CSC110 Fall 2024 Problem Set 1

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Part 1: Interpreting Test Results

1. test_class_average_single_student_equal()- **PASSED**
   test_section_average_many_students_equal()- **FAILED**
   test_class_average_many_students_different()- **FAILED**

2. **test_section_average_many_students_equal()**- For this function the example grades list provided contained lists with all elements as strings rather than float. This meant when the string type test cases were later passed into the student_average() function, they could not be multiplied by the weights (since floats cannot multiply strings) causing a Type Error.

   test_class_average_many_students_different()- For this function the list weights had been set up incorrectly in the student_average() function. The order of the weights was in descneding order, while the grades they were applied to were in ascending order, which was incorrect as the highest mark should have the highest weightage and vice versa. This meant the calculation of the weighted grade was incorrect, leading to an incorrect class average, meaning the tests failed, not matching the value in the example.

3. t**est_class_average_single_student_equal()** passed because it only had data for one student, for whom all the grades were the same. This meant applying incorrect weightage wouldn't make a difference to their average, since each weight would be multiplied by the same number. This gave the same average of 70.0 as expected from the test. Additionally the grades in the function were all floats avoiding a Type Error similair to the one in test_section_average_many_students_equal().

Part 2: Predicate Logic

1. **S = {0, 1, 2, 3, 4, 5}**

$$\mathbf{P} : \forall x \in S,\ x > 1 \tag{1}$$

$$\mathbf{Q} : \forall x \in S, \exists y \in S,\ y < x \tag{2}$$

   P is not always true since S includes values such as **0** and **1** which cannnot be greater than **1**. Q is not always true since not all values in the set have a another value in the set which which they are greater than. For example, for $\mathbf{x = 0}$, there is no y in S, s.t `y < x`.

2. Complete this part in the provided `ps1_part2.py` starter file.

3. Complete this part in the provided `ps1_part2.py` starter file.