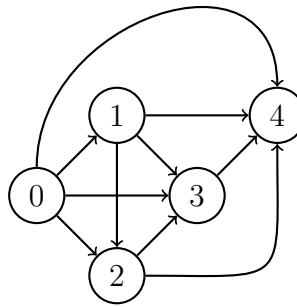
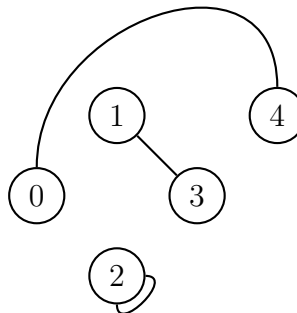


1. Let $X = \{0, 1, 2, 3, 4\}$. Draw the graph associated with the $<$ relation on X . Should this graph be directed or undirected?



the graph should be directed.

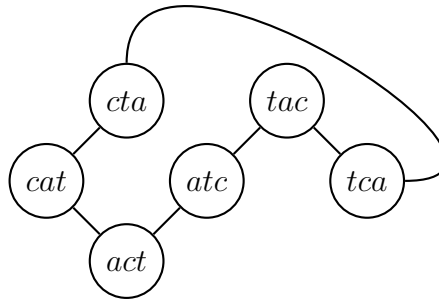
2. Let $X = \{0, 1, 2, 3, 4\}$. Define a relation R on X such that xRy if $x + y = 4$. Draw the graph associated with this relation. Should this graph be directed or undirected?



The graph should be undirected.

For Exercises 3–6, define a relation \rightleftharpoons on the set S of all strings of letters: two strings are related if you can get one from the other by reversing one pair of adjacent letters. For example, $cow \rightleftharpoons ocw$ but $cow \not\rightleftharpoons woc$.

3. Consider all the strings you can form with the letters c, a, and t (there are six). Draw the graph whose nodes are these six strings and whose edges represent the \rightleftharpoons relation. Should this be a directed or an undirected graph?



This should be an undirected graph.

4. Find an Euler path in the graph you made in Exercise 3.
The Euler path from the graph in Exercise 3 is:

$$cta \rightarrow cat \rightarrow act \rightarrow atc \rightarrow tac \rightarrow tca$$

5. Consider the graph formed by the \rightleftharpoons relation on the set of all the strings you can form from the letters l, y, n, and x. Does this graph have an Euler path? Why or why not?