

The Express Framework & node-orm2

ELEC6017

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Resources

- Reminder:
 - <https://hci.ecs.soton.ac.uk/wiki/JavascriptReferences>
 - <https://hci.ecs.soton.ac.uk/wiki/NodejsReferences>

Two Programming Patterns

- Let's look at two key ideas behind express
- Mapping URLs to functions (routing)
- Augmenting function arguments
- Basic example: [08_http_routing.js](#)
- We can wrap this functionality into an object, example:
[09_http_routing_object.js](#)

Express

- A node.js framework for web services applications
 - Express facilitates routing of URLs to functions
 - Express supports the "injection" of middleware
 - Plenty of middleware plugins
- For more information about express see also <http://expressjs.com/> & <http://expressjs.com/guide.html> and ch. 6-9 of "Node.js in Action" (see module web page)
- Hello World example: [10_hello_express.js](#)

More Express Examples

- Let's look at a slightly more advanced examples to demonstrate:
 - URL routing
 - Augmented req & res
 - Middleware
- We need an example scenario..

IoT Simple Example

- Assume we have 'things' that are mini-computers and can be connected to the Internet
- We will call these devices (aka sensor nodes)
 - Example: Arduino with WiFi shield (for prototyping)
 - Or simply AVR microcontroller with WiFi module
- Each device can have multiple sensors attached to it (e.g. temperature, humidity, etc..)
- Each sensor can produce sensor readings (i.e. data)

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IoT Simple Example API

- URLs:
 - /devices
 - /device/:device_id
 - /device/:device_id/sensors
 - /device/:device_id/sensor/:sensor_id
 - /device/:device_id/sensor/:sensor_id/readings
- Each of them could accept GET and POST
 - E.g. GET /devices to return the list of all devices
 - POST /devices to create a new device

IoT Simple Example Code

- Important notes:
 - Here I use hard-coded data, please see following slides about using DBs
 - This does not fully cover the API from the previous slide
- [11_express_urls.js](#)

Object Relational Mapping & node-orm2

- This module is not about DBs
 - Yet, we cannot assume you already know about DBs
- An Object Relational Mapping (ORM) is a way to handle a database from an object oriented language
- An ORM abstracts some of the DB issues
- There are several ORM modules for Node.js
- We will use node-orm2
Please see: <https://github.com/dresende/node-orm2>

node-orm2

- It works with several DBs
 - we will use sqlite because it is easy to install (npm install sqlite3)
- node-orm2 provides an API to
 - Define what / how to store data in the DB
 - Store & edit data into the DB
 - Retrieve data from the DB
 - Search & filter

node-orm2 Example

- [12_orm.js](#)

Summary & Outlook

- Express is a Node.js framework that makes it easier to build web services (& applications)
 - Lots of plug-ins (middleware) available to expand it
- node-orm2 is an ORM module: it abstracts how to deal with the DB
- You should now have all you need for the coursework
- In future lectures: coursework Q&A, more about IoT & my research around it