7. Answer questions a-d for the graph defined by the following sets:
   - $N = \{0,\ 1,\ 2\}$
   - $N_0 = \{0\}$
   - $N_f = \{2\}$
   - $E = \{(0,1),\ (0,2),\ (1,0),\ (1,2),\ (2,0)\}$

   Also consider the following (candidate) paths:
   - $p_0 = [0,\ 1,\ 2,\ 0]$
   - $p_1 = [0,\ 2,\ 0,\ 1,\ 2]$
   - $p_2 = [0,\ 1,\ 2,\ 0,\ 1,\ 0,\ 2]$
   - $p_3 = [1,\ 2,\ 0,\ 2]$
   - $p_4 = [0,\ 1,\ 2,\ 1,\ 2]$

   (a) Which of the listed paths are test paths? Explain the problem with any path that is not a test path.

   Solution:

   Answer: Only p_1 and p_2 are test paths. p_0 fails to terminate at a final node. p_3 fails to start at an initial node. p_4 includes an edge that does not exist in the graph.

   (b) List the eight test requirements for Edge-Pair Coverage (only the length two subpaths).

   Solution:

   Answer: The edge pairs are:

   $\{\ [n_0, n_1, n_0], [n_0, n_1, n_2], [n_0, n_2, n_0], [n_1, n_0, n_1], [n_1, n_0, n_2], [n_1, n_2, n_0], [n_2, n_0, n_1], [n_2, n_0, n_2]\ \}$

   (c) Does the set of **test** paths (part a) above satisfy Edge-Pair Coverage? If not, identify what is missing.

   Solution:

   Answer: No. Neither p_1 nor p_2 tours either of the following edge-pairs:

   $\{\ [n_1, n_0, n_1],\ [n_2, n_0, n_2]\ \}$

   As discussed in (a), the remaining candidate paths are not test paths.

   (d) Consider the prime path $[n_2,\ n_0,\ n_2]$ and path p_2. Does p_2 tour the prime path directly? With a sidetrip?

   Solution:

   Answer: No, p_2 does not directly tour the prime path. However, p_2 does tour the prime path with the sidetrip $[n_0, n_1, n_0]$.

8. Design and implement a program that will compute all prime paths in a graph, then derive test paths to tour the prime paths. Although the user interface can be arbitrarily complicated, the simplest version will be to accept a graph as input by reading a list of nodes, initial nodes, final nodes, and edges.

   Instructor Solution Only