(6 points) Consider Ammann & Offutt, edition 2, Figure 7.5, page 111

(2 points) List the test requirements for Edge Coverage

5 requirements are needed for Edges

[1,2]
[1,3]
[1,4]
[2,4]
[4,3]

(2 points) List the test requirements for Edge-Pair Coverage

4 requirements are needed for Edge-Pairs

[1,2,4]
[1,3]
[1,4,3]
[2,4,3]

(2 points) Find test case inputs such that the corresponding test path visits edge (4, 3)

As noted in the figure, input (a = 0, b = 1) works.

Exercise 7.2.2, Number 5 (a-g)

- $N = \{1, 2, 3, 4, 5, 6, 7\}$
- $N_0 = \{1\}$
- $N_f = \{7\}$
- $E = \{(1, 2), (1, 7), (2, 3), (2, 4), (3, 2), (4, 5), (4, 6), (5, 6), (6, 1)\}$

Also consider the following (candidate) test paths:

- $p_1 = [1,\ 2,\ 4,\ 5,\ 6,\ 1,\ 7]$
- $p_2 = [1,\ 2,\ 3,\ 2,\ 4,\ 6,\ 1,\ 7]$
- $p_3 = [1,\ 2,\ 3,\ 2,\ 4,\ 5,\ 6,\ 1,\ 7]$

(a) Draw the graph.

Solution:
See the graph tool at `http://www.cs.gmu.edu/~offutt/softwaretest/`

(b) List the test requirements for Edge-Pair Coverage. (Hint: You should get 12 requirements of length 2.)

Solution (Instructor only):
The edge pairs are: { [1, 2, 3], [1, 2, 4], [2, 3, 2], [2, 4, 5], [2, 4, 6], [3, 2, 3], [3, 2, 4], [4, 5, 6], [4, 6, 1], [5, 6, 1], [6, 1, 2], [6, 1, 7] }

(c) Does the given set of test paths satisfy Edge-Pair Coverage? If not, state what is missing.

Solution (Instructor only):
No. None of the given test paths tour the following edge-pairs: $\{[3,\ 2,\ 3], [6,\ 1,\ 2]\}$

(d) Consider the simple path **[3, 2, 4, 5, 6]** and test path **[1, 2, 3, 2, 4, 6, 1, 2, 4, 5, 6, 1, 7]**. Does the test path tour the simple path directly? With a sidetrip? If so, write down the sidetrip.

Solution (Instructor only):
Not directly. Yes, with sidetrip [2, 4, 6, 1, 2]. *(It is also possible to use sidetrip:* [4, 6, 1, 2, 4]*)*

(e) List the test requirements for Node Coverage, Edge Coverage, and Prime Path Coverage on the graph.

Solution (Instructor only):
NC: $\{1,\ 2,\ 3,\ 4,\ 5,\ 6,\ 7\}$
EC: $\{(1, 2),\ (1, 7),\ (2, 3),\ (2, 4),\ (3, 2),\ (4, 5),\ (4, 6),\ (6, 1),\ (5, 6)\}$
PPC: {[1, 2, 4, 5, 6, 1], [1, 2, 4, 6, 1], [2, 4, 6, 1, 2], [2, 4, 5, 6, 1, 2], [3, 2, 4, 6, 1, 7], [3, 2, 4, 5, 6, 1, 7], [4, 6, 1, 2, 4], [4, 5, 6, 1, 2, 4], [4, 6, 1, 2, 3], [4, 5, 6, 1, 2, 3], [5, 6, 1, 2, 4, 5], [6, 1, 2, 4, 6], [6, 1, 2, 4, 5, 6], [3, 2, 3], [2, 3, 2]}

(f) List test paths from the given set that achieve Node Coverage but not Edge Coverage on the graph.

Solution (Instructor only):
p_3 *(does not cover edge* (4, 6)*)*

(g) List test paths from the given set that achieve Edge Coverage but not Prime Path Coverage on the graph.

Solution (Instructor only):
$\{p_1,\ p_2\}$ *or* $\{p_2,\ p_3\}$