Firebase and Node.js Worksheet

This worksheet aims to introduce the development of more complex applications, that combine a Firebase Realtime Database and a Node.js script.

1. System Preparation

For this worksheet, it is required to install the **Node.js** software. It can be downloaded from the official website (https://nodejs.org/en/download). It is recommended to download the latest Long-Term Support (LTS) versions. It is compatible with Windows, macOS, and most Linux distributions (including Debian-based ones).

- To confirm that the installation was successful, open a terminal and type: **node -v**
    - The output should be the installed version (e.g.: v16.13.0)

2. Firebase Project

The next step configures a new project in Firebase. To do so, open the Firebase webpage (https://firebase.google.com), login with Google credentials (or register if you don't have any Google email). This will redirect you to the Console page (https://console.firebase.google.com).

Create your first project:

- **+ Add project**
- Type a project name (e.g.: cad2122-<student number>)
- Disable Google Analytics
- Create project

Next it is necessary to add a Web app:

- Click on the </> icon to add a Web app
- Type an app name (e.g.: cad2122-<student number>-webapp)
- Don't add Firebase Hosting
- On the 2nd step "Add Firebase SDK", click on "Use a <script> tag"
    - Copy and save this code – it will be required on the Web application
- Continue to console

On the left, you can now click on the Realtime Database, and create a database:

- Create database
- Select the location: Belgium (europe-west1)
- Start in **test mode**

3. Firebase and Node.js Application

This application will show, in real-time, a list of messages that will be sent to the Firebase Realtime Database. Every time a new message is pushed to the database, the page will show a new Bootstrap alert that contains the message, with a specific type (success, warning, danger or primary). The messages will be automatically pushed to the database by a Node.js script every 5 seconds, with a random sentence and a random type.
Please refer to the demonstration video, available on Moodle, that shows the application behavior.

4. Development

First, we will build the directory structure:

- Start by creating a new folder named "**06-Firebase-NodeJS**" on your local Git repository folder
- Inside this folder, create two folders: "**js**" and "**nodejs-app**"

Next, we will need to configure the Node.js application, and install the dependencies. Inside the "**nodejs-app**" directory, run the following commands:

- **npm init -y** // This will initialize the Node.js configuration file
- **npm install firebase-admin --save**
- **npm install faker –save**

Now, we need to configure the credentials for the Node.js application:

- Go to the Project settings panel → Service accounts
- Copy and save the Node.js code
- Generate new private key
    - Save the JSON file inside the **nodejs-app** directory

Finally, we are ready to develop both Web and Node.js applications.

Hints:

On the Web application, separate the JavaScript code in two files:

```
<script type="module" src="js/firebase.js"></script>
<script type="module" src="js/index.js"></script>
```

- The **firebase.js** file will include the code that is inside the <script> tag for the Firebase configuration
- The **index.js** file will include all the JavaScript code that listens for new messages and present them on the Webpage

To import the **getDatabase** method on your JavaScript file, use the CDN link:

```
import { getDatabase } from "https://www.gstatic.com/firebasejs/9.4.0/firebase-database.js";
```

To generate a random sentence, use the Faker library, namely the "`faker.lorem.sentence(number)`" function. To select a random type, use the function "`faker.helpers.randomize(array)`" that selects a random item of a given array.

5. Documentation

The required methods and functionalities should be consulted on the official documentations. **Please pay attention to the differences** between the Web and Node.js implementations.

Firebase Realtime Database (*Web*): https://firebase.google.com/docs/database/web/read-and-write
Firebase Realtime Database (*Node.js*): https://firebase.google.com/docs/admin/setup
Faker: http://marak.github.io/faker.js/