# Computer Architecture
## Agenda

http://d3s.mff.cuni.cz/teaching/computer_architecture/


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**CHARLES UNIVERSITY IN PRAGUE**

**faculty of mathematics and physics**

# Course information

- **Lecturer:** Lubomír Bulej
  - Dept. of Distributed and Dependable Systems
  - Malá Strana, 2nd floor, room no. 205
  - bulej@d3s.mff.cuni.cz
- **Lectures**
  - Tuesday 10:40, S4 (EN)
  - Wednesday 10:40, S5 (CZ)
  - http://d3s.mff.cuni.cz/teaching/nswi143

# Course contents

- **Processor architecture**
  - Gates, combinatorial and sequential cirtcuits, functional blocks, arithmetic operations
  - Processor performance, basic metrics
  - Instruction execution, data path and control
- **Computer architecture**
  - Memory subsystem, cache
  - Latency and throughput
  - Parallel and vector processing

# Some of what you should know about...

- … after finishing the course
  - **Basic architecture of a computer**
  - **How does a processor execute instructions**
  - **How to measure/compare computer performance**
  - **What determines program performance and how can a programmer influence it**
  - **How does the processor/computer architecture impact program performance**
  - **Why can‘t we just increase CPU frequency all the time**
  - **Why do we need to move from single-core to multi-core CPUs**
  - **What a processor cache is and how does it work**
  - **Why cache coherence makes scaling difficult**

# Literature

- **Books**
  - **D. A. Patterson, J. L. Hennessy: *Computer Organization and Design***
    - Recommended for this lecture
  - A. S. Tanenbaum: *Structured Computer Organization*
  - W. Stallings: *Computer Organisation and Architecture*
  - V. P. Heuring, H. F. Jordan: *Computer Systems Design and Architecture*

# Literature (2)

- **Internet**
  - Wikipedia
  - Similar courses at other universities
    - MIT, Princeton, Berkeley, Carnegie Mellon, (Coursera, edX, ...)

# How to check your understanding?

- **Try solving exercises**
  - „Check yourself“ sections in the *Computer Organization and Design* book

# Exam

- **Written form only**
  - A set of questions covering the material from lectures
  - Oral exam only in special circumstances
- **Requirements**
  - Emphasis on understading the basic principles and the ability to apply them in certain situations
    - As opposed to memorizing facts
  - **Attention:** Passive knowledge from slides/book not enough