Software Testing
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**Lab One**

**Part One - Test Cases**

T1 - function leapYear() with input 2000 -> expected result = true
T2 - function leapYear() with input 1900 -> expected result = false
T3 - function leapYear() with input 2020 -> expected result = true
T4 - function leapYear() with input 2025 -> expected result = false
T5 - function leapYear() with input -2001 -> expected result = false
T6 - function leapYear() with input 0 -> expected result = false

**Part Two - Analyze Test Cases**

| Test Case | Input Year | Expected Outputs | What the test shows: |
|---|---|---|---|
| Test case 1 | 2000 | TRUE | Divisible by 400 results in true |
| Test case 2 | 1900 | FALSE | Divisible by 100 but not 400 results in false |
| Test case 3 | 2020 | TRUE | Divisible by 4 but not 400 or 100 results in true |
| Test case 4 | 2025 | FALSE | Not divisible by 400 or 4 results in false |
| Test case 5 | -2001 | FALSE | Negative integer results in false |
| Test case 6 | 0 | FALSE | 0 results in false |

The test suite is sufficient to ensure the program works without failure because the test suite confirms the program works based on the specifications. It also takes into account error testing and prevents error hiding by testing one error at a time. For example, instead of testing -2000 for the negative number test case, -2001 is used to avoid also testing for divisible by 100 that also has the expected output of false. Even though not every input can be tested, the program is verified to work correctly based on the test suite.

**Part Three - Devil's Advocate**

The system could still pass the test due to a programming mistake when the nested if statements are in the incorrect order. For example, if the program is checking if the leap year is divisible by 4 before 100, 1900 could return true. The system could also pass the test if it handles negative numbers incorrectly. For example, if (year % 400 == 0) return true, this would result in -2000 returning true when it should return false. The program could have an if statement at the start to check for negative inputs and return false.