Submission Guidelines:

Due: 11:59pm ending Wednesday, June 27, 2018.

- The assignment should be submitted via Blackboard.
- The answers must be typed as a document.
- Make sure your name and your student ID are listed in your document.
- Name files as assignment3_<net-id>.<format>
- Accepted document formats are (.pdf, .doc or .docx). If you are using OpenOffice or LibreOffice, make sure to save as .pdf or .doc
- Please do not submit .txt files.
- If there are multiple files in your submission, zip them together as assignment1_<net-id>.zip and submit the .zip file.
- The maximum points one can get in this assignment is 100.
- You may resubmit the submit at any time. Late submissions will be accepted at a penalty of 10 points per day. Maximum latency is 3 days beyond which a grade of zero will be assigned. This penalty will apply regardless of whether you have other excuses.

Assignment Specifications:

1. Define the following concepts in your own words and give an example for each of them (**15 pts**.).

a) Basic Block

b) Simple path

c) Prime Path

d) Edge Coverage

e) Complete Path Coverage

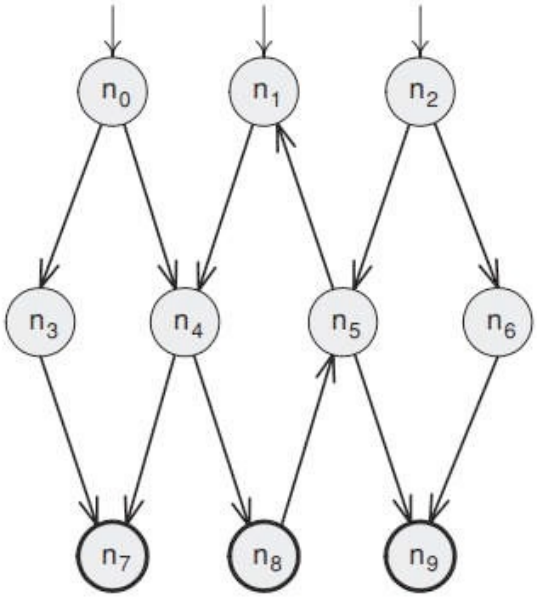
2. Answer questions (a)–(d) for the following graph (**20 points**):

a) List the sets N, N_0, N_f, and E for the G

b) Give a path that is not a test path

c) List all test paths

d) Enumerate the test requirements for prime path coverage on the graph



3. Answer questions (a)–(d) for the graph defined by the following sets (**20 pts**.):

N = {1, 2, 3, 4}
N_0 = {1}
N_f = {4}
E = {(1, 2), (2, 3), (3, 2), (2, 4)}

a) Draw the graph

b) List test paths that achieve node coverage, but not edge coverage.

c) List test paths that achieve edge coverage, but not edge Pair coverage

d) List test paths that achieve edge pair coverage.

4. Answer questions (a)–(f) for the graph defined by the following sets (**30 pts.**):

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:
t_0 = [1, 2, 4, 5, 6, 1, 7]
t_1 = [1, 2, 3, 2, 4, 6, 1, 7]

a) Draw the graph.
b) List the test requirements for edge-pair coverage. (You should get 12 requirements of length 2).
c) Does the given set of test paths satisfy edge-pair coverage? If not, identify what is missing.
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 side-trip? If so, identify the side-trip.
e) List the test requirements for node coverage, edge coverage, and prime path coverage on the graph.
f) List test paths that achieve node coverage but not edge coverage on the graph.

5. Answer questions (a)–(c) for the graph defined by the following sets (**15 pts.)**:

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.
b) List the eight test requirements for edge-pair coverage (only the length two sub-paths)
c) Consider the prime path [n2, n0, n2] and path p2. Does p2 tour the prime path directly? With a side-trip?