Basic Web

Node Modules, MVC, Express.js, Handlebars

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module
.exports

Node Modules

Create a Basic Web Server

Node Modules

- A set of functions you want to include in your application
- Include modules:

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

Use **require** to include a module

- Create a module:

```
exports.myDateTime = function () {
    return Date();
};
```

Use **exports** to export a module

The HTTP Module

- Built-in module, which allows Node.js to transfer data over the Hyper Text Transfer Protocol (HTTP)
- Can **create an HTTP server** that listens to server **ports** and gives a **response** back to the client
- Use the **createServer()** method to create an HTTP server

HTTP Methods

- **writeHead**() - sends a response header to the request. Requires: **status code** (like 404), **status message** (optional) and **response headers** (object)
- **write**() - sends a chunk of the response body. Can be a string or a buffer

```
http.createServer(function (req, res) {
    res.writeHead(200, {'Content-Type': 'text/html'});
    res.write('Hello Web!');
    res.end();
```

ends the response

Creating a Simple Web Server

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

http.createServer(function (req, res) {
    res.writeHead(200, {'Content-Type': 'text/html'});
    res.end('Hello Web!');
}).listen(8080);
console.log('Listening on port 8080');
```

We have to require http in order to use it

Here we start the server

Here we choose a port

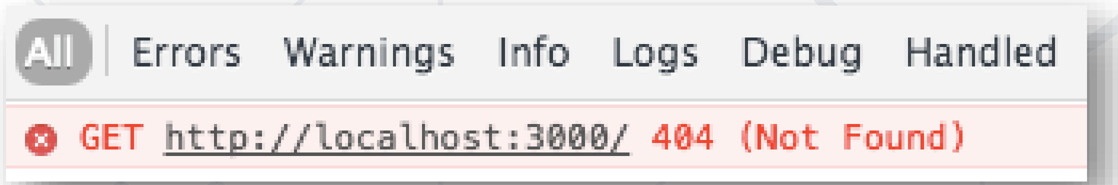
- Now type **node {filename}** and open **localhost:8080** in the browser

Express.js

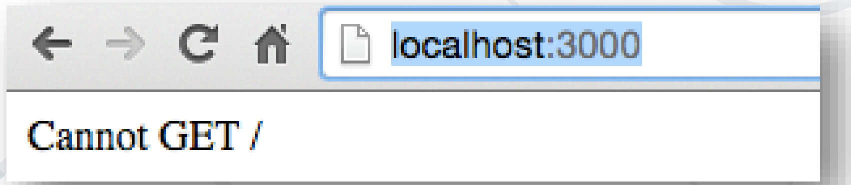
Working with a Framework

What is ExpressJS?

- Web framework for Node.js
- Handles **GET / POST HTTP** requests
- Error handling (bad request, not found, unauthorized)



```
GET http://localhost:3000/ 404 (Not Found)
```



```
Cannot GET /
```

- Routing supported

```
app.post('/users/:id', function (req, res) {})
```

Define **URL** parameters

Installation

- Create a **directory** to hold your application

```
mkdir demoapp
cd demoapp
```

- Create a **package.json** file that stores **dependency** information

```
npm init
```

- Now install **express** inside the directory

```
npm install express --save
```

Saves the **dependency** inside **package.json**

ExpressJS Routing

- Refers to determining how an application responds to a **client request** to a particular **endpoint**
- Express executes different **functions**, based on **route**:

Specify **HTTP Request** method (GET / POST)

Function to execute when the route is matched

```
app.get('/api/todos', function(req, res) {})
```

Express **instance**

URL (path on server)

Request & **Response**

Demo App

- Create an **index.js** file

```
node index.js
```

```
const express = require('express');
const app = express();
const port = 3000;

app.get('/', function(req, res) {
  res.send('Hello world!');
});

app.listen(port, () =>
 console.log(`Example app listening on port: ${port}`));
```

The function handles HTTP GET requests at URL '/'

Handle Different HTTP Methods

- Routing in express gives you the ability to handle **different** HTTP requests

```
app.post('/login', function(req, res) {})
```

```
app.put('/books/:id', function(req, res) {})
```

```
app.delete('/books/:id', function(req, res) {})
```

Working with URL Parameters

- You can get a URL parameter from **req.params**

```
app.get('/books/:id', function(req, res) {
  let bookId = req.params.id;
  console.log(bookId);
});
```

- Chaining **multiple** parameters

```
app.get('/user/:first/:second', function(req, res) {
  console.log([req.params.first, req.params.second]);
});
```

Serving Static Files in Express

- Use the **express.static** built-in **middleware** function in Express to serve static files
- Create a **public folder** and inside store static files after that write inside **index.js** the following:

```
app.use(express.static('public'));
```

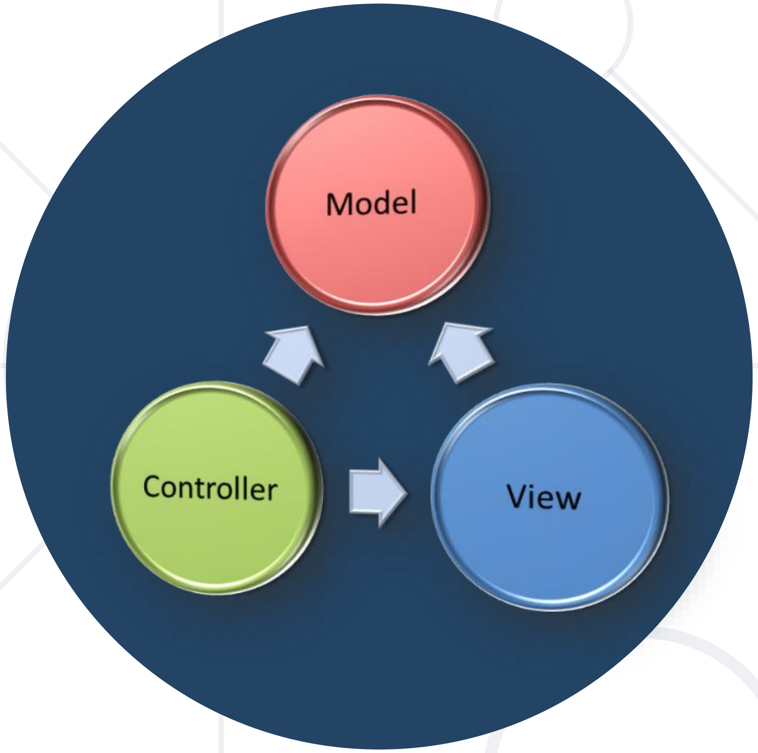
Parsing Incoming Requests

- Use **body parser** to parse incoming request bodies available under the **req.body** property

```
npm install body-parser --save
```

```
const bodyparser = require('body-parser');

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

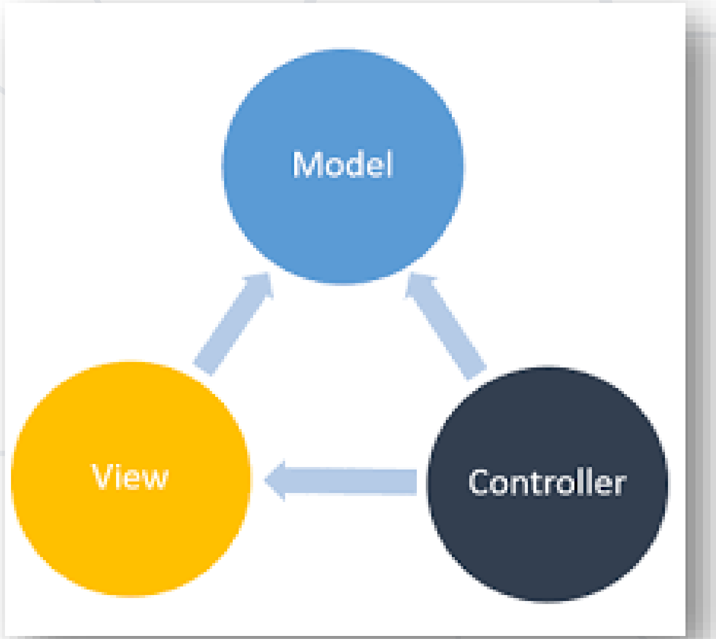


Model-View-Controller

The MVC Pattern

The MVC Pattern

- Design pattern with **three** independent components
  - **Model (data)**
    - Manages **data** and **database logic**
  - **View (UI)**
    - Presentation layer (renders the UI)
  - **Controller (logic)**
    - Implements the application logic
    - Processes user request, performs an **action**,
      updates the data model and invokes a view to render some UI



Model (Data)

- Set of classes that describes the **data** we are working with
- Rules for how the data can be **changed** and **manipulated**
- May contain **data validation** rules
- Often **encapsulates** data stored in a database
  - As well as code used to manipulate the data

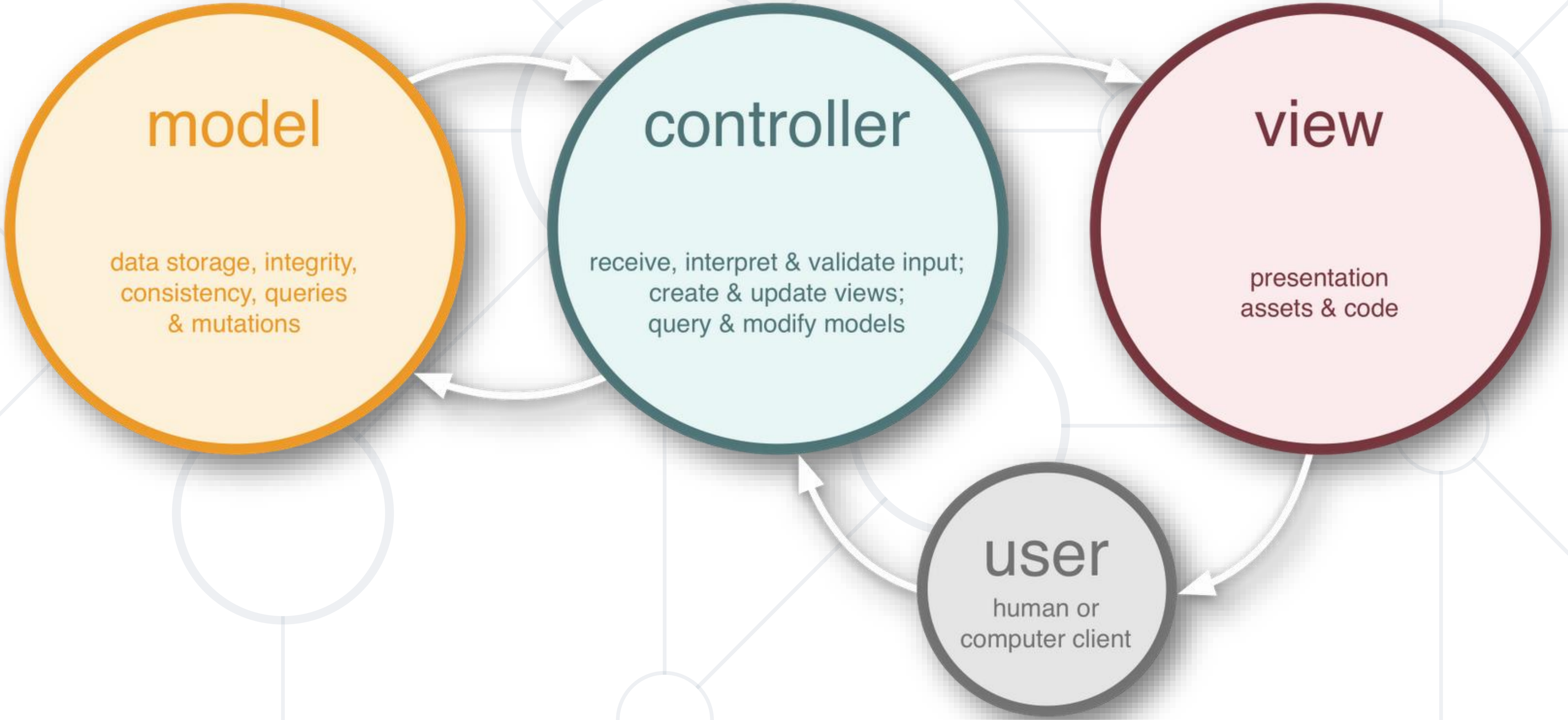
View (UI)

- Defines how the application's **user interface** (UI) will be displayed
- May support **master views** (layouts)
- May support **sub-views** (partial views or controls)
- May use **templates** to dynamically generate HTML

Controller (Logic)

- The **core** MVC component – holds the logic
- Process the requests with the help of views and models
- A set of classes that handles
  - Communication from the user
  - Overall application flow
  - Application-specific logic (business logic)
- Every controller has one or more "actions"

The MVC Pattern (in Web Apps)


model
data storage, integrity, consistency, queries & mutations
controller
receive, interpret & validate input; create & update views; query & modify models
view
presentation assets & code
user
human or computer client

MVC with Express.js

Using Node.js, Express.js, Handlebars

Handlebars Templates

- Handlebars provides the power necessary to let you build **semantic templates** effectively
- It is based on the **Mustache** template language, but improves it in several important ways
- To install it inside an Express.js project type in cmd:

```
npm install express-handlebars --save
```

View – Handlebars

- HTML views with Handlebars templating syntax:

```
<div class="container body-content">
  <div class="row">
    <h2>{{cat.name}}</h2>
    <p>Age: {{cat.age}}</p>
    {{#if cat.isAlive}}
    <p>Status: Alive</p>
    {{else}}
    <p>Status: Deceased</p>
    {{/if}}
  </div>
</div>
```

HTML Code

Handlebars syntax

Handlebars If/else

Summary

- Node.js – JavaScript runtime environment
- We use Node and HTTP to create servers
- MVC is a design pattern with individual components
- Express.js – Web Framework for building server-side JavaScript apps

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