**Topic 5: Test-driven Development**

**Formative Assessment 05**

**Test-driven development (115359 & 115384)**

*Hello and welcome to the assessment. Here you’ll prove to the world just how much you know and understand about what you’ve just learnt in the learner guides. This is an important part of your time at Umuzi because once this is done, you’ll be certified! So please, take this time to learn everything you can! Take a look at some pointers below with regard to answering the questions…*

* *Be specific*
* *Write professionally - no shorthand!*
* *Your answers must be original and come from your brain and your brain only.*
* *No copy/paste tricks! Our markers have seen it all and will know if you’re taking shortcuts.*
* *Remember, sloppy or poor work will be sent back to you to do again, so do it properly the first time and you’ll be done in no time.*
* *Ask for help at any time. Ask your friends, a manager, anybody!!*
* *Don’t skip any questions! You must do them all!*
* *You’ll see two boxes after each question - one for your answer and one for the marker’s comments. DO NOT delete the marker’s comments if you are required to resubmit your work after the first attempt. Should you have to do it again you will see a new box* ***under*** *the marker’s comments, so fill that one out in* ***BLUE****. Remember!! It’s not the end of the world if you have to resubmit. You’re here to learn, so don’t beat yourself up if you don’t get it right on the first go. Obviously, try your best to get it right on the first attempt, but if not, you have another chance to do it properly!*

*Ok, and that’s that! Time to get to it! Good luck, have fun and enjoy! :)*

**Enter your name and surname below**

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| **Luvo Spofana** |

**1.** **Describe three types of errors in computer programming [6 Marks](6 - 359 SO:1 AC:1-3)**

**Your answer below**

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| **Syntax error –** A syntax error occurs when a user doesn’t follow the rules of the programming language they are using. When a built-in function is misused, or functions and variables are not typed out correctly the console will throw an error when the program is run.  **Conversion error –** Conversion errors normally come about when one is attempting to convert one type data to another, they occur when data cannot be converted from one f type to another.  **Semantic error –** When there’s a semantic error in one’s program, the program will run successfully and not throw any error messages, but the program will not do the right thing or produce the expected outcome. A semantic error is debugged by working backwards and looking at the output to understand what the program one wrote is doing. |

**Marker’s Comments**

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**2. What is an underflow error and an overflow error? [4 Marks](4 - 359 SO:2 AC:1-2)**

**Your answer below**

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| **Overflow error –** This error occurs when a program is run, and the result of a calculation is a number that is too large and is outside of its well-defined range of values it can represent in memory on its CPU.  **Underflow error –** This error occurs when a program is run, and the result of a calculation is a number that is smaller than the smallest absolute value the computer can represent in memory on its CPU. |

**Marker’s Comments**

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**3. What is the three step process for test-driven development? [6 Marks](6 - 384 SO:1 AC:1-4)**

**Your answer below**

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| **Red** – The first step is a phase in one in which the developer writes the tests without having written the code with the program’s functions and methods and executes the tests to fail. When the tests fail, the unit test framework the developer is using will give a red flag.  **Green** – In this step the developer then writes the code that will pass the 1st test. With the Test-driven development approach, the developer writes code just enough to pass 1 test at a time, and then goes on to add another test that will fail and raise a red flag for which the developer will write more code that will then pass the 2nd tests and keeps going.  **Refactor** – The 3rd step comes into place when all the tests and the code to pass the tests has been written, the goal of this step is to adopt and incorporate good design patterns, consider the code’s maintainability and quality so it can be adjusted to be up to the expected standard. |

**Marker’s Comments**

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**4. How does test-driven development help reduce the number of errors/bugs in a program? [4 Marks](4 - 359 SO:2 AC:1-2)**

**Your answer below**

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| Test-driven development helps reduce errors by ensuring that the developer has the test logic before they start writing any code. Which means that an implementation of code for a certain feature only gets written when a test that verifies that the code works correctly has been written.  The tests help give immediate feedback because they run on every change and as soon as the developer breaks any part of the code they will know and efficiently be pointed to the broken part of the code. |

**Marker’s Comments**

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**5. How do testing libraries (like QUnit or Mocha) help a programmer identify and eliminate bugs from a program? [4 Marks](4 - 384 SO:2 AC:1-4)**

**Your answer below**

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| They help a developer verify that their code works as expected.  When something goes wrong within one’s program, the purpose of these libraries is to make it easy for the developer to easily know and understand what went wrong, and where.  Testing libraries help developers organize their tests and makes it easy for them to process the test results.  Another way testing libraries help is by executing the test functions individually and reporting how many tests, if any, out of the total number of tests have failed and how many have run successfully. |

**Marker’s Comments**

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