In questions 1 and 2, we use the notion of interval graphs to reinforce several basic concepts. You can find the definitions of interval graphs and of other unfamiliar terms at [https://en.wikipedia.org/wiki/Glossary_of_graph_theory_terms](https://en.wikipedia.org/wiki/Glossary_of_graph_theory_terms). Questions 3 through 5 turn to issues of connectivity such as we discussed in class.

1. Draw the interval graph for the intervals in Figure 1, and then answer the following (no proofs are necessary).
   a. What is the eccentricity of vertex C?
   b. What is the graph’s diameter?
   c. What is the graph’s radius?
   d. What is the graph’s girth?
   e. What is the graph’s circumference?
   f. What is the graph’s center?
   g. List the graph’s cut edges, if any.
   h. List the graph’s cut vertices, if any.

2. Consider an interval graph $G$ with $n$ vertices. Answer the following, with brief explanations for each.
   a. What is the largest clique $G$ can contain?
   b. What is the largest independent set $G$ can contain?
   c. What is the largest induced cycle set $G$ can contain?

![Figure 1: A set of intervals](image-url)
3. Problem 3.1.1 (Recall that \( \omega \) is the number of components in a graph):
   
   a. Show that if \( G \) is \( k \)-edge-connected, with \( k > 0 \), and if \( E' \) is a set of \( k \) edges of \( G \), then \( \omega(G - E') \leq 2 \).
   
   b. For \( k > 0 \), find a \( k \)-connected graph \( G \) and a set \( V' \) of \( k \) vertices of \( G \) such that \( \omega(G - V') > 2 \).

4. Problem 3.2.1: Show that a graph is 2-edge-connected if and only if any two vertices are connected by at least two edge-disjoint simple paths.

5. Problem 4.1.2: If possible, draw an eulerian graph \( G \) with \( n \) even and \( m \) odd; otherwise, explain why there is no such graph.