Concurrency and Parallelism

Degree in Computer Science 2022

Lab 3 – MD5 in Erlang

We are going to reimplement the hash breaking program from the previous assignment using message passing. The provided `break_md5` module breaks a hash using a single process.

```
1> break_md5:break_md5("76a2173be6393254e72ffa4d6df1030a").
76A2173BE6393254E72FFA4D6DF1030A: passwd
ok
```

The progress bar runs in its own process, and prints a bar each time it receives an update with the number of new checks completed.

Exercise 1 (**Check for several hashes**) Write a function `break_md5s/1`, that given a list of hashes finds the corresponding passwords. For example:

```
1> break_md5:break_md5s(["e80b5017098950fc58aad83c8c14978e",
"76a2173be6393254e72ffa4d6df1030a"]).
E80B5017098950FC58AAD83C8C14978E: abcdef
76A2173BE6393254E72FFA4D6DF1030A: passwd
ok
```

Exercise 2 (**Print the number of password checks per second**) Print the number of passwords checked every second next to the progress bar.

You can measure time using `erlang:monotonic_time(microseconds)`. This functions returns a monotonic value for the current time in microseconds (i.e. it returns a value that will always increase in subsequent calls, even if the system time changes)

For example,

```
T1 = erlang:monotonic_time(microseconds),
...
T2 = erlang:monotonic_time(microseconds)
```

`T2 - T1` is the elapsed time between the calls to `monotonic_time`.

Exercise 3 (**Break the hashes using several processes**) Change the implementation so that the hashes are calculated and checked using several processes. When a process finds the password associated with a hash, it should notify the rest of the processes so that they stop checking for it. The program should stop when there are no more hashes to break, and the processes that we started should stop.

Checking that all processes stop

Use the debugger (`debugger:start()`) to check if all processes finish correctly. The debugger will list all processes running in the modules selected in the menu `modules=>interpret`. Use that option to check if all the processes have finished when all passwords have been found.

Submission Deadline

The submission deadline is March 20th. You can create your repository for this assignemnt at https://classroom.github.com/a/4fONKAef.