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Exercise Sheet 1

Computer Engineering and Communication Networks

Handout: 19.09.2019 (No hand-in)
Discussion: 26.09.2018 (start 10:00 a.m.)

1. Basics and Introduction

1.1. What is the difference between hardware and software?
1.2. Name 4 basic components of a computer.
1.3. What is the purpose of the Input and Output unit? Mention 2 examples.
1.4. What is the purpose of the memory unit? Which types exist?
1.5. What is the purpose of the CPU?
1.6. Which further hardware components are needed to have a running computer?
1.7. What components are presented by the von-Neumann Architecture? Which component is missing in comparison to Question 1.2 and 1.6?
1.8. What does “Moore’s Law” state?
1.9. What trends are predicted for the future development of computer systems?

2. Arithmetic

2.1. What is the general purpose of arithmetic?
2.2. What number systems do you know? State the used base.
2.3. What is the smallest unit a binary computer can handle?
2.4. What is the binary number system?
2.5. What is the purpose of the Horner Scheme? How does it work?
2.6. Which representation options for negative numbers do you know?
2.7. What is the hexadecimal representation of the number Z = 1100111011001000?
2.8. Convert the decimal number 98712_{10} into the octal number using the Horner scheme.
2.9. Convert the decimal number 2018.09_{10} into the hexadecimal number using the Horner scheme.
2.10. Complete the following table by converting the given numbers into the requested number representation using the methods introduced in the lecture. All numbers in the dual system have a length of 5 Bits here.

Decimal number	-12_{10}		
Absolute value plus algebraic sign			
One’s Complement		11001_2	
Two’s Complement			
Offset-Dual representation			00110_2

2.11. What are Floating Point numbers? Where do you find them in daily live?