Security of Distributed Software

SS 2020 – 3. Tutorial

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Task 1

What is Session Hijacking?

The Session Hijacking attack consists of the exploitation of the web session control mechanism, which is normally managed for a session token.

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How do you get a Session-Token?

- Predictable Session Token
- Session Sniffing
- Client-side attacks (XSS)

https://mytuc.org/vwfx enables registered users to retrieve the PIN number of his mobile phone (e.g. using username Max and password Mustermann).

Find out the PIN number of user John.

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Task 2

Install a MySQL database

1. Create a database named {URZ Nutzername}-svs with a table *personen*:
   - id: INT, Index: PRIMARY, AUTO_INC
   - name: CHAR(20)
   - age: INT
2. Addsome data
3. Write an SQL query, which returns all persons, whose name is *Max.*
4. Extend *personen.php* to send above query to DB.
5. Extend program with search functionality (use string concatenation)

What is SQL-Injection?

A SQL injection attack consists of insertion or "injection" of a SQL query via the input data from the client to the application

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What can be done with SQL Injection?

…read sensitive data from the database, modify database data (Insert/Update/Delete), execute administration operations on the database (such as shutdown the DBMS), recover the content of a given file present on the DBMS file system and in some cases issue commands to the operating system

How can a SQL-Query be injected?

- Form data

```
POST / HTTP/1.1
…
username=max&password=mustermann
```

- URL paramter

```
GET /login.php?username=max&password=mustermann HTTP/1.1
```

- Cookies

```
Cookie: username=max; id=114;
```

3 Task 3

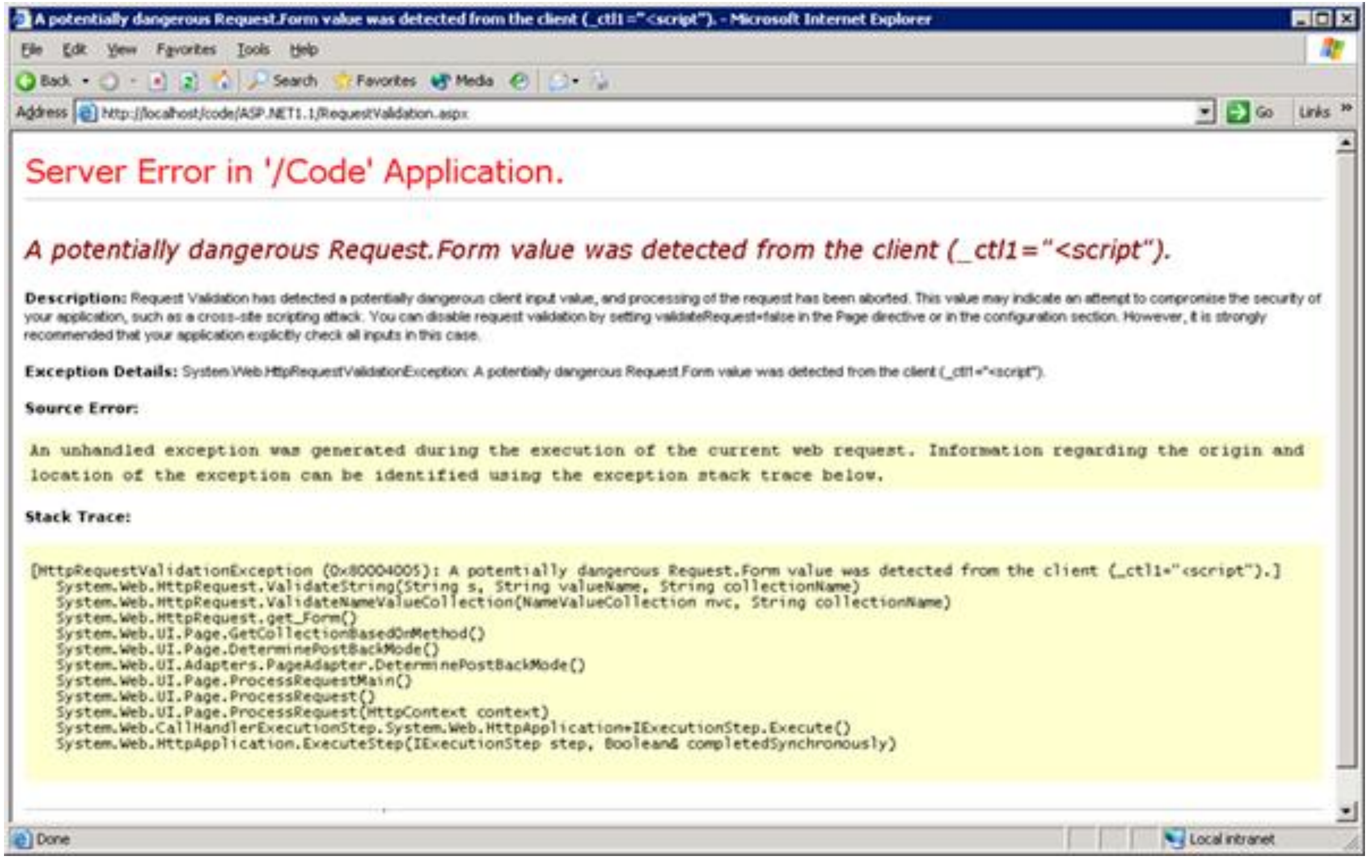
Open the page from task 2, cf. https://mytuc.org/vkdt

1. What you can enter into the search field to find all persons in the table?
2. What can you enter to find out, if the current database contains a non-empty table *gehaelter*?
3. Answer the following:
    a. Which mistakes are exploited during SQL-Injection attacks?
    b. Which possibilities to inject SQL queries do you know?
    c. Which defense mechanisms against SQL injection exist?

SQL-Injection Protection:

- Filter or mask special chars
- Check input values for properties
- Black-/Whitelisting of parameters
- Seperation of Data and SQL-Queries
- Fine Distinction of user rights
- Disable unused DB functionalites
- Apply Web Application Firewalls

Web Application Firewall



A potentially dangerous Request.Form value was detected from the client (_ctl1="<script"). - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://localhost/code/ASP.NET1.1/RequestValidation.aspx
Go Links
Done
Local intranet

Server Error in '/Code' Application.

A potentially dangerous Request.Form value was detected from the client (_ctl1="<script").

Description: Request Validation has detected a potentially dangerous client input value, and processing of the request has been aborted. This value may indicate an attempt to compromise the security of your application, such as a cross-site scripting attack. You can disable request validation by setting validateRequest=false in the Page directive or in the configuration section. However, it is strongly recommended that your application explicitly check all inputs in this case.

Exception Details: System.Web.HttpRequestValidationException: A potentially dangerous Request.Form value was detected from the client (_ctl1="<script").

Source Error:

```
An unhandled exception was generated during the execution of the current web request. Information regarding the origin and
location of the exception can be identified using the exception stack trace below.
```

Stack Trace:

```
[HttpRequestValidationException (0x80004005): A potentially dangerous Request.Form value was detected from the client (_ctl1="<script").]
   System.Web.HttpRequest.ValidateString(String s, String valueName, String collectionName)
   System.Web.HttpRequest.ValidateNameValueCollection(NameValueCollection nvc, String collectionName)
   System.Web.HttpRequest.get_Form()
   System.Web.UI.Page.GetCollectionBasedOnMethod()
   System.Web.UI.Page.DeterminePostBackMode()
   System.Web.UI.Adapters.PageAdapter.DeterminePostBackMode()
   System.Web.UI.Page.ProcessRequestMain()
   System.Web.UI.Page.ProcessRequest()
   System.Web.UI.Page.ProcessRequest(HttpContext context)
   System.Web.CallHandlerExecutionStep.System.Web.HttpApplication+IExecutionStep.Execute()
   System.Web.HttpApplication.ExecuteStep(IExecutionStep step, Boolean& completedSynchronously)
```

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Task 4

At https://mytuc.org/yngk one can find a form to request user data.

One valid pair of username and password is user1 and pass1.

Find out, which further users exist in the table.

Your feedback on today‘s session:

mytuc.org/tgxs

Questions?

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