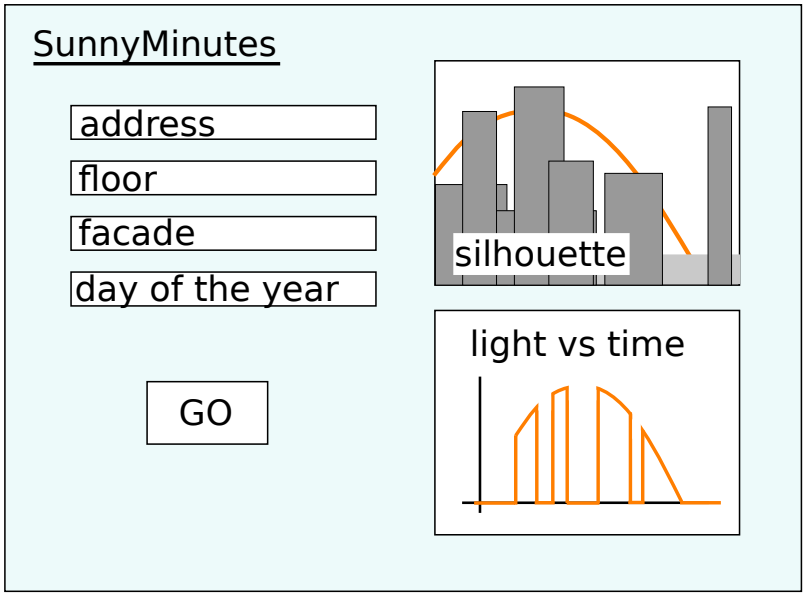
SunnyMinutes – by Peter Komar

Problem:

There's no easy way to know how much sunlight an office or apartment in downtown Manhattan will get during the year before renting

Format:

Web application



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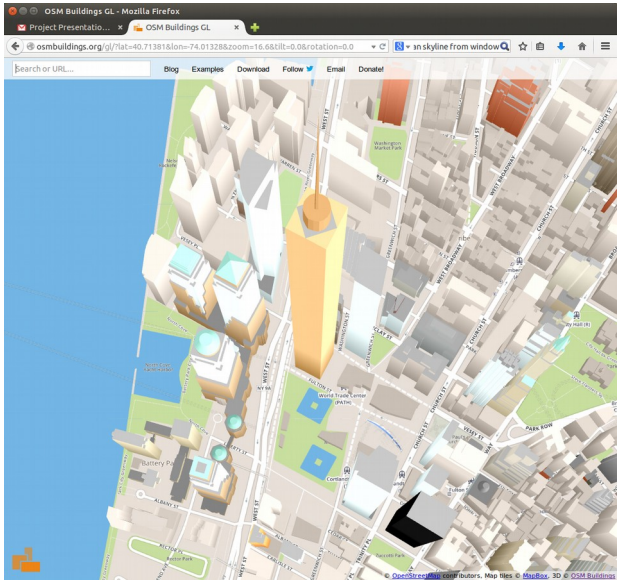
Data:

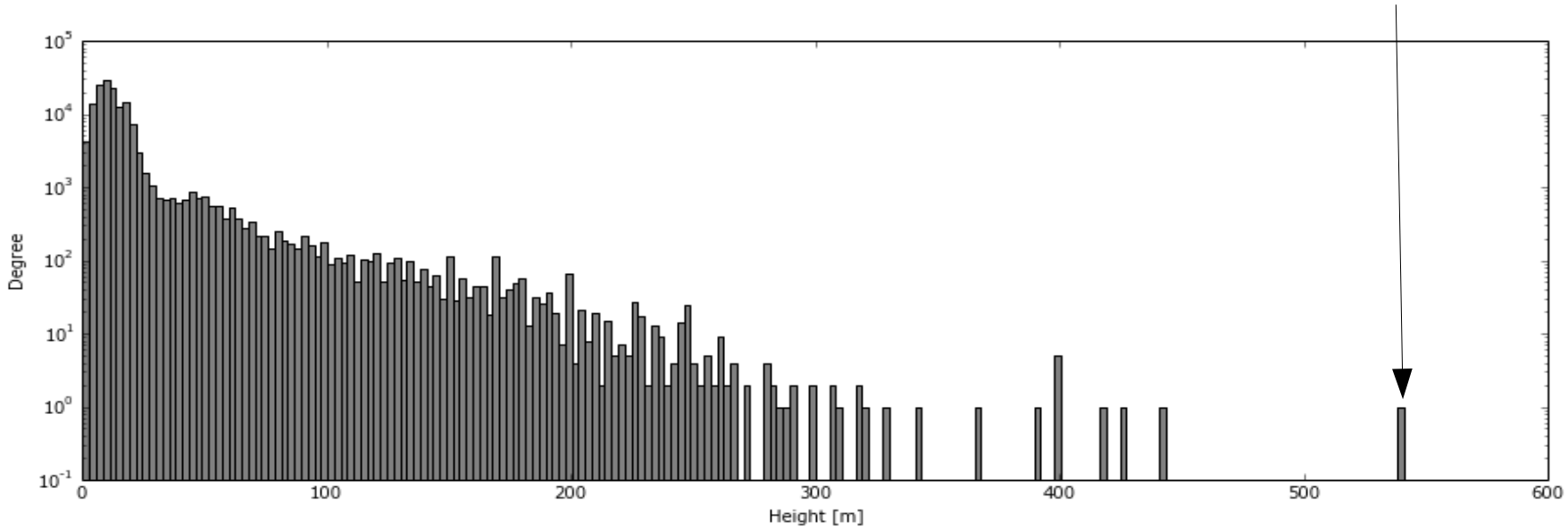
- OpenStreetMap data of heights of buildings in Manhattan
  [http://osmbuildings.org/?lat=40.78251&lon=-73.96590&zoom=15]
- native format: OSM, exported into XML with Overpass API
- filtered with [“building”] and '[“building:part”] tags



Simple plot:

- Histogram of building heights

One World Trade Center



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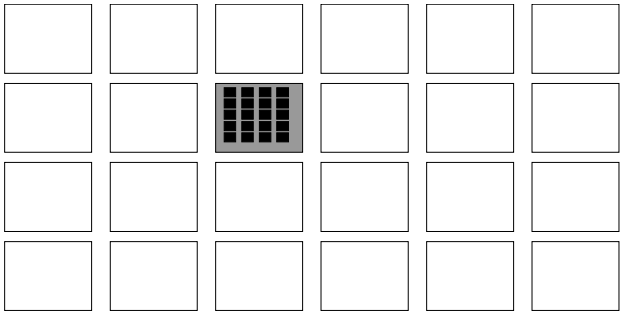
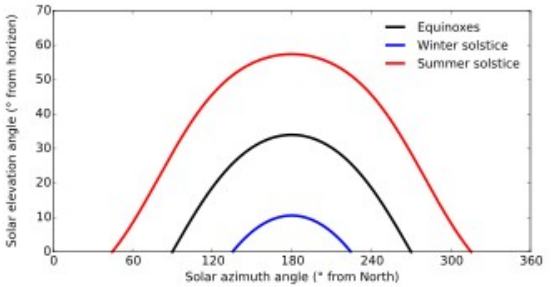
Algorithm to draw the silhouette:

1. Group the buildings into larger rectangular blocks
2. For each block calculate and store:
    i. max height
    ii. 2D coordinates of the 4 vertices of the block
3. When rendering the silhouette:
    o. Exclude all blocks with max height smaller than observer's altitude
    i. Start with self
    ii. Continue with the buildings in the same block
    iii. Continue with the buildings in the neighboring blocks
    iv. Continue with all remaining buildings
    v. Exclude blocks that are completely shadowed by the new silhouette





Algorithm to calculate Sun's path and light curve:

1. Minute by minute, calculate the Sun's (phi, theta) as seen by the observer
2. For each minute, determine whether the Sun is blocked