Performance Evaluation of Computer Systems
Complete performance experiment

Vojtěch Horký      Petr Tůma

Department of Distributed and Dependable Systems
Faculty of Mathematics and Physics
Charles University in Prague
Czech Republic

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Task

Design and execute a complete performance experiment

1. Choose what you will evaluate.
2. Write down your expectations.
3. Write the measurement code.
4. Execute the experiment.
5. Compare the results with your expectations.

Implementation

Java or C++, data processing in R (preferably).
# Source Code & Submission

## Examples

http://d3s.mff.cuni.cz/teaching/peva/files/lab05.tar.gz

## Submission

By e-mail to horky@d3s.mff.cuni.cz.

Send TAR (or ZIP) with (commented) sources, run scripts, results and a brief README.
The Task
Option 1 – Threading Building Blocks (TBB)

Evaluate performance of tbb::concurrent_unordered_map.

Compare it with std::unordered_map or similar data structure.

The evaluation has to be in an environment with more than one thread.

A simple example code with the concurrent map and a thread synchronization is available for you in lab05.tar.gz.
Option 2 – Java Collections

Evaluate performance of `java.util.HashMap` and at least two other data structures (e.g. `LinkedList` or `TreeMap`).

You know the theoretical complexity of basic operations on these data structures.

- Do the implementations behave as expected?
- What about multiplicative constants?

Do not forget that Java needs longer warm-up and it is also better to limit variability in GC behaviour.
Choose What You Will Evaluate

Basically, choose axes and lines in the plot.

Do not choose more than two operations (there is not that much time for more in-depth analysis).

**Example**: `StringBuffer.insert(0, ...)`
- Vertical axis: elapsed time.
- Horizontal axis: size of existing content of the buffer (up to few KB).
- Lines: size of added content (1, 10, 100).
Write Down Your Expectations

Think what results would you expect from your measurements.

**Example:** StringBuffer.insert(0, ...)
  - Linear growth.
  - Depending on the existing size and on the size of the added content.
Run the Experiment!

Write the measurement code and execute it.
  – Think about warm-up and other factors.

Compare the results with your expectations.
  – Hypothesize on the reasons for differences.

Do measurements to confirm your hypothesis.
  – Use different metric, more fine-grained operations, ...