

# Exercises 13: Node.js

Upload a JavaScript file named USPnumber1.USPnumber2.js with your server implementation.

Attention: If you need to upload a file after the deadline, use late.USPnumber1.USPnumber2.js

- 1. Read and understand the code in the annex. It explains how to create a node.js web server without a framework.
- 2. Run the server. You may use node js on your computer or an online node js IDE, such as <a href="https://codesandbox.io">https://codesandbox.io</a>. There is a <a href="codesandbox template">codesandbox template</a>. You can copy it by signing up (it is free) and using the Fork button. To run a new version, use the Fork button again.
- 3. Create a new, more modern version of the program that uses import (not require), await/async, let/const (not var), and arrow functions, with a Promise version of fs.readFile. For the import command to work, include "type"="module" in the package.json file.
- 4. Create a new HTML file, different from index.html, and serve it from the folder example.
- 5. Modify the server to create a new route, called /random, that returns HTML with a random number between 0 and 1.
- 6. Modify the server to create a new route, called /random?max=3, that returns HTML with a random number between 0 and the value of the max variable.

## Annex: index.js

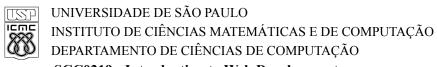
```
// We start importing the necessary modules for the server.
// The `http` module is a built-in Node.js module for creating
// networking capabilities like HTTP servers and clients.
var http = require("http");
// The `fs` (file system) module is a built-in Node.js module that
// provides an API to interact with the file system.
var fs = require("fs");
// The `path` module is a built-in Node.js module that provides
// utilities for working with file and directory paths.
// It can be used for extracting file extensions, joining paths,
// resolving paths, etc.
var path = require("path");
// `http.createServer()` is a method to create a new instance of an
// HTTP server.
// It takes a callback function, which is invoked every time the
// server receives a request.
http.createServer(function (request, response) {
    // We're logging the requested URL to the console.
    console.log("request ", request.url);
   // Preparing the file path for the requested resource.
   // The `.` at the start refers to the current directory, so we're
   // looking for files in the same directory as this script.
   var filePath = "." + request.url;
    if (filePath == "./") {
        // If the requested path is just `/`, we change the file path
        // to `./index.html`.
        // This is a common practice since `index.html` usually
serves
        // as the homepage in many web servers.
        filePath = "./index.html";
    }
```

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```
// Extracting the extension from the requested file's path.
// We're converting it to lowercase to avoid case-sensitivity
// issues.
var extname = String(path.extname(filePath)).toLowerCase();
// This is a lookup object for MIME types based on file
// extensions.
// A MIME type is a standard that indicates the nature and format
\ensuremath{//} of a document, file, or assortment of bytes.
var mimeTypes = {
    ".html": "text/html",
    ".js": "text/javascript",
    ".css": "text/css",
    ".json": "application/json",
    ".png": "image/png",
    ".jpg": "image/jpg",
    ".gif": "image/gif",
    ".svg": "image/svg+xml",
    ".wav": "audio/wav",
    ".mp4": "video/mp4",
    ".woff": "application/font-woff",
    ".ttf": "application/font-ttf",
    ".eot": "application/vnd.ms-fontobject",
    ".otf": "application/font-otf",
    ".wasm": "application/wasm"
};
// Finding the correct MIME type for the requested file.
// If the extension is not in our lookup table, we default to
// "application/octet-stream".
var contentType = mimeTypes[extname]||"application/octet-stream";
// Reading the requested file from disk using the `fs.readFile`
// function.
// This is an asynchronous operation, so we provide a callback
// function that will be executed once the file is read.
fs.readFile(filePath, function (error, content) {
    // If there's an error while reading the file:
    if (error) {
```

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```
// If the error is "ENOENT" (Error NO ENTry), it means
the
            // file was not found.
            if (error.code == "ENOENT") {
                // In that case, we read a custom 404 error page.
                fs.readFile("./404.html", function (error, content) {
                    // We set the response status code to 404 and the
                    // content type to "text/html".
                    response.writeHead(404,
                                       {"Content-Type": "text/html"
});
                    // We then end the response, sending the content
                    // of our 404 page.
                    response.end(content, "utf-8");
                });
            } else {
                // For any other error, we set the response status
                // code to 500 (Internal Server Error).
                response.writeHead(500);
                // We then end the response, sending an error
message.
                response.end(
                    "Sorry, check with the site admin for error: " +
                    error.code +
                    " ..\n"
                );
        } else {
            // If the file was successfully read (there's no error),
            // we set the response status code to 200 (OK) and the
            // content type correctly.
            response.writeHead(200, { "Content-Type": contentType });
            // We then end the response, sending the content of the
            // file we just read.
            response.end(content, "utf-8");
        }
   });
})
// We then make our server listen for incoming requests.
// The number 8125 is the port number. This could be any number
// between 1024 and 49151, but 8125 is chosen arbitrarily here.
```



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```
.listen(8125);

// Finally, we log to the console that the server is running and
// listening for requests.

// The IP address 127.0.0.1 is the loopback address, which means the
// host computer itself.
console.log("Server running at http://127.0.0.1:8125/");
```

## Annex: index.html

Good Work!