NRMS - Nuclear Reactor Management System

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1. Description

NMRS is implementation of very simple management system of nuclear reactor. Its job is to monitor temperatures (T1, T2 and T3) and decide when and if start cooling the reactor.

2. Workflow

NRMS uses CLI to communicate current temperatures and takes commands (quit or measure temperatures) from user.

When system is started it first measures temperatures and then awaits for user's action. They can quit or update temperatures.

2.1 Temperature measurement

Temperature values are generated by PRNG from Crypto++ library which is triggered each time user measures them. After measurement temperatures are being checked and decision is made: if any value exceeds its limit reactor is turned off nad cooling starts.

2.2 Cooling

Colling is implemented as decreasing the temperatures each time temperature is being measured. Step of cooling is defined as COOLING_EFFICIENCY, and it is constant. Management system will cool system even after quiting system (when necessary).

Note that while cooling is on. New temperatures are not generated by PRNG.

2.3 Quiting

Second user's action is turning off the system. When executed system checks if any of temperatures is to high to cool part of reactor. System turns off only when all three temperatures are appropriate.

3. Build and usage

To build project use cmake (version 3.20+) and install crypto++ library. Check path library in CMakeList.txt line 7 and run in project root directory:

```
mkdir build
cmake -DCMAKE_BUILD_TYPE=Debug -S . -B ./build
cmake --build ./build --target NRMS -- -j 6
```

Or open project from CMakeList.txt file with IDE that supports cmake projects.

To run just execute binary file:

```
./build/NRMS
```

4. Problems and troubleshooting:

4.1 Undefined behaviour

No UB present.

4.2 cmake

While developing cmake 3.20 was used but user can use previous version after editing CMakeLists.txt file.

4.3 Bug reporting

In case of any bugs please report then via email. Information below.

5. Contact

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