Big Excercise 4 – Distributed Modulo operation

Documentation

What's the big idea?

My program consists of two parts:

Module A takes two integers as arguments, the dividend and the divisor, and returns the result of a modulo operation of them. However, the actual operation is done on one or more Module Bs. A will get the solution from every B it calls and will accept it, if every B returns the same value. If the values are not the same, it will call all Bs again.

Module B takes port number as an argument and listens for messages which have to be in the form of 'integer%integer', for example 42%20. It then returns modulo of the two integers.

The gist of the excercise and my rather silly program is the fact that it contains three different faults.

The faults

The program contains three different faults (Though, the minimal error checking assumes that the configuration file and all of the inputs are correct, so beware).

Module B performs the modulo operation correctly 80% of time. However, there's a 10% chance that the result is off by one. There's also another 10% chance that B returns an error message.

If B returns an error message, A is programmed to be unable to handle it. If an error occurs, A will exit with a status code 1. This is the fault that propagates to user as a failure.

If one or many Bs returns a value that differs from at least one other returned value, the error will be handled by A and it will request the computation again from every B. This is the error tolerated by A.

However, if every B should happen to return the same wrong value (Chance to happen 0,1% with 3 Bs) A would accept the solution. This is the latent fault A won't be able to detect.

How to run

Compile both modules A and B (src/A/A.java and src/B/B.java). Run a considerate number of Bs if you ever want to get a solution instead of an error. (I have used 3). The command is java B.B <port number>. Run A with java A.A <integer> <integer>. Notice the space. Be sure to replace the

contents of the configuration file (configuration.txt) with the locations of B modules. By default there are 3 Bs configured to run on localhost ports 1024, 1025 and 1026. The addresses are each configured on their own lines. The format is 'ip:port'. Example: 127.0.0.1:1024.

The modules produce a few extra prints for debugging and seeing which values are returned.

Notes

The program has minimal error checking and assumes that the user is not up to shenaningans. If something does not work, check your inputs and the configuration file correctness.

The program source code can be found at https://github.com/Fleuri/BigExcercise4ModuleA

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