Hao Bai, Haob.19@illinois.edu, UIUC

VSC-WebGPU: A Selenium-based VS Code Extension For Local Edit And Cloud Compilation on WebGPU

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Prerequisites

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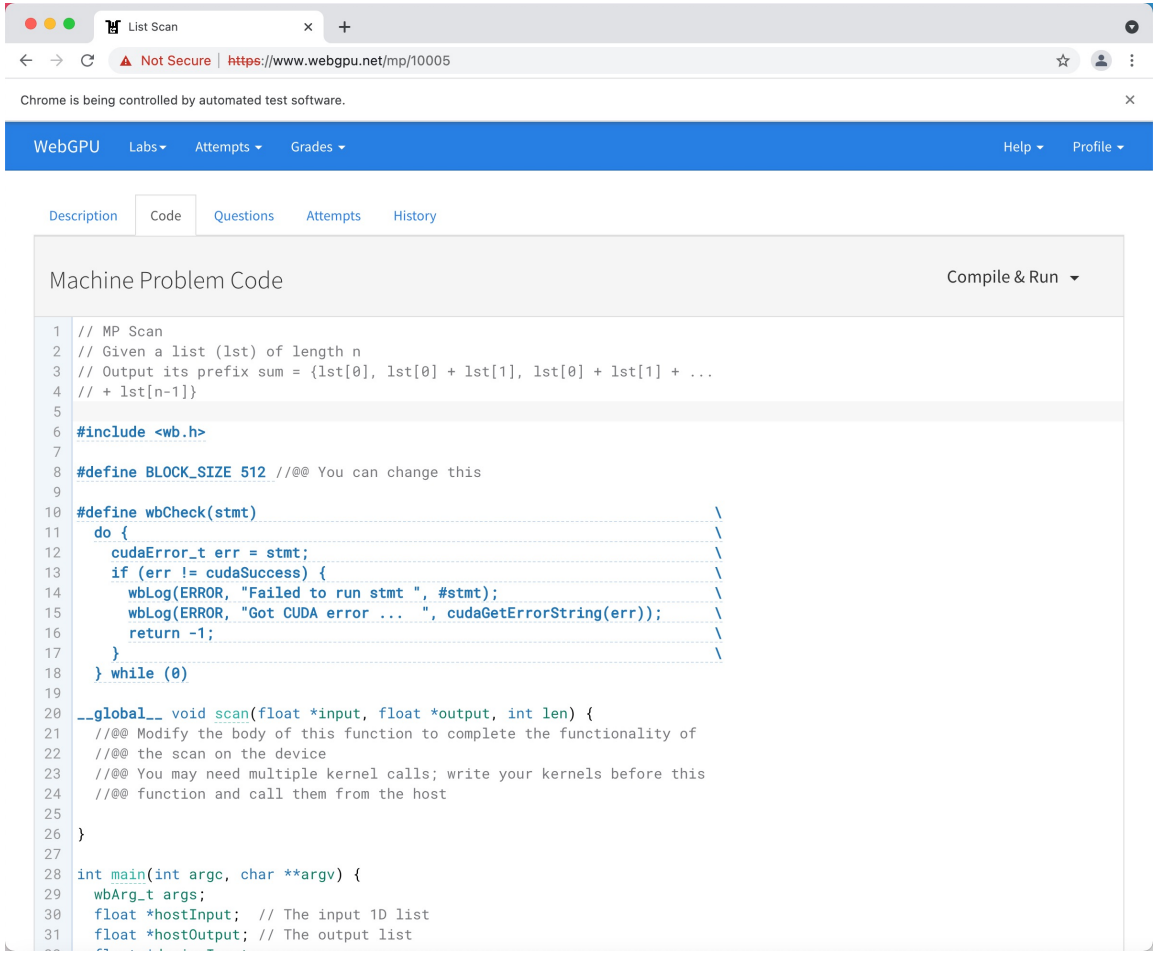
WebGPU: A Scalable Online Development Platform for GPU Programming Courses

Abdul Dakkak
Department of Computer Science
University of Illinois at Urbana-Champaign
Urbana, USA
dakkak@illinois.edu

Carl Pearson and Wen-mei Hwu
Department of Electrical and Computer Engineering
University of Illinois at Urbana-Champaign
Urbana, USA
{pearson, w-hwu}@illinois.edu

What's based on?



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```
int main(int argc, char **argv) {
  wbArg_t args;
  float *hostInput;  // The input 1D list
  float *hostOutput; // The output list
  float *deviceInput;
  float *deviceOutput;
  int numElements; // number of elements in the list

  args = wbArg_read(argc, argv);
```

```
// we use the un-optimized approach
__global__ void total(float *input, float *output, int len) {
  in
  //@@ Abbreviation Generation
  int bx = blockIdx.x;
  int tx = threadIdx.x;
```

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Problem

- Few syntax highlight.
- No auto-completion.

```
int main(int argc, char **argv) {
  wbArg_t args;
  float *hostInput;  // The input 1D list
  float *hostOutput; // The output list
  float *deviceInput;
  float *deviceOutput;
  int numElements; // number of elements in the list

  args = wbArg_read(argc, argv);

  wbTime_start(Generic, "Importing data and creating memory on host");
  hostInput = (float *)wbImport(wbArg_getInputFile(args, 0), &numElements);
  hostOutput = (float *)malloc(numElements * sizeof(float));
  wbTime_stop(Generic, "Importing data and creating memory on host");

  wbLog(TRACE, "The number of input elements in the input is ",
        numElements);
```

```
__global__ void scan(float *input, float *output, int len) {
  in
  // abc include                                          ality of
  // abc input
  // abc int                                              fore this
  // abc Initialize
```

Inspiration

VS Code can do this well!

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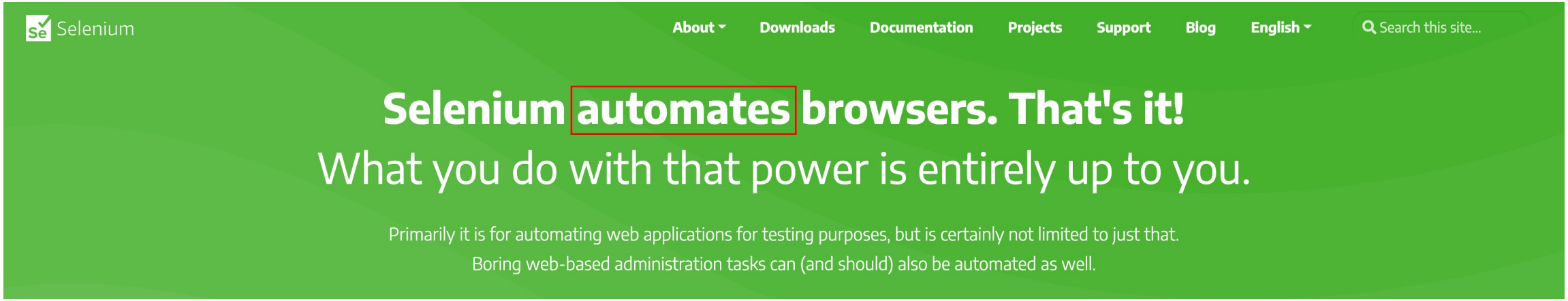

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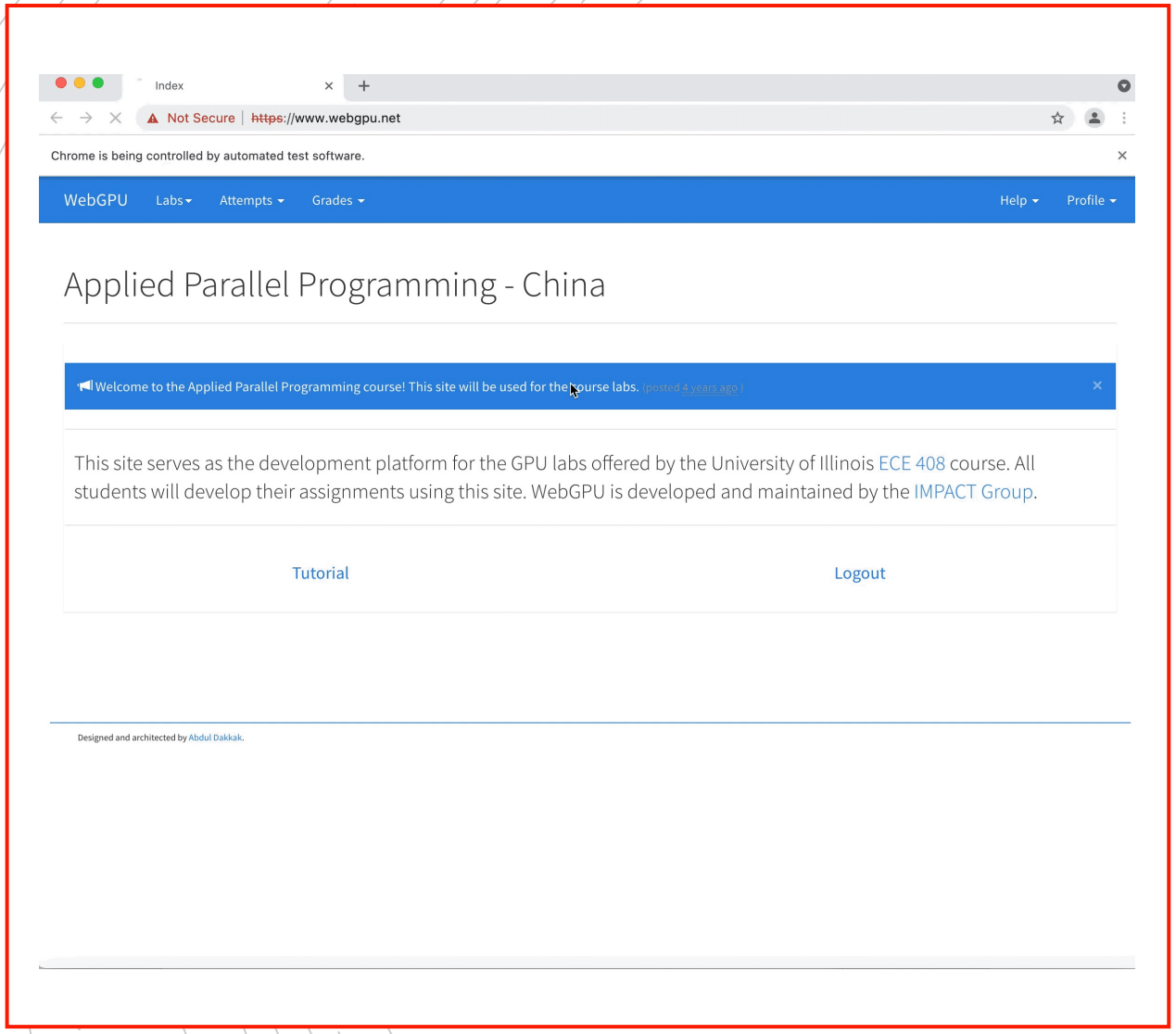
The Approach: Selenium Automata

- https://www.selenium.dev/
- We use Selenium in VS Code extension to combine them up!



An Automated Illustration of Selenium

- **Everything is done automatically.**

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Architecture

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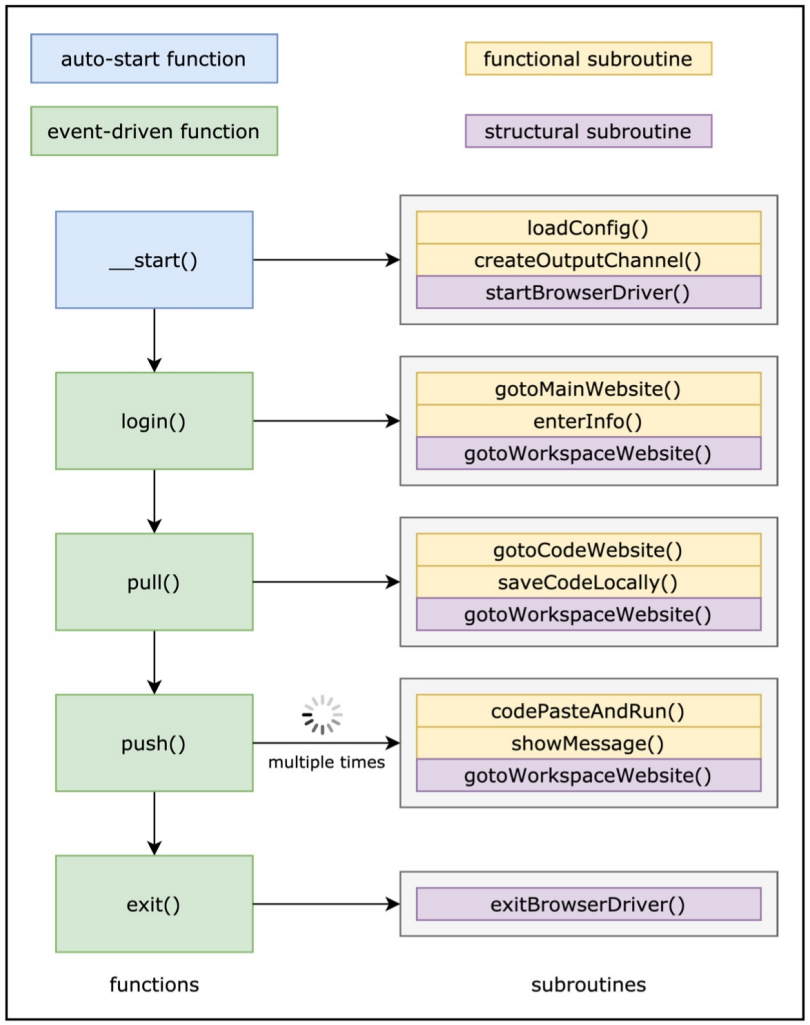
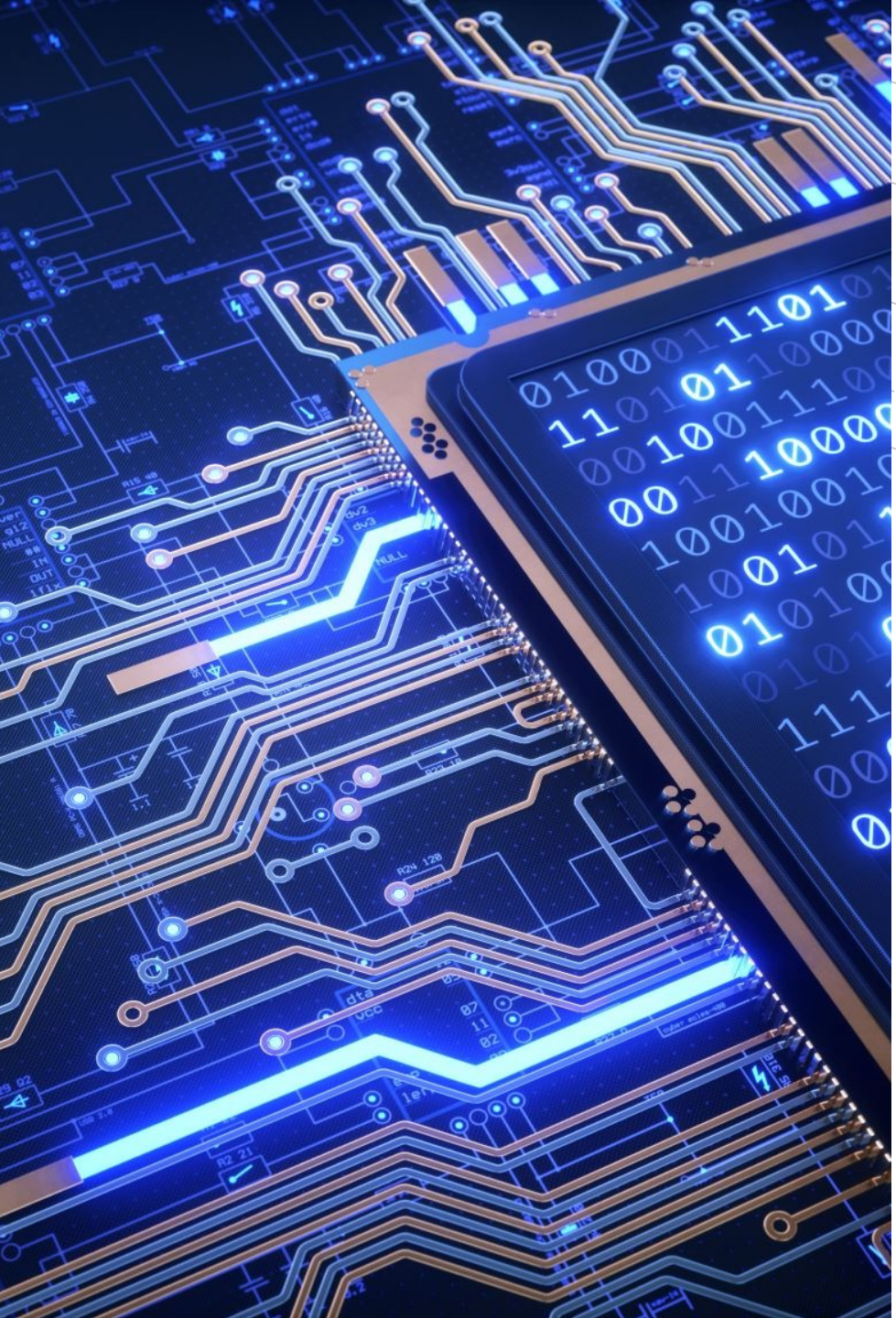


Figure 1. The overall structure of the extension. **Left**: the functions implemented in the extension. **Right**: the subroutines (functionalities) of each function. Note that the `push` function may be called several times, please students tend to write code and run several times.



Technical Chanllenges

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Blocking in Node.js

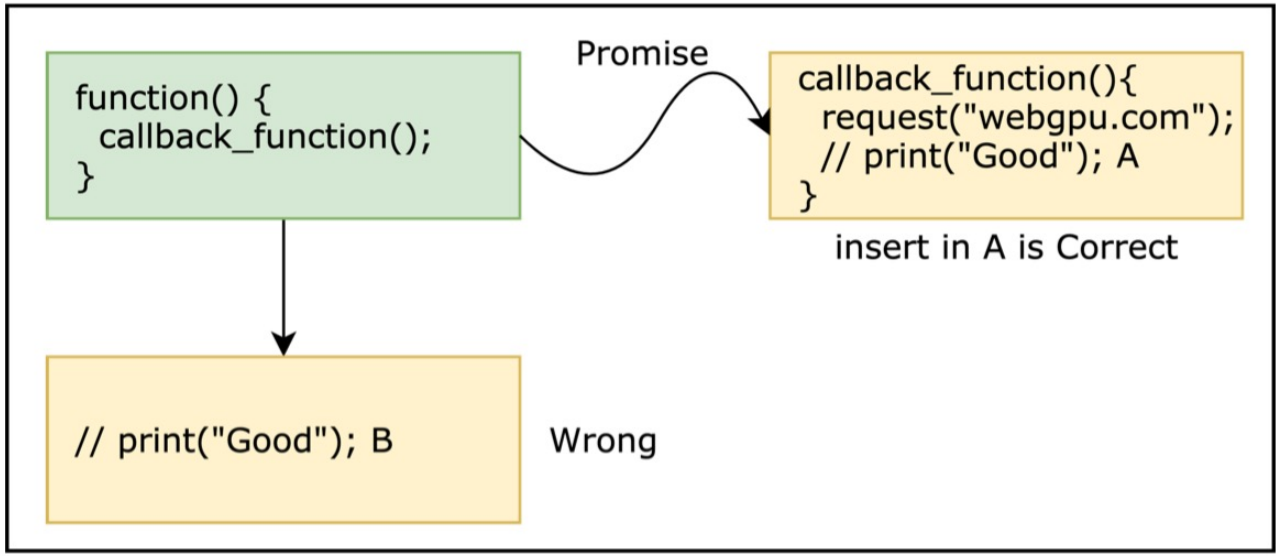

Figure 3. A comparison of blocking or not. Server programmers tend to use choice **A** to report potential errors. **A**: blocking. **B**: non-blocking.

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Implicit and Explicit Waiting

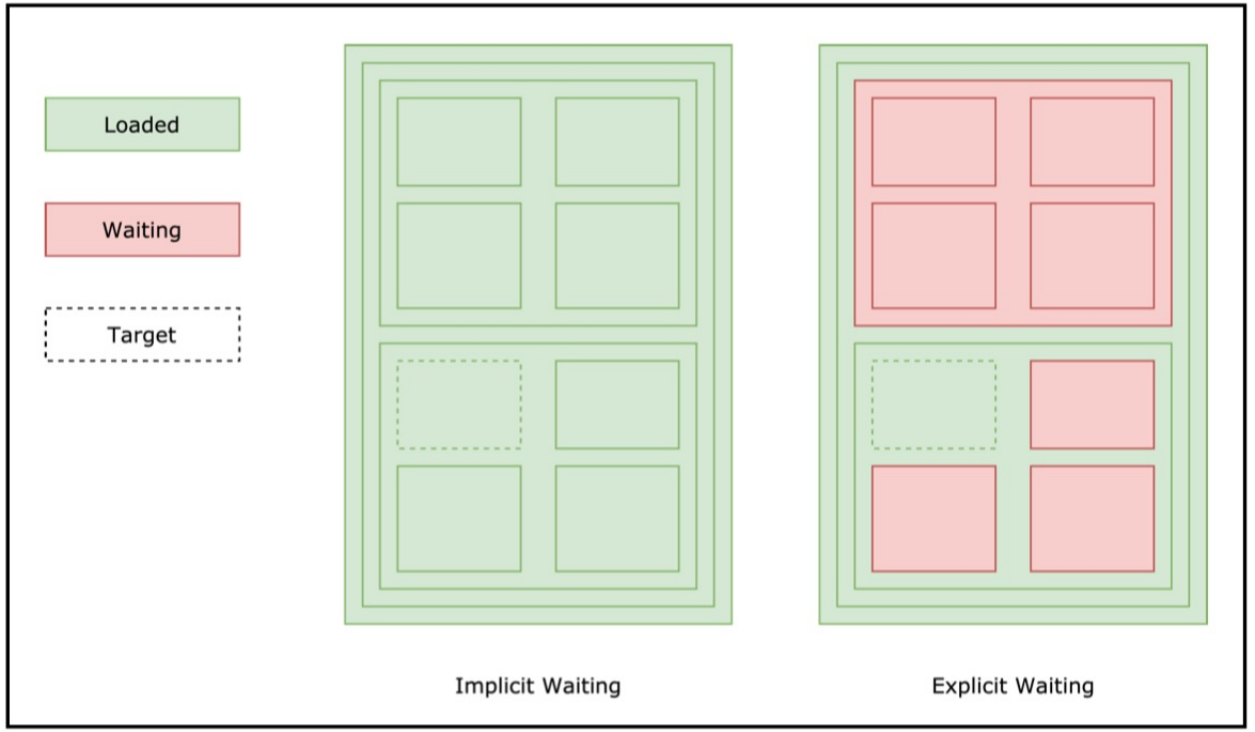

Figure 4. Difference between implicit waiting and explicit waiting. The explicit waiting method waits for only the target to be loaded to carry on the next command (non-blocking) while the implicit waiting method waits for all the elements in the web page to get loaded (blocking).

Apply to the wider world

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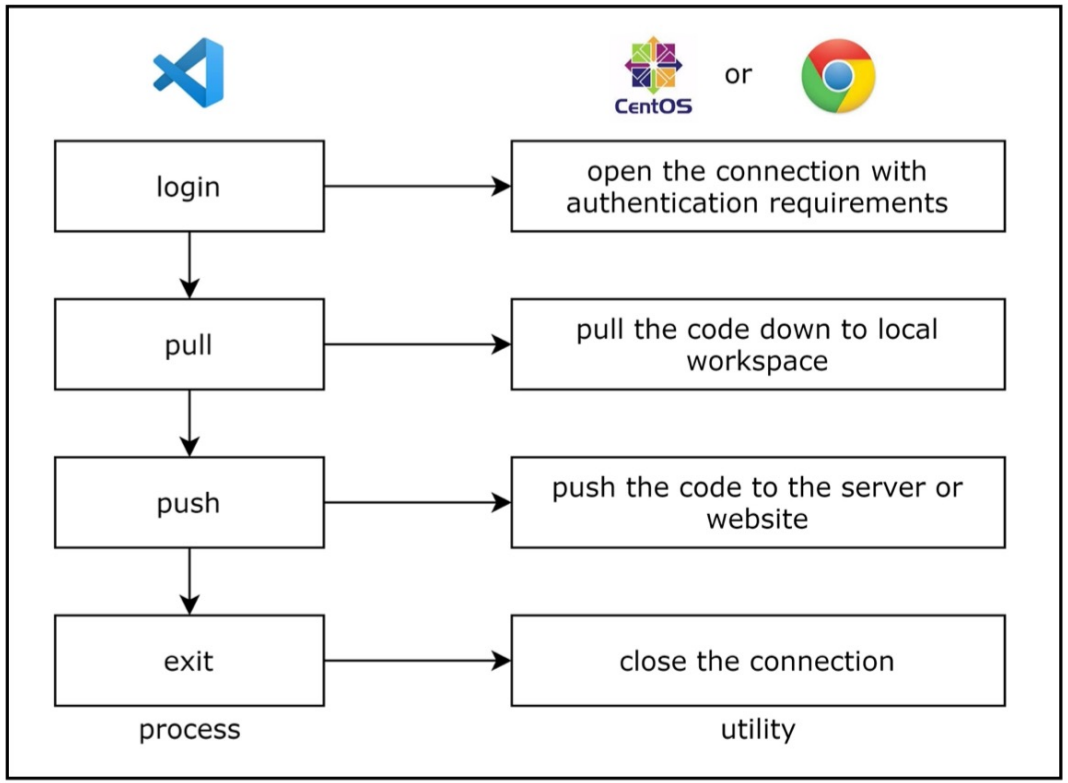

Figure 6. Our design pattern can use *VS Code* to create a connection between not only the browser but also directly the server. The workflow applies to most of the scenarios where we want to run our code on the cloud instead of a local machine.

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Github: https://github.com/BiEchi/ece408-remote-control

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Thanks for listening!

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