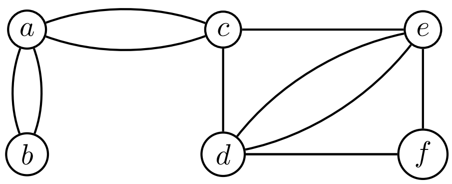
CS 228, Euler and Hamiltonian Paths

Name:

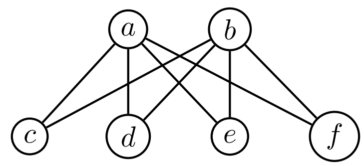
Some questions are from **Discrete Mathematics and It's Applications 7e** by Kenneth Rosen.

Consider the following graphs:

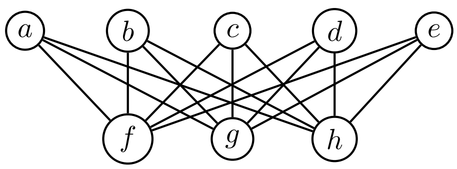
A



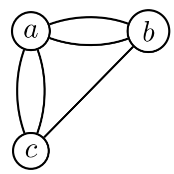
B



C



D



- Which of these graphs have Euler paths and which have Euler circuits?

- Which of these graphs have Hamiltonian paths and which have Hamiltonian circuits? In each case either provide the path or argue that it does not exist.

- Execute the following algorithm to find an Euler circuit of the graph below. Whenever a vertex or edge must be chosen arbitrarily, use alphabetical order to determine the choice. Draw H and indicate the value of *circuit* after each iteration.

> **procedure** EULER(G : connected multigraph with all vertices of even degree)
>   *circuit* := a circuit in G beginning at an arbitrarily chosen vertex with edges successively added to form a path that returns to this vertex
> H := G with the edges of this circuit removed
>   **while** H has edges
>   *subcircuit* := a circuit in H beginning at a vertex in H that also is an endpoint of an edge in *circuit*
> H := H with edges of *subcircuit* and all isolated vertices removed
>   *circuit* := *circuit* with *subcircuit* inserted at the appropriate vertex
>   **return** *circuit*