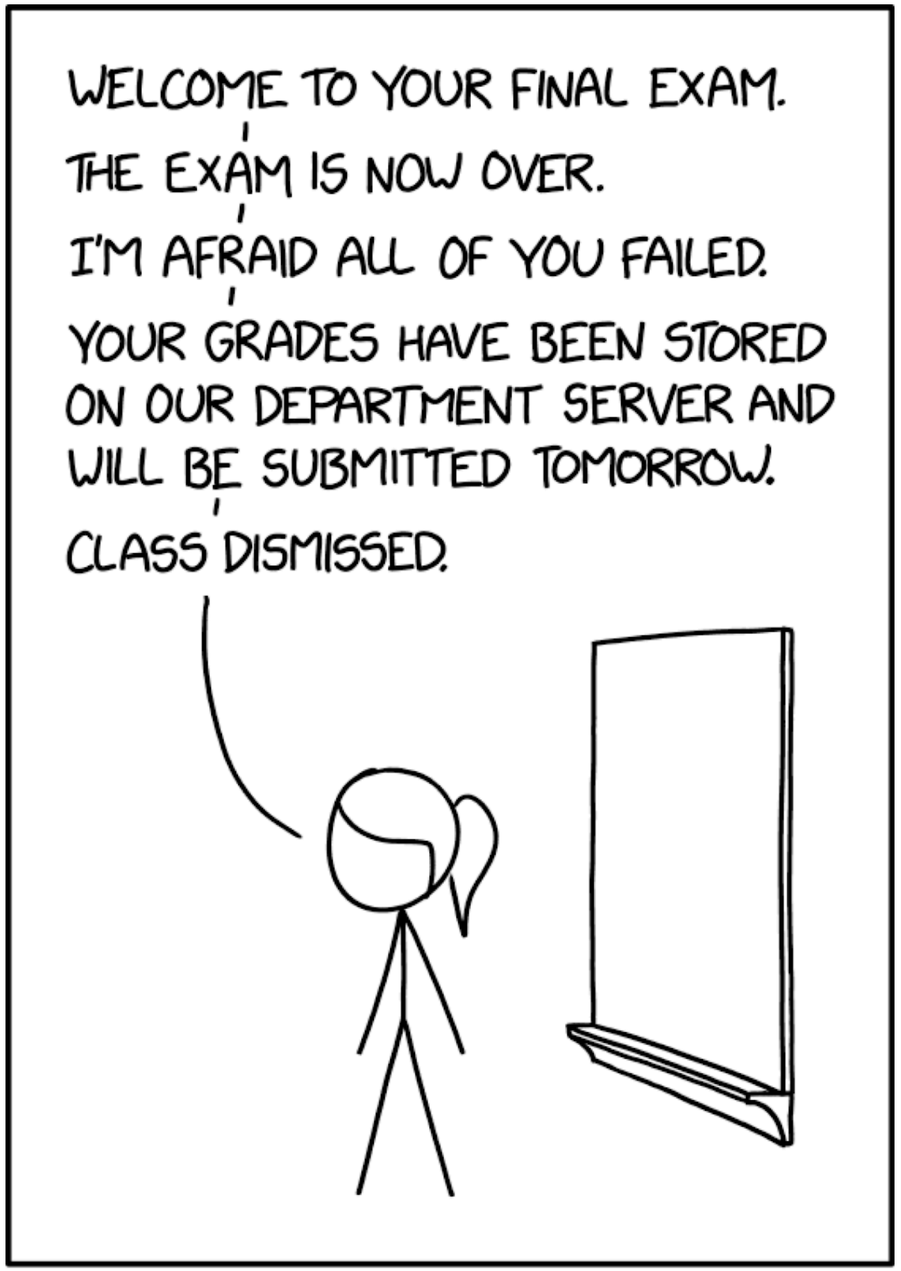
PeoplePath

Web Application Security

Ondrej Esler, November 30, 2022



CYBERSECURITY FINAL EXAMS

https://xkcd.com/2385/

We are a **global provider** of cloud-based solutions for **talent relationship management.**

Since 2002, we have empowered our clients to establish, track and develop **personal relationships** with talent throughout their entire **career lifecycle**.

We offer the most powerful and flexible **candidate engagement** technology in the marketplace.

Seattle
USA

New York
USA

Munich
Germany

Pilsen
Czech Republic

60+
employees

100+
clients in all major sectors

250+
years of combined talent engagement experience

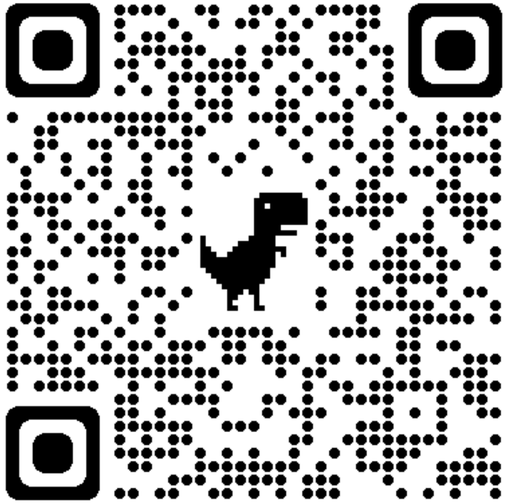
1,500,000+
talent profiles across clients globally

Cooperation with schools and students

- Trainee program
- Final thesis advisory
- Internships
- Lectures
- Excursions

- Workshops

https://github.com/**peoplepath/workshop-web-security**



Why's security important?

ISO 27001

INFORMATION SECURITY MANAGEMENT SYSTEM

ISO 27001

ISMS

Human Resources

Access control

Cryptography

Physical and environmental security

Communications security

...

and many more

Development security

Coding standards, Security principles, Penetration testing

What's penetration testing?

Most common attacks on the Web?

```
$sql = ‘SELECT * FROM user WHERE id = ‘ . $_GET[‘id’];
```

SQL injection

(SQL) injection

SQL injection

```
$sql = ‘SELECT * FROM user WHERE id = ‘ . $_GET[‘id’];
```

Demo

SQL injection protection

```
$sql = ‘SELECT * FROM user WHERE id = :id‘;

$stmt = $pdo->prepare($sql);

$stmt->execute([‘:id’ => $_GET[‘id’]]);
```

```
echo ‘You are searching for ‘ . $_GET[‘query’];
```

Cross-Site Scripting

XSS

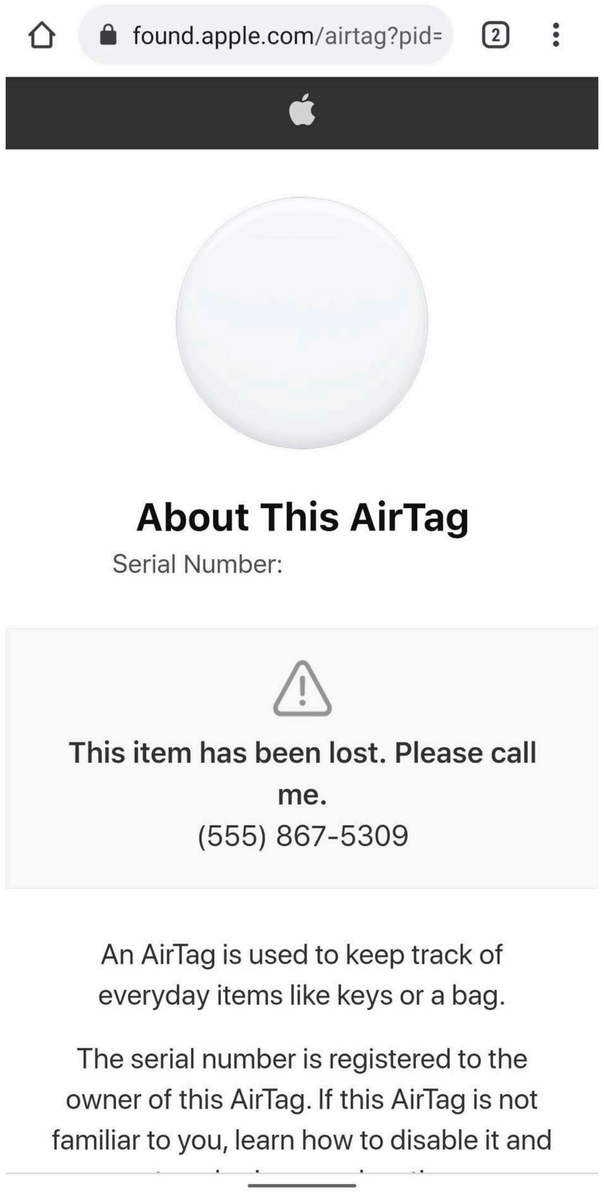
XSS

```
echo ‘You are searching for ‘ . $_GET[‘query’];
```

Demo

XSS

XSS


found.apple.com/airtag?pid=
About This AirTag
Serial Number:
This item has been lost. Please call me.
(555) 867-5309
An AirTag is used to keep track of everyday items like keys or a bag.
The serial number is registered to the owner of this AirTag. If this AirTag is not familiar to you, learn how to disable it and

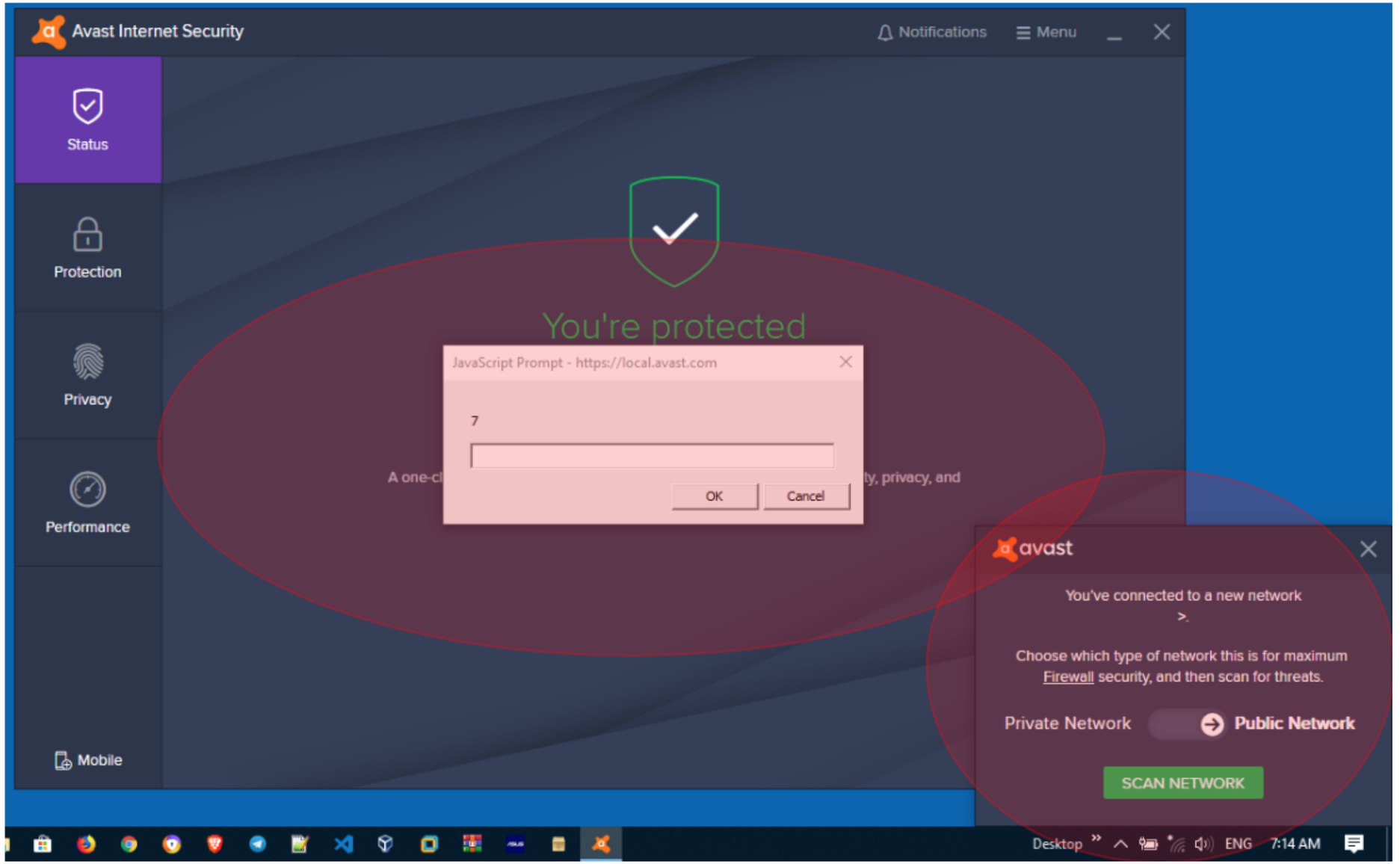
XSS

<script>window.location=’https://malicious.com’;</script>

XSS

source: https://www.zdnet.com/article/tweetdeck-wasnt-actually-hacked-and-everyone-was-silly/

XSS



source: https://medium.com/bugbountywriteup/5-000-usd-xss-issue-at-avast-desktop-antivirus-for-windows-yes-desktop-1e99375f0968

XSS protection

```
echo ‘You are searching for ‘ . htmlspecialchars($_GET[‘query’]);
```

XSS protection

CSP

Content-Security-Policy

XSS protection

Content-Security-Policy: default-src 'self'; img-src https://*; child-src 'none';

source: https://developer.mozilla.org/en-US/docs/Web/HTTP/CSP

if ($_**SESSION**[‘authenticated`]) payTo($_**REQUEST**[‘user_id’]);

CSRF

Cross-site request forgery

CSRF

if ($_**SESSION**[‘authenticated`]) payTo($_**REQUEST**[‘user_id’]);

Demo

CSRF

```
$csrfMatches = $_SESSION[‘csrf’] == $_POST[‘csrf’];

if ($isAuthenticated && $csrfMatches) payTo($_POST[‘user_id’]);

$_SESSION[‘csrf’] = bin2hex(random_bytes(16));
```

SameSite cookie

CSRF

```
; php.ini configuration
session.cookie_samesite = 1
```

source: https://www.php.net/manual/en/session.configuration.php#ini.session.cookie-samesite

CSRF

Set-Cookie: PHPSESSID=123…; SameSite=Strict

source: https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Set-Cookie/SameSite

Directory Traversal

Directory Traversal

https://example.com?download=../../../etc/passwd

Demo

Directory Traversal

```
; php.ini configuration
open_basedir = /var/www;/data/uploads
```

source: https://www.php.net/manual/en/ini.core.php#ini.open-basedir

OWASP

Open Web Application Security Project

https://www.owasp.org

OWASP top 10

List of most common security issues

Sensitive data exposure - example

HTTP/1.1 200 OK

Server: Apache/2.4.54 (Unix)
X-Powered-By: PHP/8.2.0

sources: https://httpd.apache.org/docs/current/mod/core.html#traceenable, https://httpd.apache.org/docs/current/mod/core.html#servertokens, https://www.php.net/manual/en/ini.core.php#ini.expose-php

Cryptographic failures - example

```
$password = md5(`APm9FK7Yn`);
```

Cryptographic failures - protection example

```
$password = password_hash(`APm9FK7Yn`, PASSWORD_DEFAULT);
```

Security misconfiguration

apt-get install mongodb

service mongod start

Best practices

What's most important?

(in web security)

Everything is user input!

form data, files, headers, ...

Implement with proven frameworks/libraries

(if you can)

basic security out-of-box

Learn about secure configuration

or use Cloud

Add CAPTCHA on public forms

keep that pesky robots away

Use password manager

never reuse password

Use 2FA

especially on github/gitlab, etc.

Make a plan what to do in case of security attack

you'll be hacked soon or later

https://www.peoplepath.cz/