

# Programming for IoT applications – AY 2015/16

## Lab 2

---

**SUGGESTION:** Use **Postman**, a chrome plugin for testing REST web services by managing HTTP requests

---

Exercise 1. Extend *Exercise\_1* proposed during the *Lab 1*, for designing a RESTful-style calculator.

Develop the **HTTP GET** method to manage the following commands:

- **add**: to add two operands and send in the *HTTP body* the JSON;
- **sub**: to subtract two operands and send in the *HTTP body* the JSON;
- **mul**: to multiply two operands and send in the *HTTP body* the JSON;
- **div**: to divide two operands and send in the *HTTP body* the JSON. CHECK that the operation is possible, if not an exception must be raised with the suitable HTTP code;

**Manage possible errors in invoking the web services (e.g. wrong command or wrong number of parameters).**

The output should be a JSON reporting both input operands, the executed command and the result (validate with <http://jsonlint.com/>)

*Example:*

- `http://localhost:8080/add?op1=10&op2=12`  
where **add** is the command and the parameters **op1** and **op2** provide the input operands
- `http://localhost:8080/sub?op1=10&op2=9`  
where **sub** is the command and the parameters **op1** and **op2** provide the input operands

Exercise 2. *Exercise\_1 follow-up*: redesign RESTful-style calculator for exposing full URL fashion web services where parameters must be provided slash-separated.

*Example:*

- `http://localhost:8080/add/10/12/`
- `http://localhost:8080/sub/10/9/`

Exercise 3. Extend *Exercise\_2* proposed during the *Lab 1*, for designing a RESTful-style calculator.

Develop the **HTTP POST** method for receiving in the body-message the following JSON:

```
{
  "command": "add",
  "operands": [10, 9, 8, 7, 6, 5, 3, 2, 1]
}
```

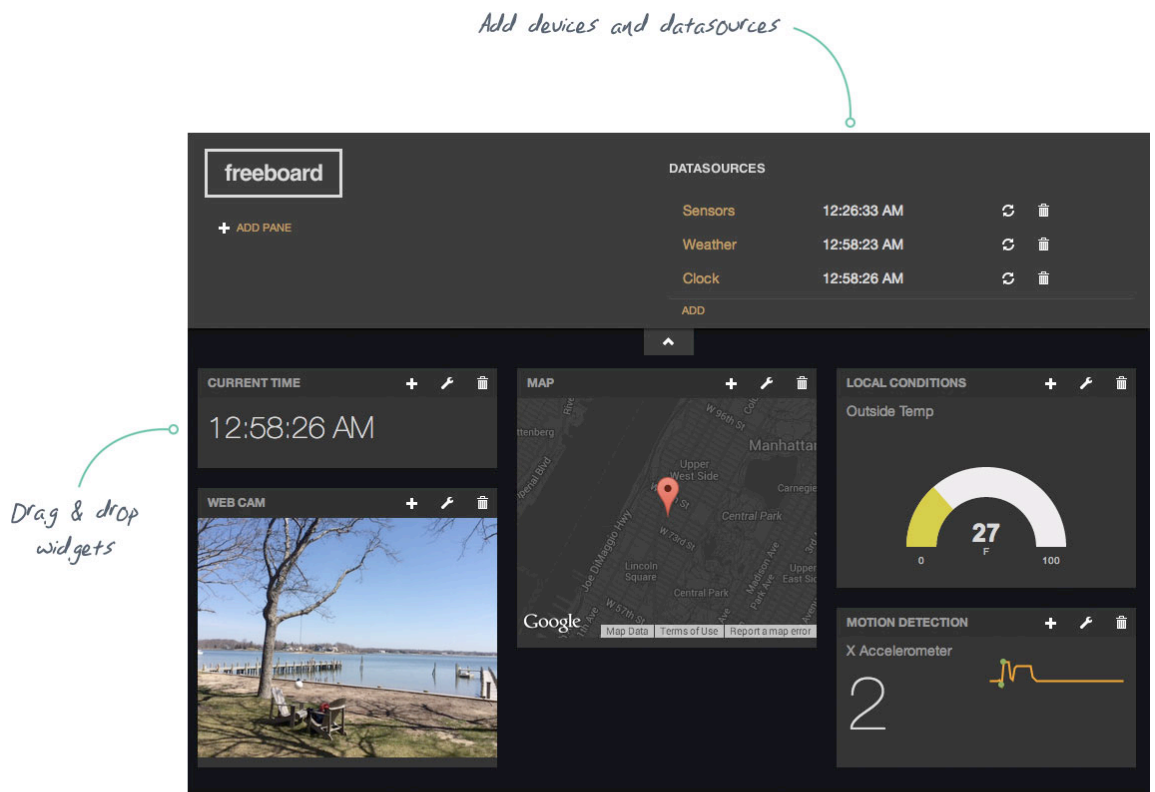
where "command" indicates the operation to be performed among: add, sub, div, mul. "operands" is an array with the inputs for the operation.

Finally, the **POST** method should return a JSON reporting the input operands, the executed command and the result (validate with <http://jsonlint.com/>)

Exercise 4. Develop REST web services for deploying freeboard<sup>1</sup> (use the version provided as additional material) with cherrypy.

Develop the **HTTP GET** method for providing the index.html

Develop the **HTTP POST** for saving the new dashboard configuration (the resulting *dashboard.json* file must be saved in the "freeboard/dashboard" folder)



<sup>1</sup> Freeboard (<http://freeboard.io/>) is an open source software useful for building real-time, interactive dashboards and visualizations in minutes using the intuitive drag & drop interface.