



Compliance to the code of conduct

I hereby assure that I solve and submit this exam myself under my own name by only using the allowed tools listed below.

Signature or full name if no pen input available

Computer Networking and IT Security

Exam: INHN0012 / Quiz 2

Date: Thursday 9th February, 2023

Examiner: Prof. Dr.-Ing. Stephan Günther

Time: 19:30 – 19:45

Working instructions

- **Do not forget to sign the rules of conduct at the top of this page (or to enter your name in the field in case you do not use a tablet device).**
- This exam consists of **4 pages** with a total of **2 problems**.
Please make sure now that you received a complete copy of the exam.
- The total amount of achievable credits in this exam is 15 credits.
- Detaching pages from the exam is prohibited.
- Allowed resources:
 - everything **except the help of others and plagiarism**
- Subproblems marked by * can be solved without results of previous subproblems.
- **Answers are only accepted if the solution approach is documented.** Give a reason for each answer unless explicitly stated otherwise in the respective subproblem.
- Do not write with red or green colors nor use pencils.
- Physically turn off all electronic devices, put them into your bag and close the bag.

Problem 1 Multiple Choice (9 credits)

The following subproblems are multiple choice / multiple answer, i. e. at least one answer per subproblem is correct. Subproblems with a single correct answer are graded with 1 credit if correct. Those with more than one correct answers are graded with 1 credit per correct answer and -1 credit per wrong answer. Missing crosses have no influence. The minimal amount of credits per subproblem is 0 credits.

Mark correct answers with a cross



To undo a cross, completely fill out the answer option



To re-mark an option, use a human-readable marking



Given an alphabet of $N = 256$ symbols that are uniformly and independently distributed:

a)* What is the **minimum** length of a codeword when a Huffman code is created for that alphabet.

- 10 9 other
 7 8 6

b)* What is the **maximum** length of a codeword when a Huffman code is created for that alphabet.

- 7 9 other
 6 10 8

c)* Convert 0xadfe1723 from big endian to network byte order.

- 0x3271efda 0xadfe1723 different value 0x2317fead

d) Which of the following IPv4 addresses in the subnet 192.168.255.255/18 are useable to address hosts?

- 192.168.254.254 192.168.1.1 192.168.186.1
 192.168.255.255 192.168.192.25

e)* What does the HTTP status code 404 mean?

- unauthorized not found forbidden
 moved permanently internal server error

f)* Which statements regarding resolvers and nameservers are correct?

- | | | |
|--|--|---|
| <input type="checkbox"/> For each zone there is a secondary nameserver | <input type="checkbox"/> Resolvers are authoritative for one or more zones | <input type="checkbox"/> Answers by resolvers are authoritative |
| <input type="checkbox"/> Nameservers are authoritative for one or more zones | <input type="checkbox"/> Nameservers allow for recursive queries | <input type="checkbox"/> Nameservers resolve arbitrary FQDNs |
| <input type="checkbox"/> For each zone there is a primary resolver | <input type="checkbox"/> Resolvers allow for recursive queries | |

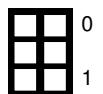
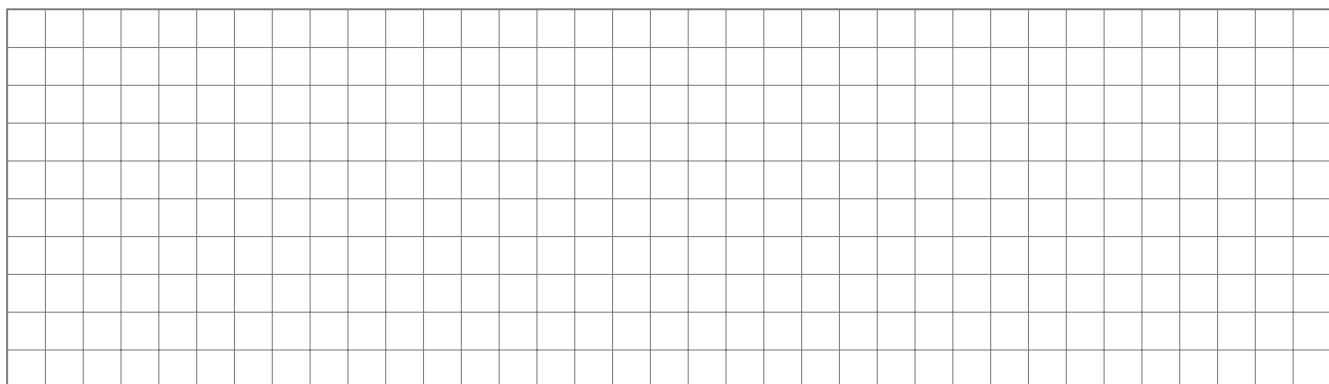
g)* What does “authentication” enable?

- limit resource access enable identity verification non-repudiation
 encryption confidentiality integrity

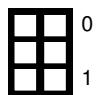
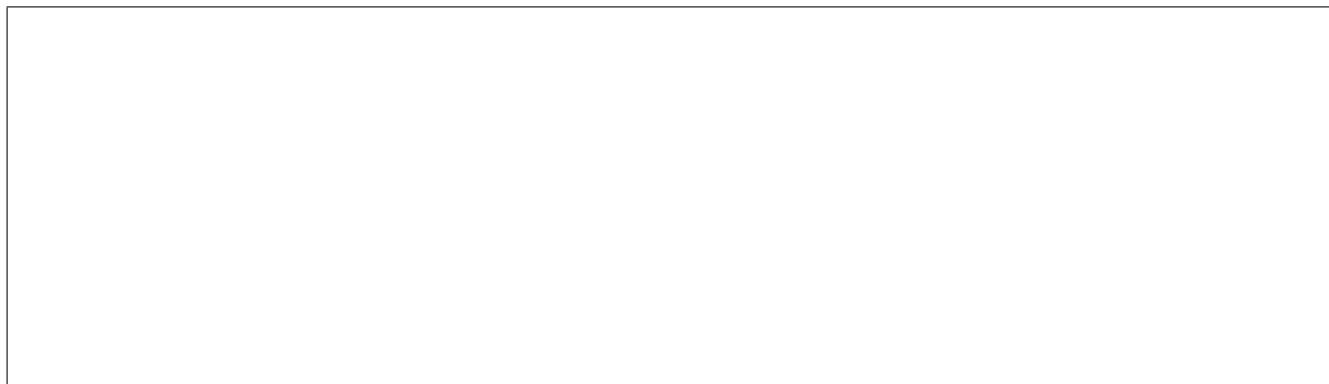
Problem 2 Short problems (6 credits)

The following subproblems are independent of each other and can be solved without the solution of preceding subproblems.

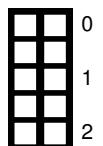
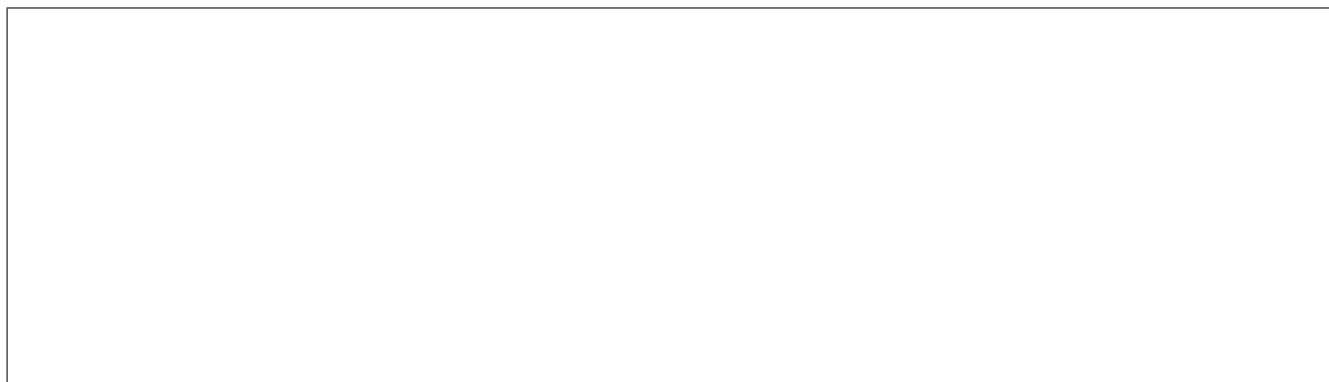
a)* Sketch the typical progression of the TCP congestion window over the time of a connection (starting at the beginning of the connection).



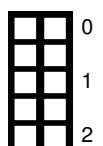
b)* What is an *Autonomous System (AS)*?



c)* Describe the difference between IPSec in transport and tunnel mode when using ESP.



d)* Briefly describe the syscall select() in your own words.



Additional space for solutions—clearly mark the (sub)problem your answers are related to and strike out invalid solutions.

A large grid of squares, approximately 20 columns by 30 rows, intended for students to write their additional solutions. The grid is composed of thin black lines on a white background.