# Computer Architectures (GEIAL301-B2a)

*Exam question examples*

1. What are the main requirements of the Neumann principle in relation to the computer?
2. What is the meaning of the "Stored-program" principle in Neumann's sense?
3. What is the advantage of having data and programs in the same internal storage (memory) in a Neumann computer?
4. What are the main components of the Neumann machine?
5. How can error and event handling be done on the Neumann machine?
6. What kind of control process (Instruction Stream) and data stream (Data Stream) are typical for machines based on the Neumann principle?
7. What do we call "Process"?
8. What is a file?
9. What do we call "Directory"?
10. What do we call a "Parent" directory?
11. Which directory does not have a "parent" directory?
12. What are the characteristics of the "Root" directory?
13. What is a "File System"?
14. What do we usually call the hierarchical structure implemented on a block-oriented device, in which files can be identified, their attributes and blocks are accessible, the block occupancy of the device is managed?
15. What are the characteristics of the "File System"?
16. What do we call "Path"?
17. What do we call "Absolute path"?
18. What do we call "Relative path"?
19. What do we call the list of directory names in the parent-child relation, which identifies a directory or a file starting from one of the directories?
20. What do we call "Default directory" (Working directory)?
21. What are the classes of computer networks according to extent?
22. What are the main characteristics of the Internet?
23. What are the main characteristics of the "Packet switching" computer network data transfer technique?

24. What is the essence of the client-server architecture?
25. What is the essential difference between (alphanumeric) command language interface (CLI) and graphical (Graphical User Interface, GUI) user interfaces?
26. What is the concept of "Command" in the case of Command Language Interface (CLI) user interface?
27. What does the command language interpreter of the user interface do with the received command?
28. Which three open data streams are automatically assigned to the shell process on Unix OS?
29. What is the syntax of "command list" for Unix OS shell?
30. Which command list "list operators" do you know about the Unix OS shell?
31. What is the syntax of "command list" and what is the effect of the && list operator for Unix OS shell?
32. What is the syntax of "command list" and what is the effect of || list operator for Unix OS shell?
33. What is the syntax of "command list" and what is the effect of ; or \n as a list operator for Unix OS shell?
34. What is the function and notation of "pipeline" in Unix systems?
35. What stream redirection operators do you know in Unix systems?
36. What is the function of the stream redirection operator "<file" in Unix systems?
37. What is the function of data stream redirection operator ">file" in Unix systems?
38. What is the function of the stream redirection operator ">>file" in Unix systems?
39. How does the "?" character matches in Unix filename expansion?
40. How does the "*" character matches in Unix file name explanation?
41. How does the "[...]" pattern (where the ... represents characters) matches in relation to Unix file name explanation?
42. How does the "[!...]" pattern matches (where ... represents characters ) in relation to Unix file name expression?
43. When executing a command (command list), how is "filename resolution" (substitution) performed for arguments by the Unix OS shell?
44. How to neutralize a single metacharacter in relation to Unix file name expression?
45. How can multiple metacharacters be neutralized in Unix filename expansion so that the variable substitution remains?
46. How to neutralize several metacharacters in connection with Unix filename expansion so that variable substitutions are not left?

47. What are the main parts of the CPU?
48. What is the role of the arithmetic and logic unit (ALU) within the CPU?
49. What is the role of registers within the CPU?
50. How do we usually call CPU internal storage?
51. What is the role of the controller and decoder unit in the Neumann architecture?
52. What is the role of the address generator in the Neumann architecture?
53. What is the role of the bus control unit in the Neumann architecture?
54. What is the role of the CPU internal bus in the Neumann architecture?
55. In the case of sequential execution of machine instructions, what does the number of cycles per instruction (cycle number) mean?
56. In the case of sequential execution, how can the execution time of a task be estimated based on the number of cycles per instruction (C), the cycle time (T) and the number of instructions per task (I)?
57. Conceptually, what are the main characteristics of CISC (Complex Instruction Set Computer) architectures?
58. Conceptually, what are the main characteristics of RISC (Reduced Instruction Set Computer) architectures?
59. What non-structural methods do you know to increase processor performance?
60. What structural methods do you know to increase processor performance?
61. What is the available parallelism?
62. What is the utilized parallelism?
63. For a task, can the value of the utilized parallelism exceed the available parallelism?
64. In what case can the value of the utilized parallelism reach the available parallelism when executing a task?
65. What two conceptually different types of available parallelism do you know?
66. In relation to available parallelism, what do we call functional parallelism?
67. In relation to available parallelism, what do we call data parallelism?
68. What do we call instruction-level parallelism (fine granularity)?
69. What do we call cycle-level parallelism (medium granularity)?
70. What do we call procedure-level parallelism (medium granularity)?
71. What do we call program-level parallelism (coarse granularity)?
72. What structure characterizes the pipe-line processing?
73. What is the purpose of examining the dependency of two instructions?

74. In relation to dependencies between instructions, what characterizes data dependency?
75. In relation to dependencies between instructions, what characterizes control dependency?
76. Regarding dependencies between instructions, what characterizes resource dependency?
77. When is a data dependency considered a "real" dependency?
78. When is a data dependency considered a "false" dependency?
79. What is the ''static'' dependency management?
80. What is "dynamic" dependency management?
81. What do we call "Speculative execution" in relation to the dispatch policies of dynamic dependency management within the processor?
82. In connection with the serial consistency of instruction processing, what do we call "processor" consistency?
83. In relation to the serial consistency of instruction processing, what do we call "memory" consistency?
84. In connection with the serial consistency of instruction processing, what do we call "weak" consistency?
85. Regarding the serial consistency of instruction processing, what do we call "strong" consistency?
86. Regarding the serial consistency of instruction processing, what is the purpose and how does the reordering buffer (ROB, ReOrder Buffer) work?
87. In relation to bus classifications according to the order of bit transmission, what do we call a parallel bus?
88. In relation to bus classifications according to the order of bit transmission, what do we call a serial bus?
89. What are the characteristics of synchronous buses?
90. What parameters can the performance of the bus depend on?
91. What do we call "RAM" (Random Access Memory) in relation to semiconductor storage?
92. What does "randomness" mean in the name of "RAM" (Random Access Memory) semiconductor storage?
93. What are the main characteristics of "DRAM" (Dynamic RAM) in relation to semiconductor storage?
94. What do we call "SRAM" (Static Random Access Memory) in relation to semiconductor storage?

95. What is the essential difference between the structure of DRAM (Dynamic RAM) and SRAM (Static RAM)?
96. What does the abbreviation ROM come from, what are the main features of its operation?
97. Conceptually, what is the purpose of "caches" (caches)?
98. How does the "cache" work in the case of the operational storage?
99. Conceptually, what is stored in "caches"?
100. What does "temporal" locality mean in relation to memory access?
101. What does "spatial" locality mean in relation to memory access?
102. What do we call "tracks" (tracks) in relation to magnetic storage devices (disks)?
103. What do we call "sectors" (Sector) in relation to magnetic storage (disks)?
104. What do we call a "cylinder" in relation to magnetic disk storage (disks)?
105. Regarding magnetic disk storage devices (disks), what do we call the set of tracks accessible from several disk sides with one head position?
106. What is the principle of operation of a liquid crystal display?
107. What is the principle of operation of the Organic Light-Emitting Diode (OLED) display?
108. What is the principle of operation of a laser printer?
109. What is the working principle of an inkjet printer?