Test Report

**Introduction**  
The Testing of this project will happen in 2 main phases. First the back end and front end of the project will be tested separately, testing for speed, accuracy and Acceptability respectively. Then once all the tests in Phase one have been passed Testing will move onto phase 2. Which will test the communication between the server and the program, as well as the speed of communication between the two.

**Phase 1 - Unit Testing**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Test ID*** | ***Test Description*** | ***Test Input*** | ***Expected output*** | ***Actual Output*** | ***Comments*** |
| Request-1 | Request Returns Expected map area | |  | | --- | | -37.8066061867195 | | 144.9548339843750 | | Map of Map for -37.8066061867195,144.9548339843750 | Same Image |  |
| Request-2 | Request Returns Correct Map size | |  | | --- | | -37.8066061867195 | | 144.9548339843750 | | A 520\*640 Image | A 520\*640 Image |  |
| Request-3 | Request Returns Correct Colour Encoding | |  | | --- | | -37.6265459647984 | | 144.6781158447260 | | C:\Users\User\AppData\Local\Microsoft\Windows\INetCache\Content.Word\static.png | Same Image | I |
| Request-4 | Request Happens in <2 second | |  | | --- | | -37.8066061867195 | | 144.9548339843750 | | <1.5 Response Time | 1.262372732  Response Time |  |
| Count -1 | Testing Image of Ocean | |  | | --- | | -37.8823149899180 | | 144.9417877197940 | | 0m^2 Area | 0 m2 Area |  |
| Count -2 | Small Amount of Road | |  | | --- | | -37.6265459647984 | | 144.6781158447260 | | More Area than Count-1 and less than Count-3 | 32457 m2 Area |  |
| Count -3 | Medium Amount of Road | |  | | --- | | -37.6830825507767 | | 144.6609497070310 | | More Area then Count-2 and less then Count-4 | 55731 m2 Area |  |
| Count-4 | Large Amount of Road | |  | | --- | | -37.8066061867195 | | 144.9548339843750 | | More Area then Count-3 and less then Count-5 | 295240 m2 Area |  |
| Count-5 | All Road | All Green Image | 1000000 m2 Area | 1000000 m2 Area |  |
| Count-6 | Counts Pixels in appropriate Time | |  | | --- | | -37.8823149899180 | | 144.9417877197940 | | <0.5 Seconds | 0.314512968  Seconds |  |
| Count-7 | Counts Pixels in appropriate Time | |  | | --- | | -37.8066061867195 | | 144.9548339843750 | | <0.5 Seconds | 0.292054653  Seconds |  |
| Output-1 | Returns data in GBR format | |  | | --- | | -37.8066061867195 | | 144.9548339843750 | | Green data, Blue data, Red data returned in that order | As Expected |  |
| Interface-1 | User Approval Testing-Aesthetics | The GUI | User approves of User interface | As Expected |  |
| Interface-2 | User Approval Testing-Intuitiveness | The GUI | User understands how to operate Interface without tutorial | As Expected |  |
| Interface-3 | Google Maps pin working as intended | The GUI | Pin Drags when clicked on | As Expected |  |
| Interface-4 | Latitude and Longitude Updating | The GUI | Dragging the pin updates latitude and longitude | As Expected |  |

***Discussion***The testing of certain aspects of this project proved difficult as there was no respected source out there that has results to check against, we overcame this difficulty by rather than testing for a specific value of road area we tested several different areas with a clear escalation of road area and checked that the calculated road area also increased between the test cases. Other than that issue testing was rather straight forward, and due to the extensive work done on the project before it reached this stage no major issues where found.

User Acceptance Testing was preformed both by my peers in the class as well as family members who had very limited knowledge of the project to cover the full range of possible users, and while the program required a general explanation of what was the point and what it was trying to do, I felt that it is safe to assume that anybody using the program would already have that knowledge, and so considered it a pass.\

Something interesting that arose in testing is that it seems that the Google static API takes longer to respond to requests the more roads there are on the image, fortunately even for super dense roads it falls under my expected time, but it was a complication that I was not expecting to encounter.   
  
**Phase 2 - System Testing**

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| --- | --- | --- | --- | --- | --- |
| ***Test ID*** | ***Test Description*** | ***Test Input*** | ***Expected output*** | ***Actual Output*** | ***Comments*** |
| Communication-1 | Server Retrieves latitude and longitude from google API | |  | | --- | | -37.8066061867195 | | 144.9548339843750 | | Server outputs latitude and longitude to console | As expected |  |
| Communication-2 | Back-end receives latitude and longitude from server | |  | | --- | | -37.8066061867195 | | 144.9548339843750 | | Back-end outputs latitude and longitude to console | As expected |  |
| Communication-3 | Server receives RGB values from Backend | |  | | --- | | -37.8066061867195 | | 144.9548339843750 | | Server outputs RGB values to console | As expected |  |
| Communication-4 | Webpage receives RGB values from Server | |  | | --- | | -37.8066061867195 | | 144.9548339843750 | | Webpage displays RGB values | As expected |  |
| Full-Test-1 | Speed Test-Small Roads | |  | | --- | | -37.6265459647984 | | 144.6781158447260 | | <10 Seconds | 3.4  Seconds |  |
| Full-Test-2 | Speed Test-Lots of Roads | |  | | --- | | -37.8066061867195 | | 144.9548339843750 | | <10 seconds | 3.6  Seconds |  |
| Full-Test-3 | Accuracy Test-Small Roads | |  | | --- | | -37.6265459647984 | | 144.6781158447260 | | 32457 (same as before) | 32457 |  |
| Full-Test-4 | Accuracy Test-Lots of Roads | |  | | --- | | -37.8066061867195 | | 144.9548339843750 | | 295240 (Same as before) | 295240 |  |

***Discussion***Since the backend and GUI are both hosted on the same local machine it meant that communication between the back-end and server was almost entirely negligible when it came to the execution of the complete project (ENTER TIMES HERE). The simplicity of the communication also seemed to ensure that there was almost no chance of information loss occurring during the transfer as the correct values were returned everytime

**Conclusion**In Conclusion the program works slighter faster than specified and is accurate to the best of my ability to determine, it is certainly accurate to the calculations derived from the image, but testing how accurate the retrieved image is to the real-world total was something I did not come up with a way to test, even after communicating with peers, since they all took the same approach to the project as me, we had no control to test the accuracy of the original image against. That said the parts communicate flawlessly with each other and the GUI is both functional and aesthetically bearable so overall the project is functioning completely as expected as well as according the brief.