# Exam Preparation and Summary of Topics
# Advances Systems Programming S. 5 Bachelor WS21/22
# h_da Darmstadt

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## Contents



# 1 Introduction to Systems Programming

## 1.1 What is Systems Software?

Important aspects of systems software:

Systems software ...

- ... closely interacts with the hardware.
- ... is concerned about efficiency.
- ... is used by other software as opposed to application software which is used by the end-user directly.

Examples for systems software:

- Operating system
- Compiler
- Game engine
- Search engine
- Programming languages virtual machines e.g. java virtual machine
- Device drivers

Examples for application software:

- Text editor
- Shopping website
- Social media apps
- Chat client

## 1.2 Systems Programming Languages

Systems programming languages are languages which make systems programming easy. There are three properties we are especially interested in:

1. Direct access to hardware resources:
   - Memory management
   - Network throughput
   - GPU
   - CPU (single or multi core)
   - threads and processes
2. Performance, therefore mostly compiled languages
3. It would be nice to have some useful abstractions to improve productivity (C/C++ $\rightarrow$ Rust or Go).

Examples for systems programming languages:

- C, C++
- Rust
- Go
- Assembly (rarely)

Examples for application programming languages:

- JavaScript (disgusted tone of voice)
- Python
- Java