**Title:** Accurate Location

**Name(s):** Kasitphoom Thowongs

Student number(s): 65011328

email address(es): [65011328@kmitl.ac.th](mailto:65011328@kmitl.ac.th),

**Aim:** To show how accurate the data of collected GPS values by using standard deviation

**Methods:**

1. Tools:
   1. A computer / laptop which has Rust programming language installed.
   2. Visual Studio Code for IDE.
2. Step in the experiment
   1. Planning
      1. Read through the instructions.
      2. Read the input and find out how to handle it.
   2. Coding
      1. Code to read file inputs
      2. Make a function to find mean, standard deviation, max and min
   3. Debugging
      1. Debugging the code to see that the output and method is correct using function *eprintn!()*
   4. Procedure & Step
      1. Take input as .CSV file
      2. Collect Latitude and longitude values in to vector.
      3. Find mean, standard deviation, max and minimum
      4. Calculate error to meter using standard deviation
      5. Split data in 2. into two vectors to use for histogram creation
      6. Create histogram of both latitude and longitude
      7. Output both data into .CSV file

**Results:**

1. Observations
   1. The histogram of latitude is not as expected as the most points occur are not on the mean.
   2. The result of longitude is as expected, same as mean and the graph looks great.

**Discussion:** The result are expected as the result and value read is agreeable.

**Conclusion:** The accuracy of GPS in the computer is accurate as the result shown that there is an error of only 3 to 4 meters. The histogram show us where really the actual computer are located.

**Acknowledgments:**

I acknowledge that all of the code written, and all of the result are addressed by myself, and all information are correct.

(Kasitphoom Thowongs)

**Appendix:**

These are result of the output (both eprintln and println)

Mean Lat: 13.730427812500004, Mean Long: 100.78090829166666

Standard Deviation Lat: 0.000027619178308121402, Standard Deviation Long: 0.000038053667330387994

Min Lat: 13.730394, Min Long: 100.780824

Max Lat: 13.730487, Max Long: 100.780966

Standard Deviation Lat: 3.06957 meter, Standard Deviation Long: 4.10839 meter

|  |  |
| --- | --- |
| =======Latitude====== | =======Longitude====== |
| 13.73039 \*\*\*\*\*\*\*\*\*\*\*\*  13.73040 \*\*\*\*\*\*\*\*\*\*  13.73041 \*\*\*\*\*  13.73042 \*\*  13.73043 \*\*  13.73044 \*\*\*\*\*\*\*\*\*  13.73045 \*\*  13.73046 \*\*  13.73047  13.73048 \*\*\*\* | 100.78082 \*\*\*\*  100.78084 \*\*\*  100.78085 \*  100.78087 \*\*  100.78088 \*\*\*\*\*\*\*\*  100.78090 \*\*\*\*\*\*  100.78091 \*\*\*\*\*\*\*\*  100.78093 \*\*\*\*\*\*\*\*  100.78094 \*\*\*\*\*\*  100.78096 \*\* |

(CSV file will be attached via goedu website)