Swinburne University of Technology
Department of Computing Technologies

Software Testing and Reliability
SWE30009
Semester 2, 2023

Assignment 1

This is an individual assignment worth 20% of the total unit score.
Due date: 11:00pm, Monday, 21 August 2023

DESCRIPTION

Program under test

Consider the following program:

Input A, B // A and B are real variables
A = A - B
*C = A * 2*
Output C // C is a real variable

Assume that there are only four feasible arithmetic operators, namely, + (addition), - (subtraction), * (multiplication) and / (division).

Assignment Requirement

This assignment serves to strengthen your understanding of the test activities as well as how to generate test cases with reference to the code of the program under test. In particular, you are required to do the following:

   A. **Tasks:**

   You are required to adopt the testing objective of detecting ANY possible incorrect use of arithmetic operators in this program.

   The above program contains two arithmetic operators, namely, "-" in the statement of "A = A - B" and "*" in the statement of "C = A * 2". By "ANY possible incorrect use of arithmetic operators", it means that "-" is incorrect, or "*" is incorrect, or both "-" and "*" are incorrect.

   Task 1: Explain and show all details on how to design the test cases for the above testing objective.

Task 2: Suppose you use test case (A=3, B=1) to test the above program. Is this test case able to achieve the required testing objective? Provide your answer with justifications.

Task 3: Based on your design in Task 1, what is (or are) the concrete test case (or cases) that can achieve the above testing objective? Explain and justify your concrete test case (or cases).

Task 4: Given B=1, find all possible values of A so that the concrete test cases (A,B) cannot achieve the above testing objective? Explain and justify the correctness of your solution.

B. **Requirement:**

- **You need to prepare a self-contained and complete report for addressing these four tasks**. Your report must use 12-point font size on A4 papers. The report must contain <u>no more than three pages</u>. The coverage page is not required, but your submission must contain <u>your full name and your student number</u> on the first line of its first page.

- **You must submit the Assignment 1 report as a single PDF file** (which must have the filename specified in this format as "Assignment1-YourStudentID-YourSurname.pdf", for example, Assignment1-12345678-Nash.pdf) before the due date using the Submission System for Assignment 1 in Canvas available to you.

C. **Instructions**:

You may want to refer to "Lecture 2" for all tasks. For Task 3, you can use the trial method and may construct one or more than one concrete test cases. For Task 4, you can develop a program to find them automatically, or prove the exhaustiveness of test cases.

MARKING CRITERIA

- A maximum of **40 marks** for technical correctness, comprehensibility, cohesion and quality of Task 1.
- A maximum of **10 marks** for technical correctness, comprehensibility, cohesion and quality of Task 2.
- A maximum of **20 marks** for technical correctness, comprehensibility, cohesion and quality of Task 3.
- A maximum of **20 marks** for technical correctness, comprehensibility, cohesion and quality of Task 4.
- A maximum of **10 marks** is for the presentation, structure, comprehensibility and completeness of report, as well as the compliance with the submission requirements.
- **Penalty** will be applied for late submission and plagiarism. Refer to the Unit Outline for the policy on late submission and plagiarism.