Worksheet 12 (Graph Theory 4): Euler Paths and Circuits

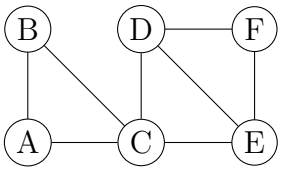
Group Names: _____

1. For each of the following graphs, do the following:

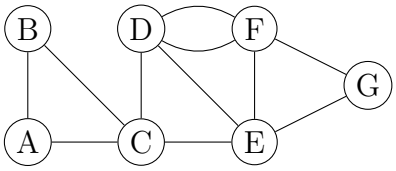
   (i) Highlight all the vertices of odd degree.

   (ii) Determine whether it has an Euler path or an Euler circuit. If it has an Euler path or circuit, circle the correct choice. If it has neither an Euler path nor an Euler circuit, explain why.

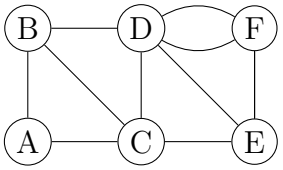
path circuit neither



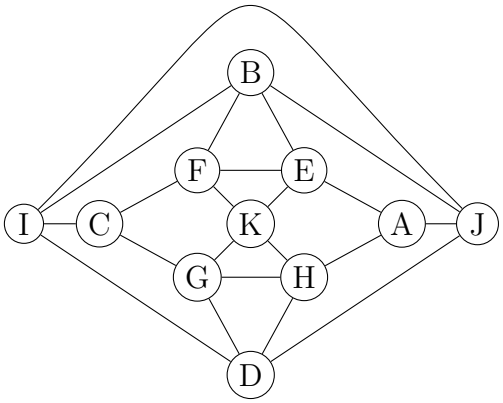
path circuit neither



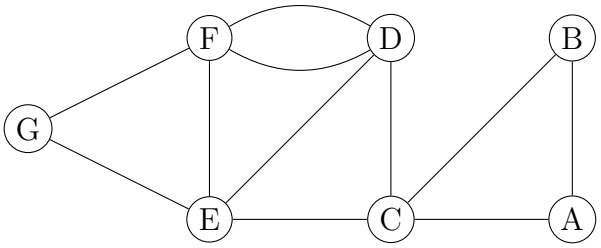
path circuit neither



path circuit neither



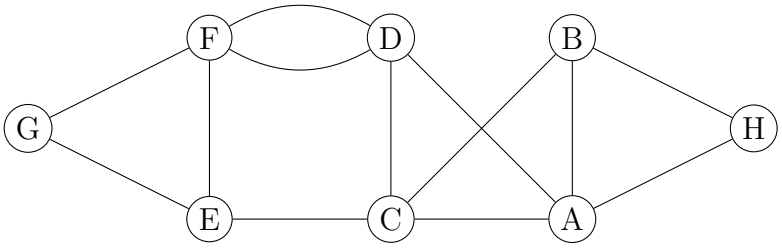
2. Find an Euler circuit on the following graph. Draw it next to the edges of the graph so it is clear what the circuit should be, and list the vertices of the circuit in order.



circuit: _____

3. (a) This graph has two vertices of odd degree. What are they? _____

   (b) Find an Euler path. Draw it next to the edges of the graph so it is clear what the path should be, and list the vertices of the path in order.



path: _____

4. (a) This graph has more than two vertices of odd degree.
   List the odd-degree vertices _____

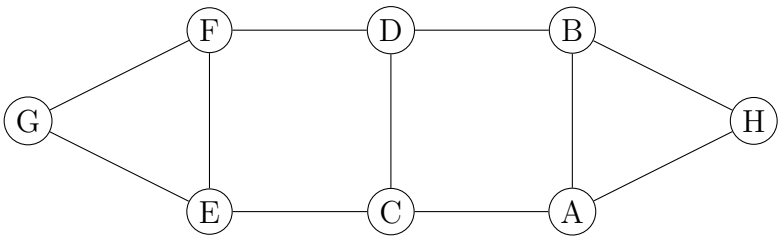
   (b) Add some additional edges so that every vertex is even degree. Which edges did you add?

   _____

   (c) What is the smallest number of edges you can add?

   _____

   (d) Using your additional edges, find an Euler circuit. Draw it next to the edges of the graph so it is clear what the path should be, and list the vertices of the circuit in order.



circuit: _____