

## Computer systems

### Theoretical questions

1. What is the role of the cache in the microprocessor?  
**The purpose of cache** memory is to store program instructions and data that are used repeatedly in the operation of programs or information that the CPU is likely to need next. The computer processor can access this information quickly from the **cache** rather than having to get it from computer's main memory.
2. How can you implement a number using two's complement?
  - $-x = \text{inverse } x + 1$
  - One zero, on 1 byte numbers between -128 +127
3. What do you know about UTF8 coding? What is it good for?  
Utf-8 is a variable-length character encoding for Unicode. It can be used to represent any character in the Unicode standard.  
Interaction in multiple languages is not a barrier
4. List at least 3 memory types!  
RAM, SRAM, DRAM, DDR, DDR2,DDR3,DDR4
  - ROM, PROM, EPROM, EEPROM, FLASH
5. List some devices from daily life in which there are "computers"!  
Cashier machine, atm, vending machine
6. What is the difference between a server and a client computer?  
Client, typically serves out a single user.  
Server, typically serves out a lot of users!
7. List at least 3 operating systems!  
UNIX, MS-DOS, Windows
8. What is the difference between the ssh and the telnet connection?  
SSH uses secured protocol and all the data is very hard to decrypt.(port 22)  
telnet is not secure and uses port 23
9. What kind of services has an operating system got today?  
User Interface.  
Program Execution.  
File system manipulation.  
Input / Output Operations.  
Resource Allocation.  
Error Detection.
10. What do you mean by shell? Name at least two!  
Shell: classical user interface program, derived from Unix system  
- Unix Shell Script , Windows Powershell
11. What UNIX file system features can you mention?
  - It's structure is hierarchical
  - Devices also get „filenames“ (/dev directory)

12. What type of file systems do you know?
  - Disk file system
  - Flash File system
  - Database file system
13. What filename conventions do you know in UNIX?
  - Length of name is not limited
  - If the name of file starting with (.) then it is hidden file which is not appear public but still can be accessed. Just a kind of convention
14. What file features do you know in UNIX?
  - Permission, Name, Size, date created, owner, the group of owner, hardlink numbers
15. Explain the base UNIX permission system!
  - User permission : u
  - Group permission: g
  - Other permission: o
  - R - reading permission
  - W - writing permission
  - X - execution permission
  - set : chmod u+x apple.txt
16. What extended permission do you know in UNIX?
  - umask - giving bits
  - chmod 6644 apple
17. What is the goal in UNIX to use process priority?
  - Unix handle processes based on priority
18. What do you know about "quotation marks" in UNIX?
  - Quotation marks are used for sed commands. ' or "
19. What is the meaning of stdin, stdout?
  - stdin (0) - keyboard, standard input channel (default input) •
  - stdout (1) - monitor, standard output channel (default output)
20. How many filter you need for a pipeline?
  - 1
21. Tell an example where we can use a regular expression?
  - '^apple' : apple word is at the beginning of the line.
  - Cat file|grep „^\$"
22. What are the environment variables?
  - The environment variables are visible in the environment and in each command started from the environment. (global)
23. Give the possible type(s) of a variable content in UNIX!
  - String
24. What is command substitution?
  - x=\${team-HAHA} // If \$team is not existing, then x will be HAHA
25. List the existing operators in UNIX shell!
  - Arithmetic Operators
  - Relational Operators
  - Boolean Operators
  - String Operators
  - File Test Operators

26. Which shell instruction has got a result value?

expr or let

27. How is the logical type implemented in UNIX shell?

exit command with value - of param of exit = 0 = True, < 0 = False  
True or False

28. Is it possible to define a function using parameter(s) in UNIX?

```
$ [ $x -lt 6 ] # test $x -lt 6
```

yes

29. Are you able to execute (describe how if you say yes) a shell script without execution permission?

No

30. What is IFS? Internal Field Separator - define delimiter character instead of default

31. What kind of tasks can you solve with the help of sed?

Complex substitutions

32. Describe generally the syntax of a sed command!

- Sed command syntax: [address] s /pattern/new\_pattern/[marker]

34. Typify the possibilities of awk!

- scan a file line by line
- splits each input line into fields
- compare input line to pattern
- perform action on matched line

35. Name the possible command blocks in awk!

Print command

Build in variables

User defined functions

Variables and syntax

36. Can awk be used for solving arithmetical tasks?

Yes

37. What is MBR and what is its task?

MBR: Boot sector

Linux Loader : choosing an operation system

38. Describe the LINUX\_UNIX boot process!

Boot Sector

Kernel Loading

Init process starting

39. Write down at least one UNIX-LINUX management possibility!

Central Management program

40. What kind of network connections do you know?

WIFI, Bluetooth

41. What do you mean by packet-switched network?

in the packet there are the addresses of the sender and the destination, the ordinal number of the packet, data.

42. What is described by OSI model?

Open Systems Interconnection

Physical layer  
Datalink layer  
Network Layer  
  
Transport Layer  
Session Layer  
presentation Layer  
Application layer

43. List network topologies!

Star topology  
Tree topology  
Ring topology  
Bus topology  
Linear topology

44. What is the task of a switch?

It guarantee the connection between computers bound into the same local network

45. What is the task of a router?

it decide about each arriving packet to which connected network should they be transported or rather to build up routing informations

46. How can you characterize the IPV4 addresses?

Can be divided into 2 parts: network address + host identifier

47. Where do you meet DNS in informatics? everywhere ping will check the existence of the connection!
48. What is DHCP?  
Dynamic Host Configuration Protocol
49. What kind of server access modes do you know?  
2 kinds : FTP HTTP (Hypertext Transfer protocol)
50. What is HTTP protocol good for?  
You can download or upload files with HTTP as well instead of using FTP.  
This is the only protocol we use nowadays.
51. What happens if there is no index.html file in public\_html directory?  
Then public\_html works as ftp catalog!
52. How can you save a web-directory with password?  
htpasswd [-c] filename username
53. What do you mean by virtual host?  
We can reference address with another name
54. What kind of Windows script writing possibilities do you know? Is there any?  
Batch program, Powershell
55. How safe script execution is ensured in PowerShell?  
the default of the execution is Restricted, you will have to run PWS with administrator and set again the ExecutionPolicy to Unrestricted, RemoteSigned ...
56. What are the structures of the PowerShell command?  
2 main families: Set-command and Get-command Family  
commandlets-cmdlets
57. List at least two different variable scopes in PowerShell!  
scope 0 : actual environment  
scope 1 : parent environment
58. How do we redirect the output in PowerShell? Is it possible anyway?  
yes, same as shell script
59. Where and for what can dot sourcing be used?  
When to declare a function within a function.
60. What does the possibility of named parameters mean in PowerShell?
61. What is the difference between a microprocessor and a microcontroller?  
the difference of their speeds. (Mhz- Ghz)  
Bits CPU: microprocessor : 64 bit  
microcontroller: 8-bit
62. What is the most important feature of a Harvard architecture?  
data and instruction memory are separated

63. What is the floating-point arithmetic used for?  
A floating-point system can be used to represent, with a fixed number of digits, numbers of different orders of magnitude.

64. What is asymmetric coding?

Asymmetric Encryption is a form of encryption where keys come in pairs. What one key encrypts, only the other can decrypt.

65. What is the meaning of the binary ftp mode?  
binary ftp mode transfer files as raw data

66. What is the meaning of ASCII ftp mode?  
ASCII mode transfer file as "text"

67. How can you redirect the standard input in PowerShell? you can't

68. How can the "here input" functionality be replaced in PowerShell?  
between ""

69. What is profile.ps1 file good for? Is there anything equivalent to it in UNIX shell?  
it can only be executed in ISE

70. What do we mean by a PowerShell module?  
It is a package where contains Powershell commands, such as cmdlets, alias, functions, variables,.....

71. Is the core PowerShell module enough to modify the registry? Why?  
Yes somehow. The powershell has Set-command which can be used easily to modify the value

72. How do you use command substitution in PowerShell?

no special form for command substitution!

73. How do you create a loop in a sed script?

74. What type of files are usually in the /etc directory? Configuration files

75. Tell an example where the "setuid" bit is useful!

76. What is the aim of using ACL in UNIX\_LINUX system? Access Control List

77. Is there anything in Windows that is adequate to ACL possibility?

78. What is the main difference between analog and digital signals?  
Analog signal: continuous wave that change over time  
Digital signal: discrete wave that carries information in binary form

79. What is the task of the data, the address and the controller bus?  
While the **address bus** carries the information about the device with which the CPU is communicating and the **data bus** carries the actual **data** being processed, the control **bus** carries commands from the CPU and returns status signals from the devices.

80. How can you create a filter in UNIX and in PowerShell? Is it possible anyway?  
yes, by using |

81. What is the main difference between the result of the UNIX ls and the PowerShell Get-ChildItem?

82. On which platform can you use regular expressions? (In Unix, in PowerShell or in both?)  
PowerShell
83. What is the special meaning if a filename starts with . in UNIX?  
Hidden file. Nothing is hidden, it just a way of file name convention
84. When and why are the regular expression groups useful?  
to find the place of specific word in the file
85. What is the main difference between the data going through the pipe in UNIX shell and in PowerShell?  
Unix command spit out text while PowerShell spit out objects
86. What tool set do we have to write a script in UNIX and in PowerShell?  
terminal on linux and ISE
87. Give the file extension of a script in UNIX and in PowerShell! Is there any restrictions or you can choose it freely?

88. Is it possible to have a parameter of a filter command? If it is possible then give an example, if not, explain why it is not possible!
89. What is the difference between stdout and stderr? Do they exist in PowerShell too?
90. What is the "problem" with ones' complement
91. How do you redirect the stdin in PowerShell?
92. What is SED good for? What is the most frequent command of it?
93. Can we call a shell script in a SED script? Why?
94. How is it decided what type of script is a script on the UNIX platform?
95. What does it mean when a processor has 10-nanometer technology? its telling that the cpu has 10nm measurement of the size of the transistors.
96. What is the difference between a processor being 32 or 64 bit?  
64-bit processor is more capable than 32-bit because it can handle more data at once
97. How do you write an AWK script? Can you at all?  
Yes by writing `#!/usr/bin/awk -f` in the beginning , but typically it is uses as shell script element
98. What are IoT devices, possibilities? Can we write programs for them?
99. What is the role of the BEGIN and END blocks of AWK?  
BEGIN: menas that AWK will execute the action in BEGIN once before any input lines are read.  
END: means AWK will execute the action in END before it actually exists.