Parallel System Architectures

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Aims of this course

The aims of this course are:

- **to give a thorough understanding of modern microprocessor design and related issues**

- **to introduce you to parallelism in computer architecture**

You should already have an understanding of instruction set design and the principles and operation of (pipelined) processors

Bibliography

- The main course text is:

  - **Computer architecture - a quantitative approach, Hennessy & Patterson**

    - **4th Edition, ISBN 978-0-12-370490-0, or**

    - **5th edition, ISBN 978-0-12-383872-8**

- Other useful texts are

  - Processor Architecture, Silc, Robic and Ungerer, Springer, ISBN 13-540-64798-8

  - D. Sima, T. Fountain and P. Kacsuk, Advanced Computer Architecture a Design space approach (Addison-Wesley)
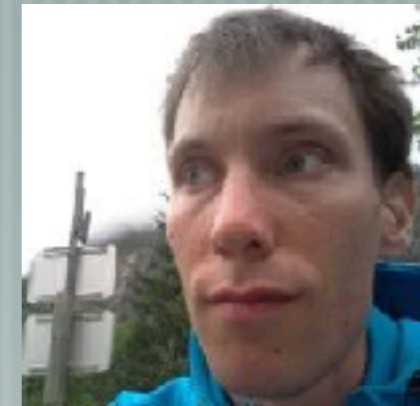
- Additional material will be made available at https://staff.fnwi.uva.nl/a.d.pimentel/psa/

Assessment

Assessment will be by coursework assignment and exam

The following weighting will be used

    Exam 60% and Assignment 40%

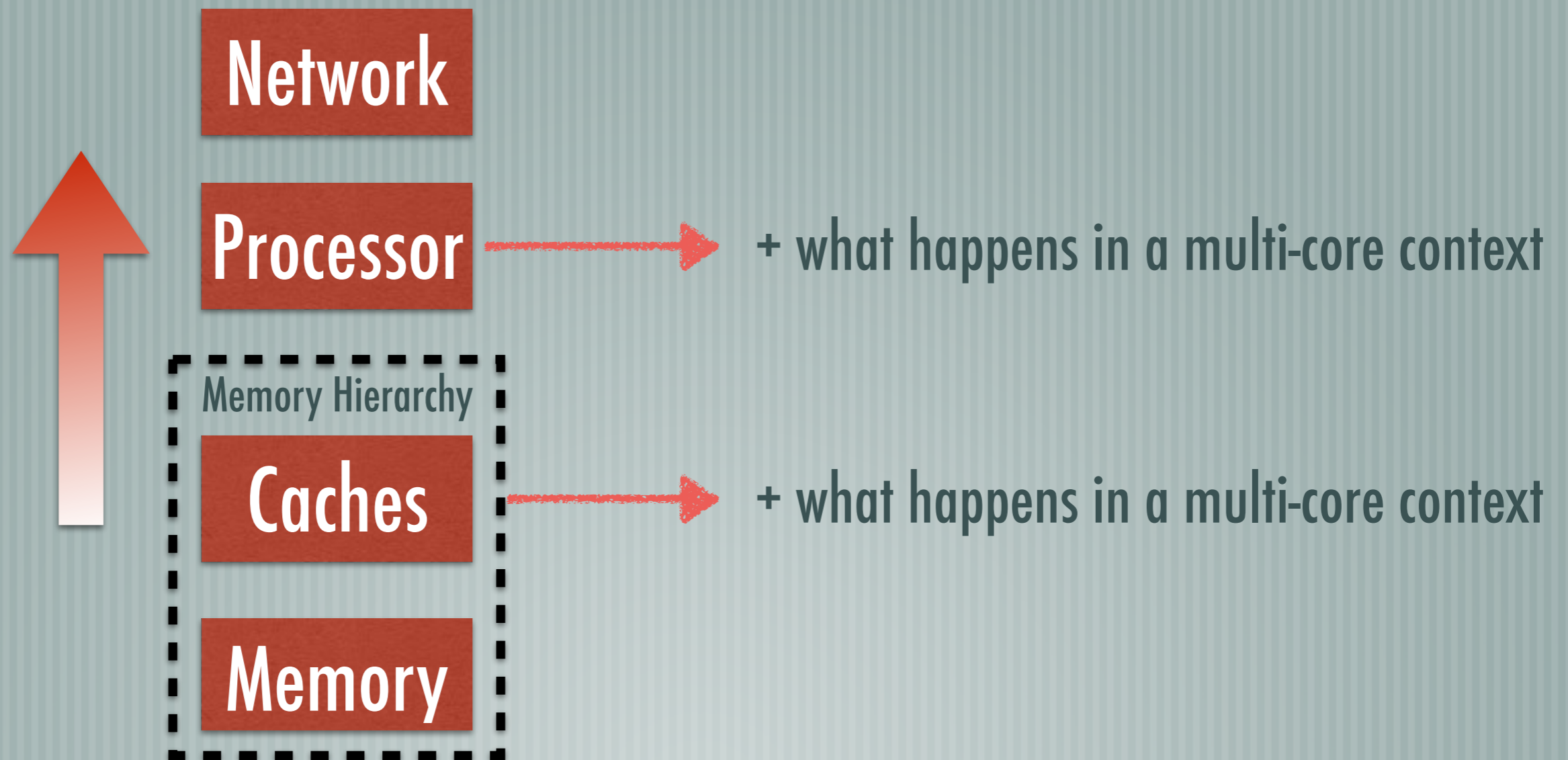Assignment labs supervised by Simon Polstra and Jun Xiao

    Website for assignments: https://staff.fnwi.uva.nl/s.polstra/psa2017/

    Mailing list: psa2017@list.uva.nl

        https://list.uva.nl/mailman/listinfo/psa2017

Assignment assessment will be based on demonstration to the lab supervisors (60%) and a brief report (40%) on the observations of your results

'Topic flow' of this course

Network

Processor → + what happens in a multi-core context

Memory Hierarchy

Caches → + what happens in a multi-core context

Memory

Overview

The following topics will be covered in a bottom-up approach to the subject

1. **Memory and memory hierarchies**

2. **Processor (micro-)architecture: Dynamic concurrency**

   — Pipelined processors, superscalar microprocessors

3. **Processor (micro-)architecture: Explicit concurrency**

   — VLIW, EPIC, and hardware multi-threading

4. **Multi-core systems and networks of processors**

5. **Embedded computer systems**

6. **Interconnection networks**