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| **Bug** | **Cause** | **Steps to avoid reproduction** |
| Careless implementation of bit manipulation routines caused bugs. Specific: - subtracting of 1 after the inversion of the bits meant the subtraction was having the wrong effect. | - Lack of thought before implementation of the methods  - Lack of rereading of the new code to understand the code and data flow.  - Lack of thinking about ways that the code could break. | - Spend more time thinking before implementing any code. No matter how simple.  - Make it a note to reread every line of code before moving on to the next task at hand.  - Write test cases first will aid in defining a clear interface and thinking about the potential inputs that will break the code.  - Step through all of the code at least once in order to understand all of the data flow and what is happening in the code. |