The total number of questions is 10.

You have 30min to do this quiz.

1. (1 point) If a TIN is used to represent a terrain, it is often a Delaunay triangulation. Why is this?

    ○ triangles are as topological as possible, good for interpolation

    ○ the Delaunay property ensures that features on the terrain (a summit) are preserved

    ○ triangles are as equilateral as possible, good for interpolation

    ○ the Delaunay property ensures that 3D vertical surfaces are possible, other triangulations cannot handle such cases.

2. (1 point) Given a Delaunay edge ϵ, its dual is:

    ○ a Voronoi edge, located parallel to ϵ

    ○ a Voronoi polygon formed of all the dual of the vertices of ϵ

    ○ a Voronoi edge perpendicular to ϵ

    ○ none of these

3. (1 point) For a given set of elevation points, which one will yield, in most cases, a smoother surfaces (less 'bumpy'):

    ○ IDW; power=2; search ellipse with radius1=10m and radius2=5m

    ○ IDW; power=2; search circle with radius=10m

4. (1 point) [What is the missing word?] A _____ tessellation reduces the number of grid cells in a DTM by merging neighbouring grid cells having the same elevation.

5. (1 point) Given a raster of elevation like the one below (left), which one of the following parameters is not necessary to calculate the hillshade (right).

- ○ the aspect of each cell
- ○ the roughness of each cell
- ○ the elevation of the sun with respect to each cell
- ○ the azimuth of the sun with respect to each cell

6. (1 point) You have access to a Python function to perform the line-of-sight between 2 cells in a gridded DSM: can you also perform a viewshed?

- ○ yes
- ○ no

7. (1 point) Is the triangulation on the right a valid constrained Delaunay triangulation of the input on the left?

- ○ yes
- ○ no

input   constrained Delaunay triangulation

8. (1 point) Draw the Voronoi diagram for those 10 points:

9. (1 point) How many points from the 10 points above will have a Voronoi cell with an infinite area?

10. (1 point) We know the slope for a given location (x, y): its gradient (α) is 15° and its aspect (θ) is 80°. Draw 3 (hypothetical) isolines for the area surrounding this location, and identify clearly the elevations for those lines. An estimation and guessing of the surrounding is fine.