SENG3320/SENG6320 Assignment 1 - Marking Guide (Semester 1 2019)

Weighting: 25%
Due: 23:59 05/05/2019

24th March 2019

1 Weighting

The course weighting for the assignment is 25%. Marks within the assignment are:

- Control Flow Graphs: 5
- Black Box Testing: 10
- White Box Testing: 10
- Total: 25

The final overall weighted mark will be rounded up to the nearest 0.5%.

2 Control Flow Graphs

Marks for this section are determined by comparing student-supplied graphs against target graphs for each method. The target graphs will be released along with student marks.

The calculation will be as follows:

$$
\begin{aligned}
&M = \{m \mid m \text{ is a method to draw the graph of}\} \\
&supplied_m = \{e \mid e \text{ is a node or edge in the student-supplied graph for method } m\} \\
&targets_m = \{e \mid e \text{ is a node or edge in the target graph for method } m\} \\
&missing_m = targets_m - supplied_m \\
&incorrect_m = supplied_m - targets_m \\
&graphTotal = 5 - 5 \cdot \frac{\sum_{m \in M} \min(|targets_m|, \max(|missing_m|, |incorrect_m|))}{\sum_{m \in M} |targets_m|}
\end{aligned}
\tag{1}
$$

Where $graphTotal$ is the total score for the Control Flow Graphs section.

3 Black Box Testing

The marks for this are calculated per method and test, based on whether or not each numbered dot point has been answered correctly. Submitted tests will be compared against target tests, which will be provided along with student marks.

The calculation will be as follows:

$$
\begin{aligned}
&M = \{m \mid m \text{ is a method to be tested}\} \\
&S_m = \{s \mid s \text{ is a class or partition to be tested}\} \\
&boundaries_m = \frac{correctBounaries_m}{targetBoundaries_m} \\
&classes_m = \frac{correctClasses_m}{targetClasses_m} \\
&partitions_m = \frac{correctPartitions_{each}}{targetPartitions_{each}} \\
&reporting_m = \frac{boundaries_m + 2\,(classes_m + partitions_m)}{5} \\
&supplied_s = \{t \mid t \text{ is a student-supplied test for } s\} \\
&targets_s = \{t \mid t \text{ is a target test for } s\} \\
&valid_s = \begin{cases} 1 & \text{if the tested class or partion } s \text{ is valid} \\ 0 & \text{otherwise} \end{cases} \\
&efficiency_s = \left| \frac{|supplied_s| - |targets_s|}{\max(|supplied_s|, |targets_s|)} \right| \\
&appropriateness_s = valid_s \cdot efficiency_s \\
&correct_t = \begin{cases} 1 & \text{if the inputs are amongst the correct inputs for } s \\ 0 & \text{otherwise} \end{cases} \\
&output_t = \begin{cases} 1 & \text{if the specified outputs are correct for the specified inputs} \\ 0 & \text{otherwise} \end{cases} \\
&result_t = \begin{cases} 1 & \text{the results of the test are correctly explained} \\ 0 & \text{otherwise} \end{cases} \\
&test_t = \frac{correct_t + correct_t \cdot output_t + correct_t \cdot output_t \cdot result_t}{3} \\
&testing_s = appropriateness_s \cdot \frac{\sum_{t \in supplied_s} test_t}{|supplied_s|} \\
&blackTotal = \frac{\sum_{m \in M} \left(reporting_m + \frac{\sum_{s \in S} testing_s}{|S|} \right)}{2|M|}
\end{aligned}
\tag{2}
$$

Where *blackTotal* is the total score for black box testing.

4 White Box Testing

The marks for this are calculated per method, coverage type, and test, based on whether or not each numbered dot point has been addressed correctly. Submitted tests will be compared against target tests, which will be provided along with student marks.

The calculation will be as follows:

$$
\begin{aligned}
&M = \{m \mid m \text{ is a method to be tested}\} \\
&C = \{statement, branch, path\} \\
&componentCount_{m,c} = \begin{cases} 1 & \text{if } guessedCount_{m,c} = trueCount_{m,c} \\ 0 & otherwise \end{cases} \\
&reachable_{m,c} = \begin{cases} 1 & \text{if the maximum reachable coverage is correctly described} \\ 0 & \text{otherwise} \end{cases} \\
&reporting_{m,c} = \frac{componentCount_{m,c} + reachable_{m,c}}{2} \\
&supplied_{m,c} = \{t \mid t \text{ is a student-supplied test}\} \\
&targets_{m,c} = \{t \mid t \text{ is a target test}\} \\
&reached_{m,c} = \frac{hit_{m,c}}{target_{m,c}} \\
&efficiency_{m,c} = \min(1, \max(0, 1 - \frac{|supplied_{m,c}|}{|targets_{m,c}|})) \\
&appropriateness_{m,c} = reached_{m,c} \cdot efficiency_{m,c} \\
&output_t = \begin{cases} 1 & \text{if the specified outputs are correct for the specified inputs} \\ 0 & \text{otherwise} \end{cases} \\
&result_t = \begin{cases} 1 & \text{the results of the test are correctly explained} \\ 0 & \text{otherwise} \end{cases} \\
&test_t = \frac{output_t + output_t \cdot result_t}{2} \\
&testing_{m,c} = appropriateness_{m,c} \cdot \frac{\sum_{t \in supplied_{m,c}} test_t}{|supplied_{m,c}|} \\
&whiteTotal = 10 \cdot \frac{\sum_{m \in M} \sum_{c \in C} (reporting_{m,c} + 4 \cdot testing_{m,c})}{5|M||C|}
\end{aligned}
\tag{3}
$$

Where *whiteTotal* is the total score for white box testing.