Homework 14 Solutions

Math 55, DIS 101-102

10.5.3 [2 points]

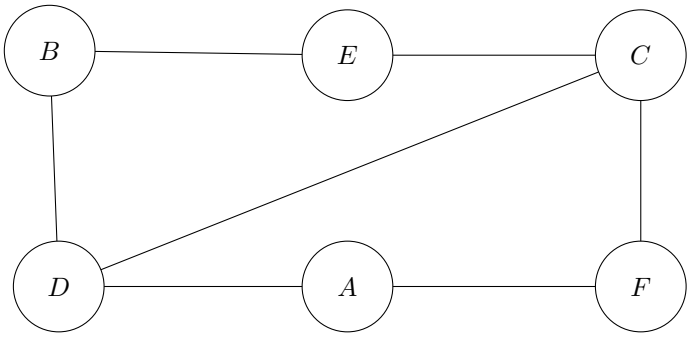
An Euler circuit does not exist because the graph has 2 vertices of degree 3, but an Euler path does exist ($a-b-d-c-a-e-b-e-c-e-d$).

10.5.10 [2 points]

An Euler circuit exists because the graph representing the town and bridges has only vertices of even degree.

10.7.6 [2 points]

If the graph is planar, draw it so that no edges cross:



10.7.18 [2 points]

If a planar graph has k connected components, e edges, and v vertices, how many regions does it have?

$r = e - v + k + 1$. Each connected component would give $r_c = e_c - v_c + 2$, so summing over all of them would give $r = e - v + 2k$. This overcounts the "outside" region by counting it k times instead of 1, so subtract $k - 1$ to get $r = e - v + k + 1$.

10.7.20 [2 points]

Deterimine whether the given graph is homeomorphic to $K_{3,3}$.

NOPE: $K_{3,3}$ has six vertices of degree 3 and the given graph has only 4. Furthermore, the given graph is planar and $K_{3,3}$ is not.