Software Testing 2023/4 Portfolio

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1 Outline of the Software Being Tested

The "PizzaDronz" application has been developed for my Informatics Large Practical course, and is written in Java. The purpose of the software is to facilitate a drone-based pizza delivery system, which delivers pizzas to students in Appleton Tower. The system retrieves all the orders for a given date (supplied as a Command Line argument), validates them, and then generates flight paths for valid orders utilising the A* algorithm. 3 files are then outputted, deliveries-YYYY-MM-DD.json, flightpath-YYYY-MM-DD.json, and drone-YYYY-MM-DD.geojson.

2 Learning Outcomes

1. **Analyze requirements to determine appropriate testing strategies** [20%]

   (a) **Range of requirements, functional requirements, measurable quality attributes, qualitative requirements**: Refer to `LO1.pdf` Section 1. It contains a comprehensive list of functional and non-functional requirements (Section 2). In addition, I have provided a detailed requirements analysis to show how I derived them (Section 1).

   (b) **Level of requirements, system, integration, unit**: Each requirement has either unit, integration or system level assigned to it. I have included a variety of non-functional requirements that cover various desirable qualities of the software. Refer to `LO1.pdf` Section 2.

   (c) **Identifying test approach for chosen attributes**: For each requirement, I have highlighted the test approach and briefly explained them, Refer to `LO1.pdf` Section 3.

   (d) **Assess the appropriateness of your chosen testing approach**: I have given a detailed assessment of my test approach, and highlighted the positives and drawbacks. Refer to `LO1.pdf` Section 4.

2. **Design and implement comprehensive test plans with instrumented code** [20%]

   (a) **Construction of the test plan**: Refer to Sections 1,2 and 3 of the `LO2.pdf` document for the test plan.

   (b) **Evaluation of the quality of the test plan**: Refer to Section 4 of `LO2.pdf`, it has key information on any drawbacks/risks associated with the plan, and how they have been accounted for.

   (c) **Instrumentation of the code**: Refer to Section 5 of `LO2.pdf` for a detailed outline of the scaffolding and instrumentation required for each requirement being tested.

   (d) **Evaluation of the instrumentation**: Refer to Section 6 of `LO2.pdf` for a detailed evaluation of the instrumentation and scaffolding.

3. **Apply a wide variety of testing techniques and compute test coverage and yield according to a variety of criteria** [20%]

   (a) **Range of techniques**: Refer to Section 2 of `LO3.pdf` for a detailed description of each technique used.

(b) **Evaluation criteria for the adequacy of the testing**: Refer to Section 3 of the `LO3.pdf` for my evaluation criteria for the adequacy of my testing.

(c) **Results of testing**: Refer to Section 4 of `LO3.pdf` for the results of the testing, and an outline of errors detected as a result of testing.

(d) **Evaluation of the results**: Refer to Section 5 of `LO3.pdf` for the evaluation of the results of testing.

4. **Evaluate the limitations of a given testing process, using statistical methods where appropriate, and summarise outcomes** [20%]

   (a) **Identifying gaps and omissions in the testing process**: Refer to Section 1 of `LO4.pdf` for a detailed outline of the gaps and omissions in the testing process.

   (b) **Identifying target coverage/performance levels for the different testing procedures**: Refer to Section 2 of `LO4.pdf` for the target coverage/performance levels.

   (c) **Discussing how the testing carried out compares with the target levels**: Refer to Section 2 of `LO4.pdf` for a detailed explanation on how the testing carried out compares with the target levels.

   (d) **Discussion of what would be necessary to achieve the target level**: Refer to Section 2 of `LO4.pdf` for an explanation of what is necessary to reach a certain target level if it isn't met.

5. **Conduct reviews, inspections, and design and implement automated testing processes** [20%]

   (a) **Identify and apply review criteria to selected parts of the code and identify issues in the code**: Refer to Section 1 of `LO5.pdf` for a detailed explanation of a code review/inspection.

   (b) **Construct an appropriate CI pipeline for the software**: I have both designed and constructed a CI/CD pipeline for my project, Section 2 of `LO5.pdf` contains the full details of this.

   (c) **Automate some aspects of the testing**: I have explained what parts of the testing I would automate, and in what order in Section 3 of `LO5.pdf`.

   (d) **Demonstrate the CI pipeline functions as expected**: I have explained how the CI/CD pipeline handles a successful case, a case with a compilation error, and a case where one of the tests doesn't pass in Section 4 of `LO5.pdf`.

3 Additional Information

Any references to Y&P refer to Software Testing and Analysis: Process, Principles, and Techniques by Mauro Pezze and Michal Young.