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# Formal Methods Assignment

Formal methods could have helped the Mars Lander with the outcome of having more error handling. If we assume that the code is proven [1] and we are using verified models and algorithms [2], that means our data and formulas were correct and that the robot will operate as it is supposed to, given the right data was inputted. As a result, there must have been some point in the code where a function might have asked for an input in metric while getting a response in imperial form, or vice versa. If there were proper conversions set in place, two different code segments using pounds and inches while the other used kilograms and centimeters wouldn't have caused the error. If we were to use the formal method of having robust error handling, we could set up more defensive measures to ensure we are reading in the correct data. For instance, we could have an acceptable range of input values, where if exceeded, means we are using the wrong system. One-hundred degrees Fahrenheit and thirty-eight degrees celsius means the same thing in human terms, but when inputted as an int, they mean two completely different scenarios for the computer. Furthermore, with robust error handling, we can make sure that even if the program doesn't crash, like having all values in the acceptance range, there still aren't any loopholes. If we take 0 to 100 fahrenheit degrees and -17 to 38 degrees celsius as an example again, there are values from 0 to 38 that fall into both acceptance ranges. Therefore, even if switching to one form of measurement could be easier, we can utilize formal methods to fix the original error.