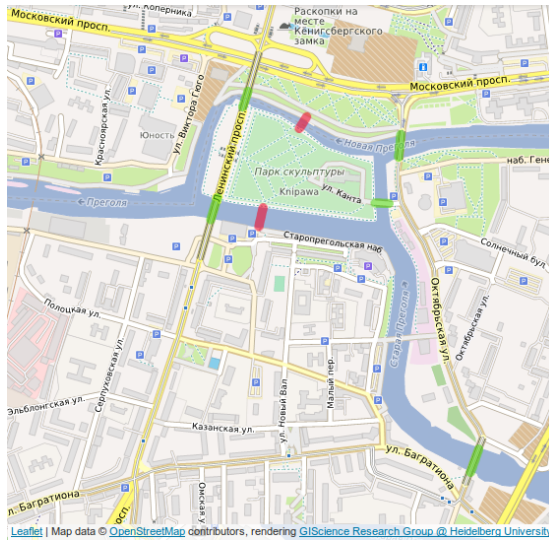


Worksheet #19; date: 10/31/2018
MATH 55 Discrete Mathematics

1. (Rosen 10.3.51) A simple graph G is called self-complementary if G and \bar{G} are isomorphic. Find a self-complementary simple graph with five vertices.
2. (Rosen 10.3.52) Show that if G is a self-complementary simple graph with v vertices, then $v \equiv 0$ or $1 \pmod{4}$.
3. (Rosen 10.3.55) How many nonisomorphic simple graphs are there with five vertices and three edges?
4. Modern Königsberg bridge problem: Was there an Euler path before the bombs? Is there an Euler path after the bombs?



5. Suppose a graph has the incidence matrix:

$$\begin{pmatrix} 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 \end{pmatrix}$$

More generally, if you know the incidence matrix A , how do you check if the graph has a Euler path? What about Euler circuit?

6. (Rosen 10.5.28b) For which values of m and n does the complete bipartite graph $K_{m,n}$ have an Euler path?
7. Show that the Petersen graph has a Hamilton path but no Hamilton circuit.