JavaScript.

The Fundamentals

JavaScript - Behavior structures

JavaScript functions.

- **Fundamental unit of composition for logic (or BEHAVIOUR).**

- **Function syntax:**
  - **ES5:**
    - **Function declarations.**
    - **Function expressions.**
    - Hoisting **(ES5) – all function declarations moved to the top of the current scope at runtime – now redundant.**
  - **ES6:**
    - **Arrow functions.**
      - **Shorthand version.**

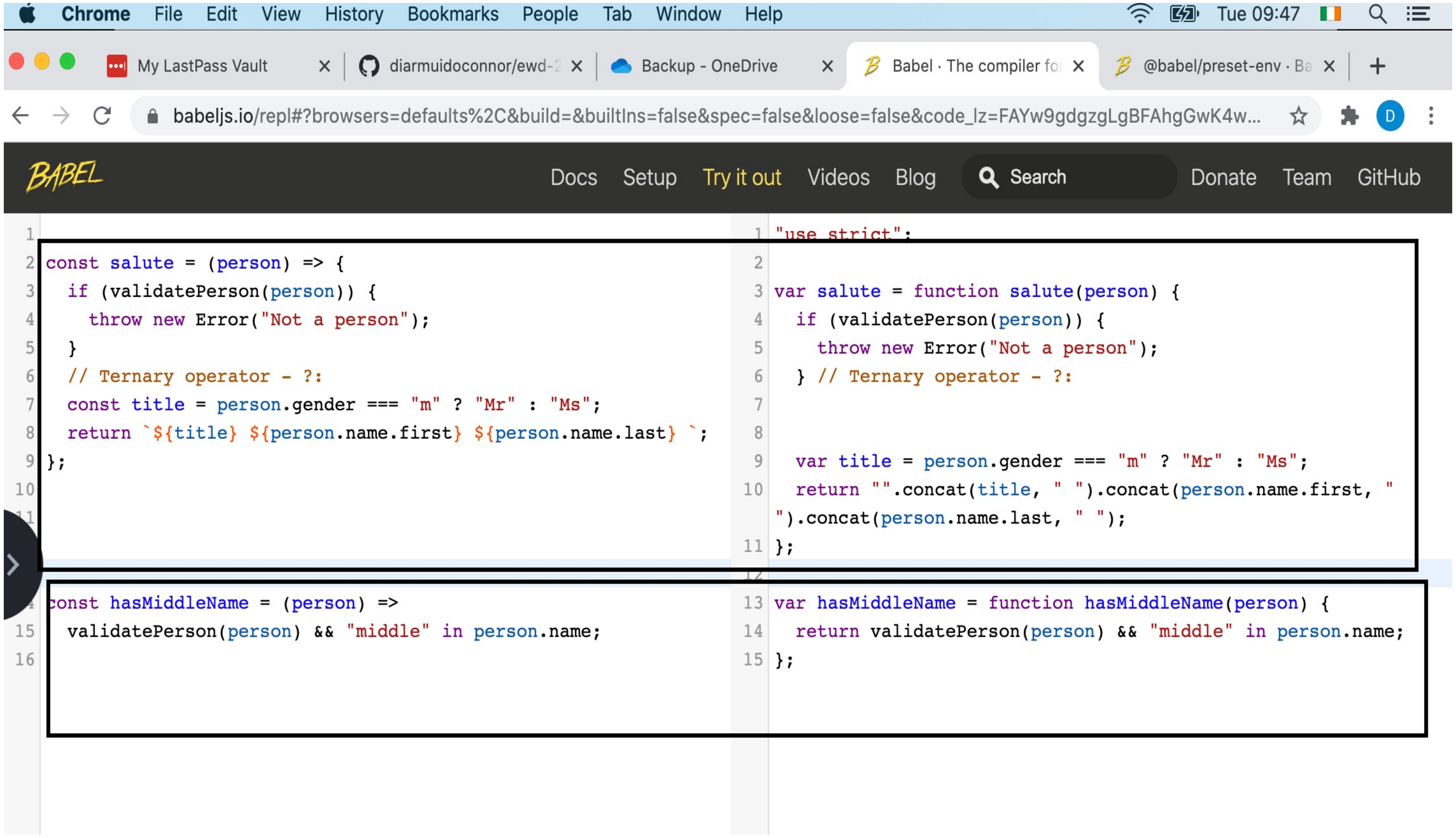
  - **Anonymous functions (see later).**
- **Ref. functions/01_functionBasics.js**

Arrow functions

- **A cleaner syntax for creating functions.**

  const name = (parameters) => { ….. Body ……. }
- **The => (arrow) separates function body from its parameters.**
- **Enclose** body **with curly braces, { …… }.**
  - **Unless body is a single expression (optional).**
- **Enclose** parameter **list with parentheses, (…).**
  - **Unless only a single parameter (optional).**
- **Omit** return **token when single-expression body (optional).**

Arrow functions – ES6 → ES5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```javascript

const salute = (person) => {
  if (validatePerson(person)) {
    throw new Error("Not a person");
  }
  // Ternary operator - ?:
  const title = person.gender === "m" ? "Mr" : "Ms";
  return `${title} ${person.name.first} ${person.name.last} `;
};



const hasMiddleName = (person) =>
  validatePerson(person) && "middle" in person.name;
```

```javascript
"use strict";

var salute = function salute(person) {
  if (validatePerson(person)) {
    throw new Error("Not a person");
  } // Ternary operator - ?:


  var title = person.gender === "m" ? "Mr" : "Ms";
  return "".concat(title, " ").concat(person.name.first, " ").concat(person.name.last, " ");
};

var hasMiddleName = function hasMiddleName(person) {
  return validatePerson(person) && "middle" in person.name;
};
```

Function characteristics

- Constructor functions **– function for creating objects of a certain type, e.g.**

  function Person(……) {. . . . . }

  let him = new Person(‘joe Bloggs’, ‘1 Main Street’, ...)

  - **Same purpose as classes in Java.**
- Side-effects **– when a function “**modifies some state variable value(s) outside of its local environment”.
  - e.g. **addMiddleName() causes a side-effect.**

    salute() does not cause side-effects.
  - **Performing I/O also considered a side-effect.**
- Pure function **– has no side-effects; will always return the same result for a given set of parameters.**
  - **Functional programming.**

Higher Order Functions (HOF).

- **Definition: A function that takes a function as a parameter (and/or returns a function response).**
  - **Function parameter termed a** callback.

    function someHOF(. . ., callback, ….)
  - **Callback usually coded as an** anonymous **function.**

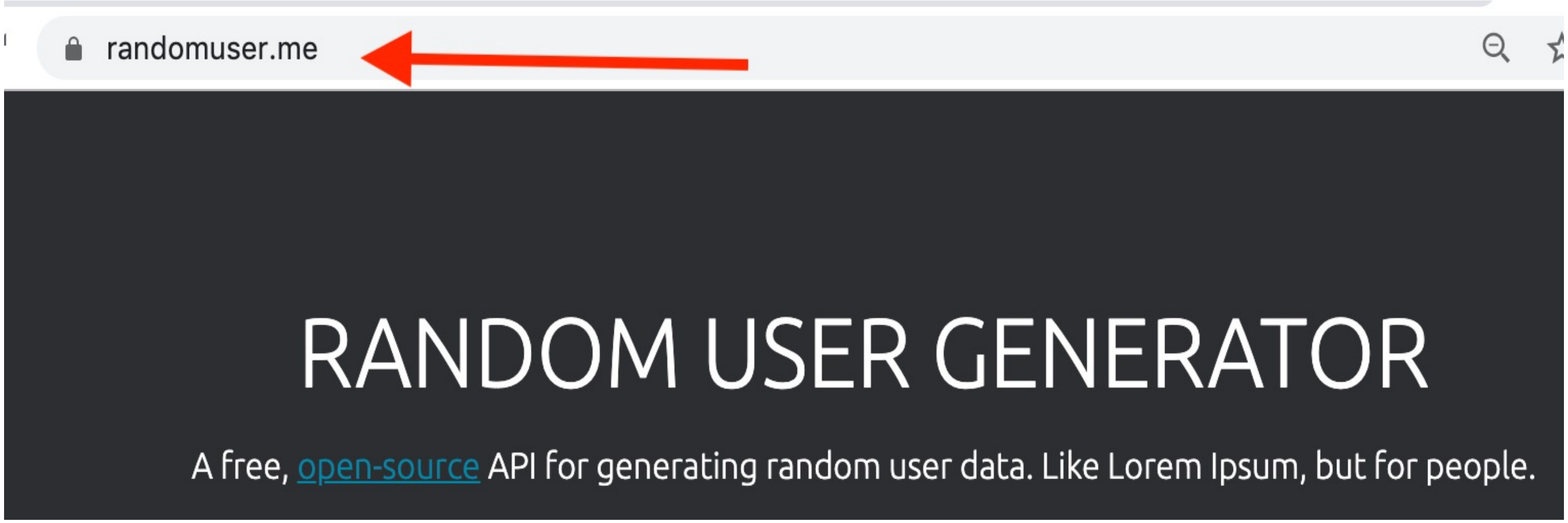
- **Case study – The Array HOFs.**
  - **forEach()**
  - **filter()**
  - **map()**
  - **reduce()**

Array HOFs – forEach().

```
const sourceArray = [ ………. ]
sourceArray.forEach(
  function(element, index, array) { …Anonymous function body …}
)
```

- **Anonymous function is called for each array element.**
- **An alternative to using for-loop.**
- index **and** array **arguments are optional.**
- **More commonly coded using Arrow function style.**

Array HOF demos context


randomuser.me

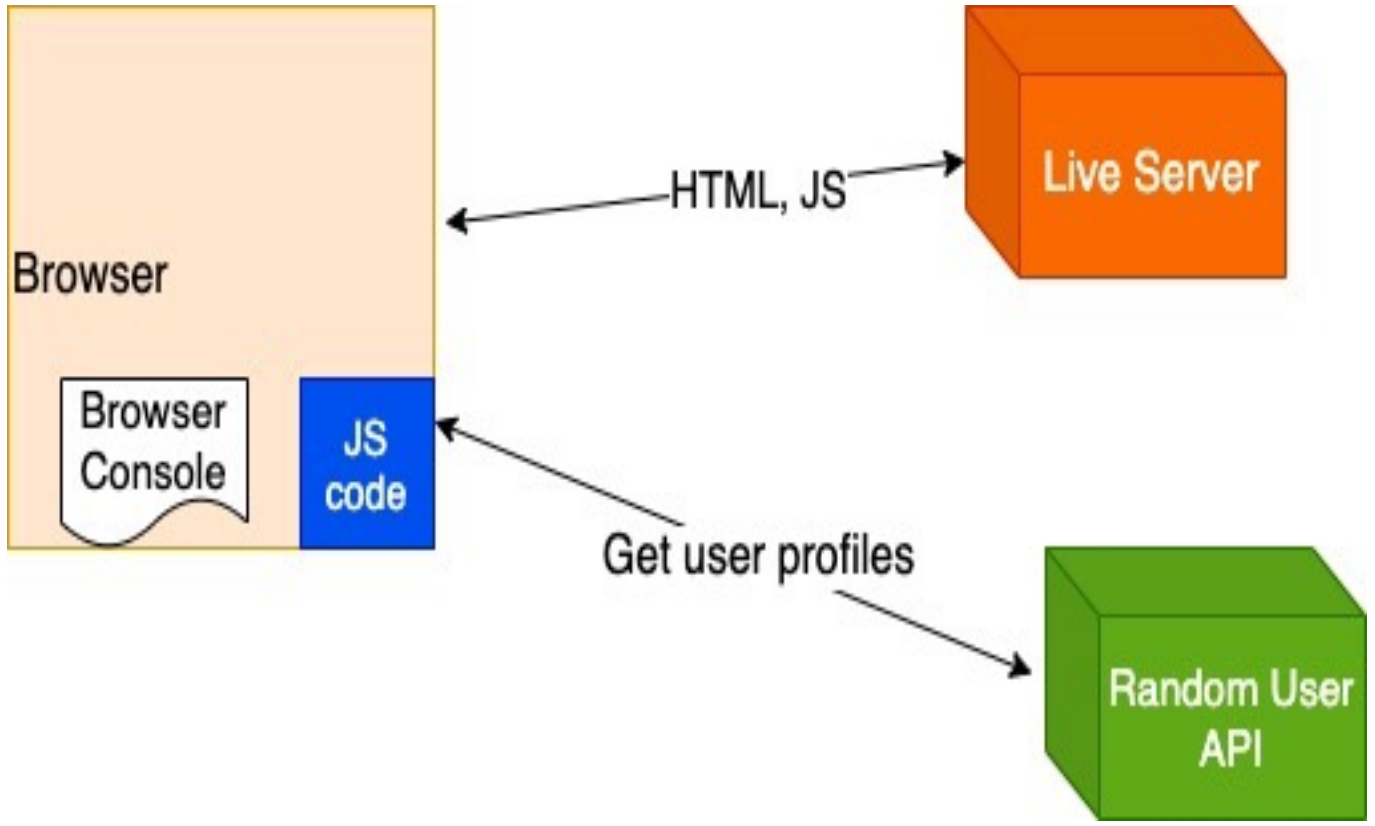
RANDOM USER GENERATOR

A free, open-source API for generating random user data. Like Lorem Ipsum, but for people.

- **Open Web API.**
- **Accepts HTTP GET requests, e.g.**

  https://randomuser.me/api/?results=10 - generate 10 user profiles and returns them in a JSON (Javascript Object Notation) structure.

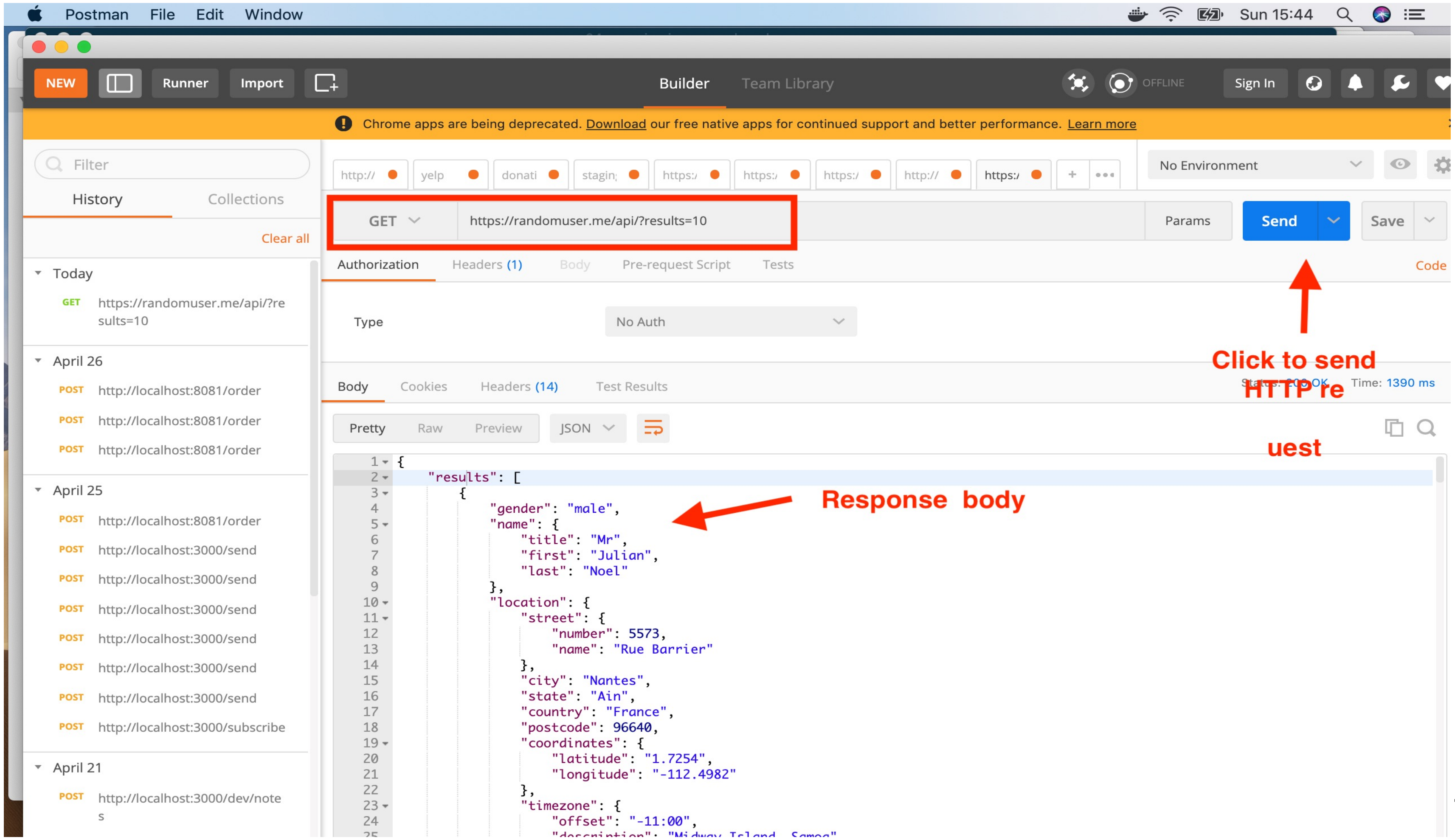
Array HOF demos context



Use **Postman** to test Web APIs.

(Postman = Chrome extension or app)

- **We'll use it later in this module.**



Chrome apps are being deprecated. Download our free native apps for continued support and better performance. Learn more

GET https://randomuser.me/api/?results=10

Type: No Auth

Status: 200 OK Time: 1390 ms

Today
- GET https://randomuser.me/api/?results=10

April 26
- POST http://localhost:8081/order
- POST http://localhost:8081/order
- POST http://localhost:8081/order

April 25
- POST http://localhost:8081/order
- POST http://localhost:3000/send
- POST http://localhost:3000/send
- POST http://localhost:3000/send
- POST http://localhost:3000/send
- POST http://localhost:3000/send
- POST http://localhost:3000/send
- POST http://localhost:3000/subscribe

April 21
- POST http://localhost:3000/dev/notes

```
{
    "results": [
        {
            "gender": "male",
            "name": {
                "title": "Mr",
                "first": "Julian",
                "last": "Noel"
            },
            "location": {
                "street": {
                    "number": 5573,
                    "name": "Rue Barrier"
                },
                "city": "Nantes",
                "state": "Ain",
                "country": "France",
                "postcode": 96640,
                "coordinates": {
                    "latitude": "1.7254",
                    "longitude": "-112.4982"
                },
                "timezone": {
                    "offset": "-11:00",
                    "description": "Midway Island, Samoa"
```

Array HOF demos.

- **Base example.**
  - fetch() **and** array.forEach(callback)
  - **Ref. functions/02_webAPICall.js.**
- **filter(callback).**
  - **Select entries from a source array, based on some criteria.**
  - **Selected entries added to a <u>new</u> array.**
  - **Source array unchanged (Pure).**
  - **Ref. functions/03_filtering.js**
- **map(callback).**
  - **Creates a new array]based on the source – 1-for-1 mapping.**
  - **Source array unchanged (Pure).**
  - **Ref. functions/04_mapping.js**

Array HOF demos.

```
accumulator = sourceArray.reduce(
    (acc, element, index, array) => {.  // Callback
        . . . . . . .
        return updatedAccumulator
   }, initialAccumulator )          // Note .
```

- **reduce(……)**
  - **reduces the source array to a** single accumulated value**.**
  - **Source array unchanged (Pure)**
  - **Callback incrementally ‘builds’ accumulator.**
  - **Accumulator passed between invocations of callback.**
  - **Ref functions/05_reducing.js**

Summary

- **Defining Behavior.**
  - **Functions:**
    - **ES5 – Function declarations; Function expressions.**
    - **ES6 – Arrow functions. Shorthand.**
    - **Anonymous functions.**
    - **Higher Order functions.**