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Webbasierte Anwendungen

Node.js

Prof. Dr. Ludger Martin

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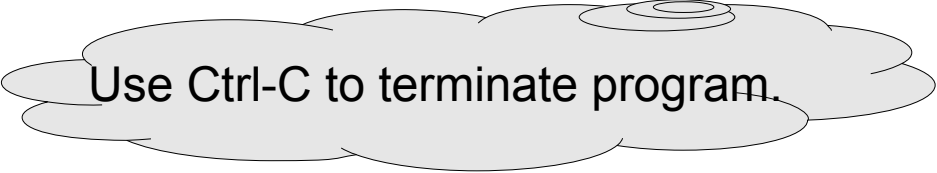
Introduction

- ◆ Node.js is a JavaScript based runtime environment outside of a browser.
- ◆ Based on V8 JavaScript execution engine, initially built for Google Chrome
- ◆ Also usable as Web server. It does not need Apache.
- ◆ Allows access to databases.
- ◆ <https://nodejs.org>
- ◆ <https://expressjs.com> (Module for Web server)

Introduction

- ♦ Call Node.js program

```
node helloworld.js
```

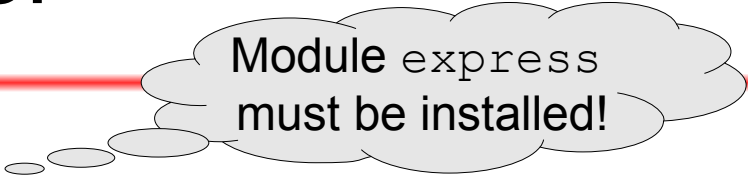


Use Ctrl-C to terminate program.

Web Server

- ◆ Import Module express

```
const express = require('express');
```



Module express
must be installed!

- ◆ Create express app

```
let app = express();
```

- ◆ Bind and listen for connection. Every port on a server can be used only once.

```
app.listen([port[, host[, backlog]]]  
          [, callback]);
```



Callback on success

Web Server

♦ Example

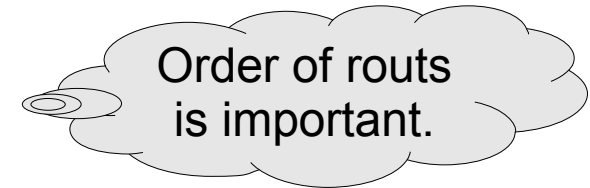
```
app.listen(3000, function () {  
    console.log(  
        'Listening on port 3000!');  
});
```

Web Server

- ◆ **Routing** refers to how an application's endpoints (URIs) respond to client requests.

- ◆ HTTP GET Requests

```
app.get(path, callback);
```



- ◆ HTTP POST Requests

```
app.post(path, callback);
```

optional for parsing `application/x-www-form-urlencoded`

```
app.use(express.urlencoded({extended: true}));
```

- ◆ HTTP PUT and DELETE similar

- ◆ `app.all(path, callback);` – matches all HTTP methods

Web Server

◆ Callback Function



◆ Request Object

★ Use `req.body.variable` to access a post variable

Web Server

◆ Response Object

- ★ Sets the HTTP status for the response.

`res.status(code)`

- ★ Sets the Content-Type HTTP header.

`res.type(type)`

- ★ Sends the HTTP response.

`res.send(body)`

- ★ Transfers the file at the given path. Content-Type based on filename's extension.

`res.sendFile(path)`

Web Server

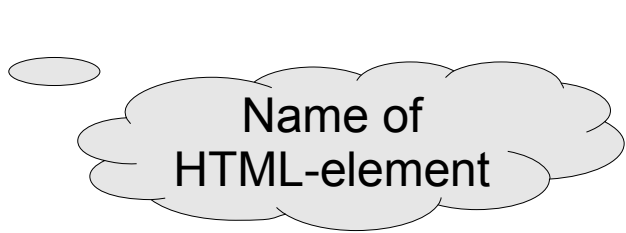
♦ Example

```
app.get('/', function (req, res) {  
    res.sendFile('/path/index.html');  
});
```

Web Server

♦ Example

```
app.use(express.urlencoded({extended: true}));  
app.post('/', function (req, res, next) {  
  res.set('Content-Type', 'text/html');  
  res.send('<!DOCTYPE html>...' +  
    '<p>Your input was ' +  
    req.body.text +  
    '</p>...');  
});
```



Name of
HTML-element

Promise

- ◆ New in ECMAScript 2015 (ES6)
- ◆ This lets asynchronous methods return values like synchronous methods
- ◆ JavaScript Engine has one task-queue and one micro task queue.
- ◆ After every event in the task queue all entries in the micro task queue are processed.
- ◆ Promises are micro tasks.

Promise

- ◆ A promise is in one of these states:
 - ★ **pending**: initial state
 - ★ **fulfilled**: operation was completed successfully
 - ★ **rejected**: operation failed
- ◆ Created with `Promise` constructor. A function is passed to initiate a task. Function calls callbacks `resolve` or `reject`.
 - ★ `resolve(result)` – task is fulfilled
 - ★ `reject(error)` – task is rejected

Promise

- ◆ The following methods are used to associate further action with a promise.
 - ★ `then(onFulfill, onReject)`
 - ★ `catch(onReject)`
 - ★ `finally(onFinally)`
 - ★ As these methods return promises, they can be chained.

Promise

◆ Example

```
let promise = new Promise(  
    function (resolve, reject) {  
        resolve(777);  
    }  
);  
promise.then(function (val) {  
    console.log("val:", val);  
});
```

Promise

- ◆ `async` and `await` introduced by ECMAScript 2017
 - ★ `async function` creates a binding of a new `async function`
 - ★ `await` keyword is permitted within the function body. Simulates `.then()` callback
 - ★ Promise-based behavior to be written in a cleaner style and avoiding the need to explicitly configure promise chains.

Database Access

Module mariadb
must be installed!

- ◆ Include module for MariaDB.

```
const mariadb =  
    require('mariadb');
```

- ◆ Configure database access

```
let conn = await mariadb.createConnection({  
    host: 'localhost',  
    database: 'schema',  
    user: 'username',  
    password: 'password'  
});
```

To use socket connection, replace host by
socketPath: '/var/run/mysqld/mysqld.sock'

Database Access

♦ Query database

```
let title = '%Pirate%';  
let sql = 'SELECT * FROM medienartikel  
          WHERE titel LIKE ?';  
let rows = await conn.query(  
    sql, [title]  
);
```

Documentation

- ◆ Only a small part of Node.js presented
- ◆ Please check the documentation for more details:
<https://nodejs.org/en/docs/>

References

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