A6. Graph Coverage Criteria

DUE: 11:59PM, Sunday 9 October 2022

25 points

Objectives

- The goal for this assignment is to practice questions related to the material on graph coverage.

Tasks

Note that you can use the tool provided on the textbook website (click here) to generate the test requirements. This will help you answer parts 1.b, 1.e, and 2.b.

1. (**15 points**) You are given a graph with the following nodes and edges:

   - **Set of nodes** = { 1, 2, 3, 4, 5, 6, 7}
   - **Set of initial nodes** = {1}
   - **Set of final nodes** = {7}
   - **Set of edges** = {(1, 2), (2, 3), (2, 4), (4, 3), (3, 5), (3, 6), (5, 3), (6, 1), (1, 7)}

   Consider the following three test paths:

   1. [1, 2, 4, 3, 6, 1, 7]
   2. [1, 2, 3, 5, 3, 6, 1, 7]
   3. [1, 2, 4, 3, 5, 3, 6, 1, 2, 3, 6, 1, 7]

   Answer the following questions based on the above graph and test paths.

   a. (5 points) Draw the graph.

   b. List the test requirements for edge-pair coverage.

   c. (2 points) Do the test paths 1 and 2 (taken together) satisfy edge-pair coverage? If not, identify what is missing.

   d. (3 points) Consider the simple path [1, 2, 4, 3, 6]. Does test path 3 tour the simple path directly? With a sidetrip? If so, identify the sidetrip. With a detour? If so, identify the detour.

   e. List the test requirements for node coverage, edge coverage, and prime path coverage on the graph.

   f. (2 points) List test paths that achieve node coverage but not edge coverage on the graph.

   g. (3 points) List test paths that achieve edge coverage but not prime path coverage on the graph.

2. **(10 points)** Consider the `main` method provided in the `PrimeSieve` class on the website linked here. Answer the following questions:

    a. (5 points) Draw the control flow graph for the statements inside the main method.

    b. Enumerate the test requirements for node coverage, edge coverage, and prime path coverage for the above graph.

    c. (2 points) List test paths that achieve node coverage but not edge coverage on the graph.

    d. (3 points) List test paths that achieve edge coverage but not prime path coverage on the graph.

Submission

Type the answers to the above questions in a document called `a6.pdf`. Submit the file using **Assignment Submission** in Canvas.
