Revision

Major concepts/topics covered

- Hierarchy of systems
- Interacting development of hardware & software
- Hardware evolution
- Trends of computing
- Input-Process-Output Model
- The von Neumann Model
- Harvard architecture

- Machine instructions and HLL
- Interpreters vs. Compilers
- Dynamic libraries and dynamic linking
- Data codes – numeric and character
- Binary number system
- Conversion of binary numbers to decimal
- Conversion of decimal numbers to binary
- Hexadecimal notation

- ASCII code
- Unicode
- Operating systems: Functions
- Client-server computing
- Processor and Registers
- Buses
- Machine Cycle
- CISC & RISC

- Execution of instructions
- Assembly language
- Main memory, RAM
- Words, bytes and bits
- Base register
- Instruction pointer
- C Programming Basics

- CPU status flags
- Inline Assembler
- Stack
- Passing parameters
- Structure of instructions
- Addressing modes
- Output in inline assembly
- Input in inline assembly

- Controlling program flow
- Unconditional jumps
- Conditional jumps
- Subroutines
- Return addresses
- Subroutines in assembly language
- Return from subroutine call
- How does CALL work
- Nested calls

- Value parameters
- Reference parameters
- Passing parameters
- Passing parameters via stack
- Nested subroutine calls
- Recursive subroutine

- Unsigned integers
- Binary vs. BCD representation
- Signed integers
- Sign-and-magnitude representation
- Complementary representations
- Addition
- Subtraction
- Overflow testing
- Two’s complement
- Numerical types in Java

- Floating Point Numbers
- Floating Point Formats
- Excess-*n* notation
- IEEE standard 754
- Data storage
- Main memory
- Memory hierarchy
- Mass storage
- Storage Requirements for Digital Audio

- Memory parameters
- Memory mapping
- Memory address decoding
- Cache memory
- Memory hierarchy
- Tracks, sectors and cylinders
- Disk Addressing
- Virtual memory

- Building computers from logic
- Boolean Operations and Boolean Gates
- Truth tables for basic logic operations
- Boolean Circuits
- Selector circuit
- Multiplexer
- Two-line decoder
- Implementing a function with logic gates

- Half adder
- Full adder
- Sequential logic circuits
- Flip-flops