POLITECNICO
MILANO 1863

Cleaning the code

Computer Graphics 2021

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Your WebGL Program

```
function main() {

  getCanvas();

  initializeYourProgram();

  drawScene();

}
```

```
function initializeYourProgram(){

  compileAndLinkShaders();
  getAttributesAndUniformLocations();
  createVAO();
  putAttributesOnGPU();
}
```

```
function updateTransformationMatrices() {
  updateModel();
  updateView();
  updatePerspective();
}

function drawScene() {

  updateTransformationMatrices();
  bindVertexArray();
  sendUniformsToGPU();
  drawElements()/drawArray();

window.requestAnimationFrame(drawScene);
}
```

Cleaning the code

In the previous lectures we defined vertex and fragment shaders as hard-coded strings

```
  var vertexShaderSource = `#version 300 es
    in vec3 a_position;
    uniform mat4 matrix;
    void main() {
      gl_Position = matrix * vec4(a_position,1.0);
    }`;
  var fragmentShaderSource = `#version 300 es
    precision mediump float;
    out vec4 outColor;
    void main() {
      outColor = vec4(1.0,0.0,0.0,1.0);
    }`;

[...]
  var vertexShader = utils.createShader(gl, gl.VERTEX_SHADER, vertexShaderSource);
  var fragmentShader = utils.createShader(gl, gl.FRAGMENT_SHADER, fragmentShaderSource);
  var program = utils.createProgram(gl, vertexShader, fragmentShader);
```

Cleaning the code

A cleaner approach is to store both vertex and fragment shaders into separate files…

```
#version 300 es

in vec3 a_position;

uniform mat4 matrix;

void main() {

  gl_Position = matrix * vec4(a_position,1.0);

}
```

vs.glsl

```
version 300 es

precision mediump float;

out vec4 outColor;

void main() {

  outColor = vec4(1.0,0.0,0.0,1.0);

}
```

fs.glsl

Cleaning the code

… and load **`vs.glsl`** and **`fs.glsl`** with javascript **`fetch()`** function (in the code of the **`utils.loadFiles()`** function provided in the *utils.js* file)

```
var path = window.location.pathname;
var page = path.split("/").pop();
var baseDir = window.location.href.replace(page, ‘’);
var shaderDir = baseDir+"shaders/";

await utils.loadFiles([shaderDir + 'vs.glsl', shaderDir + 'fs.glsl'], function
(shaderText) {
      var vertexShader = utils.createShader(gl, gl.VERTEX_SHADER, shaderText[0]);
      var fragmentShader = utils.createShader(gl, gl.FRAGMENT_SHADER, shaderText[1]);
      program = utils.createProgram(gl, vertexShader, fragmentShader);

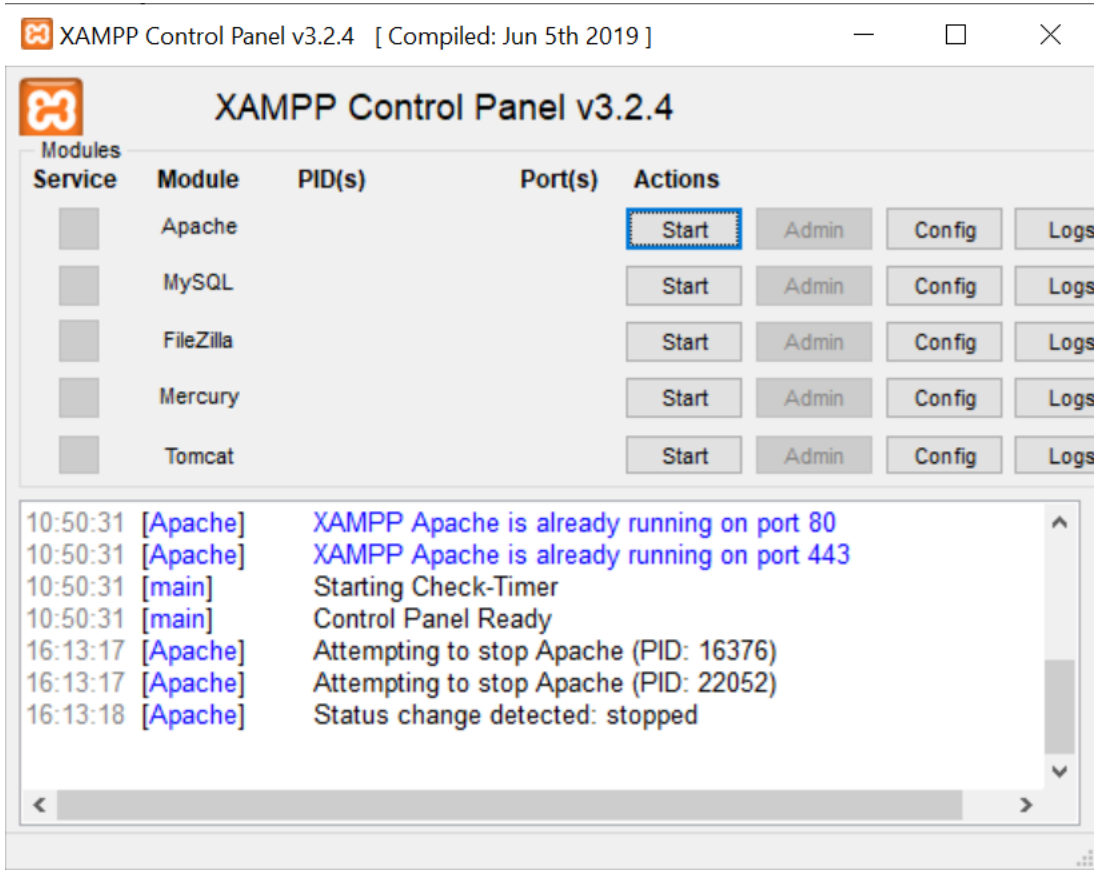
    });
```

For security reasons, the browsers stops this request. To make it work you have to setup a webServer

Setting the environment

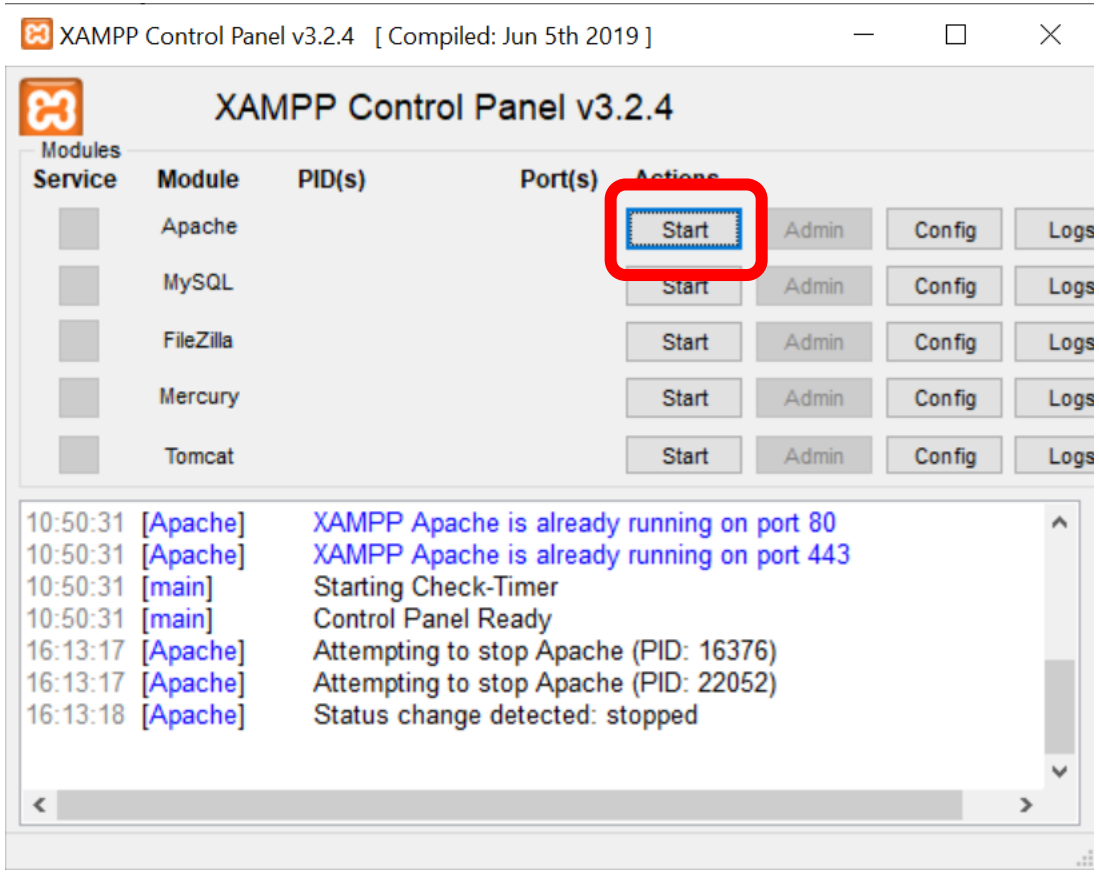
We propose here an easy way to set up a simple (and VERY unsafe) web server…

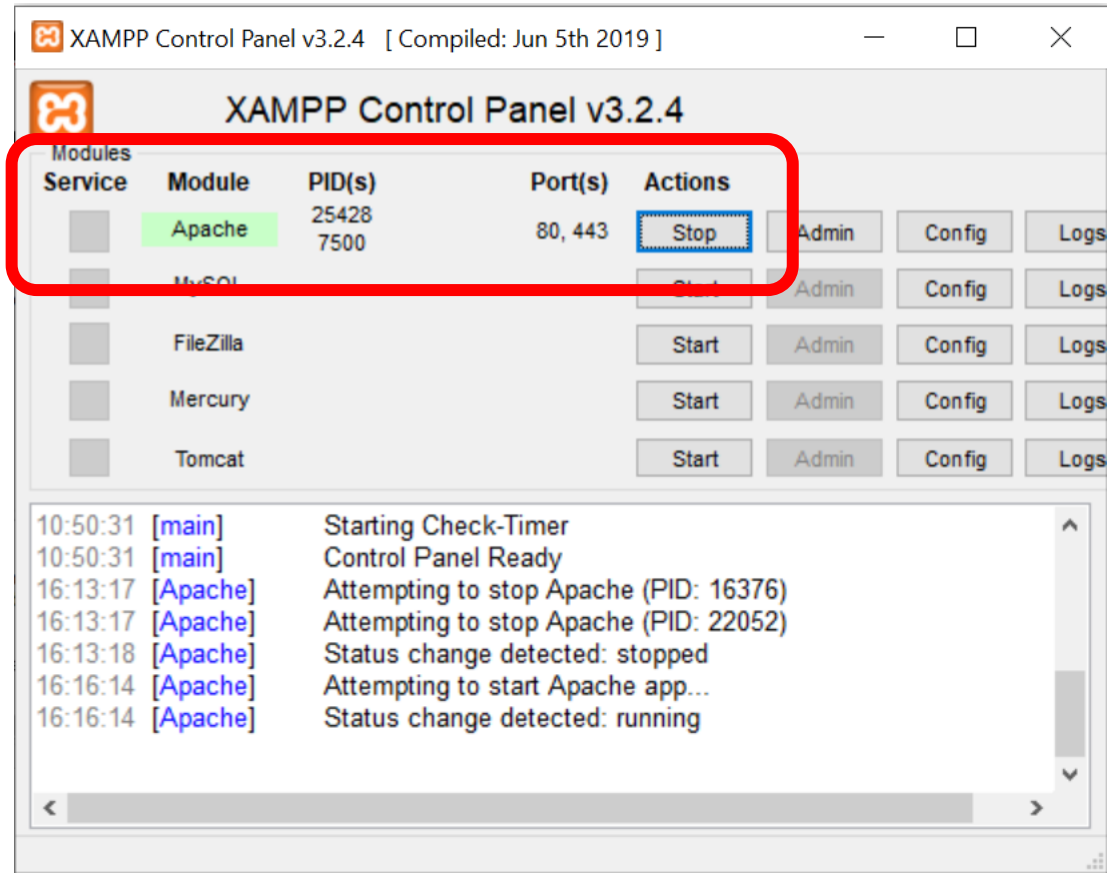
- Download XAMPP: https://www.apachefriends.org/download.html
- Install it
- Open *xampp-control-panel*



Setting the environment

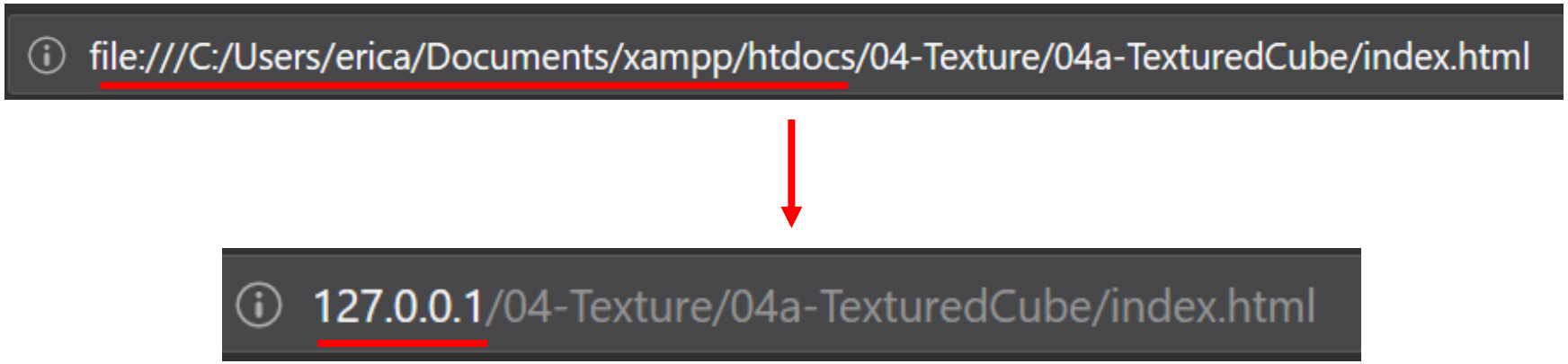
- Press *Start* on **Apache**





Setting the environment

- Put all your files under the *htdocs* folder (~/xampp/htdocs/)
- Now, when opening your html files, you **MUST** replace the path until *htdocs* with 127.0.0.1:



Cleaning the code

… and load **`vs.glsl`** and **`fs.glsl`** with javascript **`fetch()`** function (in the code of the **`utils.loadFiles()`** function provided in the *utils.js* file)

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      var fragmentShader = utils.createShader(gl, gl.FRAGMENT_SHADER, shaderText[1]);
      program = utils.createProgram(gl, vertexShader, fragmentShader);

    });
```

For security reasons, the browsers stops this request. To make it work you have to setup a webServer

Cleaning the code

Since loadFiles() is an async function, we need to slightly modify our code organisation

```
async function init(){ //init is an async function so we can use await inside it
  var path = window.location.pathname;
  var page = path.split("/").pop();
  baseDir = window.location.href.replace(page, '');
  shaderDir = baseDir+"shaders/"; //Shader files will be put in the shaders folder

  [..Retrieve canvas and webgl context here..]
  //await makes the init function stop until the loadFiles function has completed
  await utils.loadFiles([shaderDir + 'vs.glsl', shaderDir + 'fs.glsl'], function (shaderText){
    var vertexShader = utils.createShader(gl, gl.VERTEX_SHADER, shaderText[0]);
    var fragmentShader = utils.createShader(gl, gl.FRAGMENT_SHADER, shaderText[1]);
    program = utils.createProgram(gl, vertexShader, fragmentShader);
  });
    gl.useProgram(program);
    main(); //Call the main function from here so it doesn't have to be async too
}
window.onload = init; //Put init function here instead of main
```