A control flow graph (V, E) is *reducible* iff it can be partitioned into two sets of edges E_F and E_B ($E = E_B \cup E_F$) such that (V, E_F) is acyclic, and for every edge in E_B, its head dominates its tail; that is, E_B is a set of back edges.

1. Give a program with a cyclic, reducible control flow graph.

2. Explain why the following graph is not reducible.
   $V = \{1, 2, 3, 4, 5\}$
   $E = \{(1 \to 2), (1 \to 3), (2 \to 3), (3 \to 2), (2 \to 4), (3 \to 5)\}$

3. Explain why the following graph is not reducible.
   $V = \{1, 2, 3, 4, 5, 6, 7\}$
   $E = \{(1 \to 2), (1 \to 3), (1 \to 4), (2 \to 3), (3 \to 4), (4 \to 2), (2 \to 5), (3 \to 6), (4 \to 7), \}$

4. Give a program whose control flow graph is the one given in 2 above (considering each vertex to be a basic block). (Hint: Use `goto`.)