



Exercise sheet 1x – Basic setup and first steps

Goals:

- Definition of computer architecture vs computer organisation
- Computability
- Recap „IT-Systeme“ lecture
- Check your own computer

Exercise 1x.1: What does computer architecture mean?

- (a) Describe in your own words the meaning of computer architecture.
- (b) Describe in your own words the meaning of computer organisation.

Exercise 1x.2: Computability (recapitulation semester 1–3)

- (a) Can you make a statement about whether a calculation is computable on a certain computer architecture (e.g. Intel) but not on another (e.g. PowerPC)?

Proposal for solution: If you can simulate a Turing Machine, you can compute everything. But in real life there are some differences, eg:

- performance
- price
- memory
- programming comfort

Exercise 1x.3: Compatibility

- (a) State some examples for compatibility (also from everyday life).

Proposal for solution:

- Intel Pentium compatible to Intel 8086 (in real/virtual mode)
- IBM Mainframe Computer compatible to its counterpart from the 60s
- Schuko plug:
 - Italy/France: mechanically incompatible
 - USA: electrically incompatible

- (b) Does every change to an HSI cause incompatibility?

Proposal for solution: No, not necessarily. If you wrap the old HSI into the new one, you are still compatible

Exercise 1x.4: Check your own computer



- (a) Which CPU do you have (vendor, type, frequency, number of cores)?
- (b) How many transistors has your CPU?
- (c) How much RAM and which type of RAM do you have?
- (d) Which GPU do you have?
- (e) Which data storage (hard disc/SSD) do you have (vendor, type, capacity, speed)?

Exercise 1x.5: C and assembler knowledge

- (a) Recap your „IT-Systeme“ knowledge:
 - Assembler coding
 - Registers
 - Digital components
- (b) Recap your „programming“ knowledge:
 - C, data types, arrays, character arrays (strings)
 - Pointers, function pointers
 - Structs, unions