

# Solutions

## Exercises 2nd Semester

## Exercise 3.1 (Authentication Bypass)

#	Username	Password	Created SQL Query	Query Result
1	horst	n0Rd4kAD3m!E	<pre>SELECT id FROM users WHERE name = 'horst' AND password = 'n0Rd4kAD3m!E'</pre>	42
2	'	qwertz	<pre>SELECT id FROM users WHERE name = '' AND password = 'qwertz'</pre>	Error
3	'--	abc123	<pre>SELECT id FROM users WHERE name = '-- AND password = 'abc123'</pre>	null


#	Username	Password	Created SQL Query	Query Result
4	horst'--	qwertz	SELECT id FROM users WHERE name = 'horst'- - AND password = 'abc123'	42
5	admin'--	<anything>	SELECT id FROM users WHERE name = 'admin'	1
6	' OR 1=1- -	<anything>	SELECT id FROM users	1, 2, ...

## Exercise 4.2 (Session ID Generator)

The IDs are short (15 chars), have low entropy (a-z, 0-9) and contain **predictable patterns** indicating at least partial non-randomness.

#	Session ID	#	Session ID
1	h5kek4z <b>9ha</b> 1rtrf	7	po953ld <b>7hg</b> 2awi9
2	gj75l3k <b>7hb</b> 15rtr	8	t6zhj2n <b>5hh</b> 27bn0
3	l8l65k4 <b>5hc</b> 1rw7i	9	iu345r <b>53hi</b> 2aw34
4	p05jrj <b>53hd</b> 1i039	10	o0z434 <b>11hj</b> 2njkl
5	5urltda <b>1he</b> 1bn46	11	9por42o <b>9hk</b> 3dfrz
6	j5le97h <b>9hf</b> 2yq3h	...	...

## Exercise 6.1 (Info. Classification)

Practice	Public	Internal	Confidential	Secret
Publish on Internet	✓	✗	✗	✗
Publish on Intranet	✓	✓	✗	✗
Print on 	✓	✓	✓ if picked up immediately	✓ on personal or otherwise secured printer

Practice	Public	Internal	Confidential	Secret
Share with third parties	✓	✓ with NDA	✓ with NDA + permission	✓ with NDA + permission
Copy to USB key	✓	✓	✓ with encryption + permission	✓ with encryption + permission

⚠ *Many organizations do not allow the use of USB keys **in general**. This kind of restriction would obviously **overrule** any of the above "Copy to USB" assessments with ✗.*

## Exercise 6.2 (Data Lifecycle Phases)

Phase	Internal	Confidential	Secret
Permanent storage	● Access Control (against external access)	● Access Control ○ Access logs, Encryption	● Access Control, Access logs, Encryption
Transfer (internal network)	No restrictions	○ Encryption (e.g. TLS)	● Encryption (e.g. TLS) ○/● End-to-end encryption (e.g. PGP, Signal)

Phase	Internal	Confidential	Secret
Transfer (public network)	○ Encryption (e.g. VPN)	○ Encryption (e.g. VPN, TLS)	● Encryption (e.g. VPN, TLS) ○/● End-to-end encryption (e.g. PGP, Signal)
Disposal	No restrictions	● Shredding, secure deletion, data wipe	● Shredding, secure deletion, data wipe ○/● Destroy medium physically (🔨, 🔥)

**i** For "Public" data no restrictions for any lifecycle phases apply.





## Exercise 8.2 (ArrayList Deserialization)

```
/**
 * The maximum size of array to allocate.
 * Some VMs reserve some header words in an array.
 * Attempts to allocate larger arrays may result in
 * OutOfMemoryError: Requested array size exceeds VM limit
 */
private static final int MAX_ARRAY_SIZE = Integer.MAX_VALUE - 8;
```

























★ Whenever an `OutOfMemoryError` occurs, the affected JVM crashes.

## Exercise 8.3 (HashSet Deserialization)

 *With its members recursively linked to each other, when deserializing `root`, the JVM will begin creating a recursive object graph. It will never complete, and consume CPU indefinitely.*

 *If you view this as a PDF, zoom in as much as possible on the above code snippet to get an idea what is going on. You might want to look at [the original Markdown](#) file to actually be able to read something.*

## Exercise 9.1 (Protection Req. Calc.)

Aspect / Application	Website	VCS	Webshop	B2B API
Business criticality	2 	1 	5 	2 
Information classification	0 	2 	2 	2 
Compliance requirements	0 	0 	2 	1 
Exposure to threats	5 	1 	5 	5 
Authentication mechanism	0 	-2 	-1 	-1 
<b>Total Score</b>	7 	2 	13 	9 
<b>Rating</b>	Medium	Low	High	Medium

## Exercise 9.2 (OWASP Benchmark)

