

# Procedural City Generator

Cities are complex environments with lots of geometric details so modeling one manually would be a long and tedious task. A web application was made for a Bachelor's thesis and Computer Graphics Project course which automates that process. The application can generate an infinite number of cities onto randomly generated terrains and also features a user interface with several parameters which can be adjusted by user.

[bit.ly/1UOXyYX](https://bit.ly/1UOXyYX)



## Generation process

### Generating terrain

Terrain is generated using midpoint displacement algorithm. Generated terrains are quite flat. The user can change the min and max water percentage parameters to change the amount of water.

### Generating roadmap

Road generation starts from one point and roads are grown in parallel. Primary roads are generated first. Those are wider and carry more traffic. After primary road generation completes, secondary roads are generated.

### Finding lots

After the roadmap is generated, cycles are extracted from roadmap graph. Each roadmap graph cycle represents a city block. City blocks are divided into lots using a recursive algorithm which subdivides lots until each lot is small enough.

### Generating buildings

Buildings are created onto lots which have access to a road. The buildings' floorplans are created by inseting lots' shapes. The floorplan is then extruded up and resulting shape is textured. Buildings have random heights but the maximal height depends on population density at building location.

