Raspberry Pi 3 Model B GPIO pin Concurrent Access

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# Possible problems

The cold water dispenser uses Raspberry Pi for controlling of the device using GPIO pins and the execution of the dispensers software is likely split to multiple thread and possibly to multiple processes. This may cause problems when accessing GPIO pins, because we do not know will this cause race conditions in used libraries or on hardware level. One of the used libraries will be Mike McCauley’s bcm2835 and from reading the code of this library it is clear that it is not thread safe.

# Tests and solutions

Accessing GPIO pins using bcm2835 concurrently from multiple processes and reading code from the library I could not find any problems in concurrent access.

Accessing GPIO pins using bcm2835 concurrently from multiple threads in same process and synchronizing access using mutex I could not find any problems in concurrent access of GPIO pins.

Accessing GPIO pins using bcm2835 concurrently from multiple threads in same process without any synchronization corrupts the state of bcm2835 library. This problem is clear from the code if the library.

So when using this library there are no issues with concurrent access between different processes but with multiple threads in same process access to bcm2835 is required to be synchronized.