

Faculty of Computer Science, Dalhousie University

30-Jan-2024

## DGIN 5201 — Digital Transformation

### Lecture 7: An Introduction to Rapid Prototyping

Location: LSC C238      Instructor: Vlado Keselj  
Time: 14:35–15:55

## Part I

# Implementing a Solution

## 7 Unit Overview

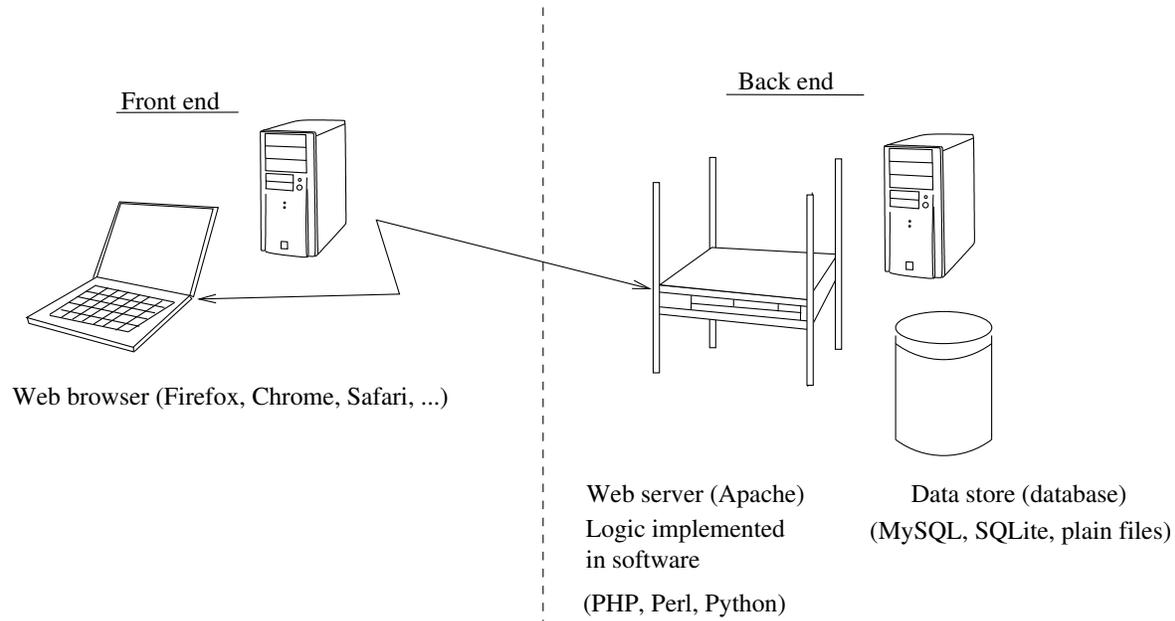
### Unit Description

- Implementing a solution: Rapid prototyping
- Review of programming and Web fundamentals
- Hands-on exercises in fundamental technology
- Elements of building a three-tier system
- Techniques for rapid prototype building

### Building MVP Example

- How to build an MVP (Minimal Viable Product) in a short time?
  - useful in the Rapid Prototyping model of development
- Course project requires a Three-Tier Architecture
- Three-Tier Architecture:
  1. User interface
  2. Control logic
  3. Data store

### Three Tier Architecture



### Three-Tier Architecture

#### Features of Three-Tier Architecture

- Front-end
  - HTML and CSS in a simple form
  - Improvements: JavaScript, AJAX; jQuery, and JS frameworks
- Back-end, logic tier
  - Scripting languages (PHP, Perl, Python, Ruby, etc.)
  - Straightforward: Apache and CGI
  - Improvements: Web frameworks such as Flask, Django, Mojolicious
- Back-end, data store tier
  - Straightforward: plain files, MySQL, SQLite
  - More: MongoDB, Redis, other database systems

#### Our Approach in this Unit

- Work on hands-on exercises
- Covering concepts and theory
- Exercises aimed at timberlea server
- Use your CSID and password
- Use of web site: <https://web.cs.dal.ca/~YourCSID>

#### Some Background Items

- Check your CSID and password, helpful site: <https://csid.cs.dal.ca/>
- Helpful if you have experience in ssh login to [timberlea.cs.dal.ca](https://timberlea.cs.dal.ca)

- Mac or Linux: `ssh` can be used from terminal
- Windows: PuTTY can be used
- PuTTY can be installed from <https://www.putty.org/>

### Baseline Implementation

- Assume diverse background knowledge and levels
- Baseline Implementation:
  - login to `timberlea.cs.dal.ca` using CSID
  - work with a shell; e.g., `bash`, basic Unix commands
  - use of a plain-text editor: `emacs`, `vi`, `vscode`, or similar
  - use of HTML, scripting languages, JavaScript, CSS
  - plain files for persistent data, database
- Make sure to be familiar with your CSID: <https://csid.cs.dal.ca/>
- Use `ssh` or PuTTY to login to `timberlea.cs.dal.ca`

## 8 Hands-on e1: Web Site, Shell, Permissions

### Using `timberlea` Server

- `ssh` login into `timberlea.cs.dal.ca`
- Windows: you can use the program PuTTY
  - other options available; e.g., MobaXterm
- On Mac: open a Terminal and type:
 

```
ssh <your_csid>@timberlea.cs.dal.ca
```

where instead of `<your_csid>` you should use your own CSID
- On Linux: similarly to Mac, you open the terminal and type the same command:

```
ssh <your_csid>@timberlea.cs.dal.ca
```

You can now try to login to the `timberlea` server provided by the Dal FCS computing environment. Your own computer may be a Windows machine, a Mac, or a Linux. You need to use the `ssh` secure protocol to login to `timberlea` and on each of these environment you may need a different application to login.

**On Windows:** If you use a Windows environment, you can use a well-known open-source and free program named PuTTY to login. This will be explained in the next step. If you do not have the PuTTY program, you can install it from the Internet.

To download PuTTY from Internet, you can search it using Google. However, you should not download just any copy of it for security reasons. The official site of PuTTY is:

<http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>

PuTTY is a free implementation of Telnet and SSH for Windows and Unix, along with an `xterm` terminal emulator.

**On Mac:** In Mac OS environment, you can click on the search image in the upper right corner and type 'Terminal' to find the Terminal application. Once you open the terminal, you can login to the `timberlea` server by typing:

```
ssh <your_csid>@timberlea.cs.dal.ca
```

where `<your_csid>` is your CSID userid.

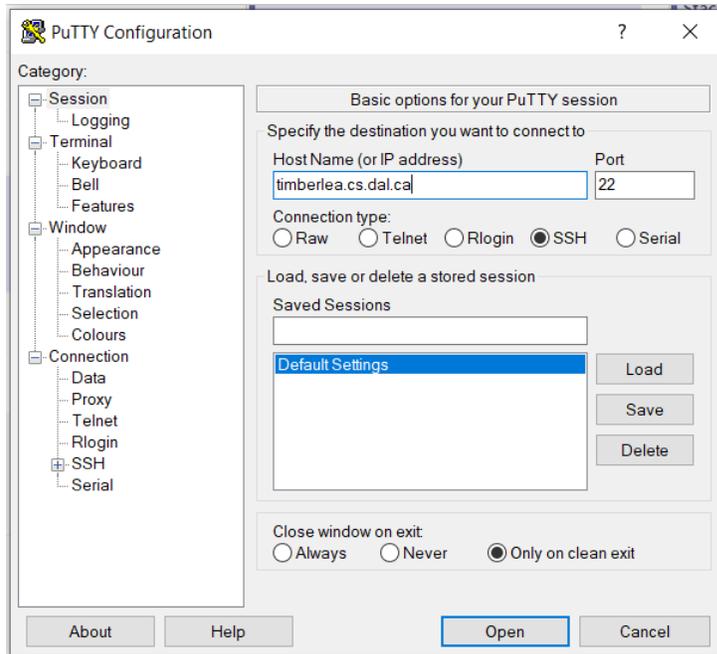
**On Linux:** In a Linux environment, you should, similarly to Mac, open a terminal and type:

```
ssh <your_csid>@timberlea.cs.dal.ca
```

where `<your_csid>` is your CSID userid.

## Running PuTTY

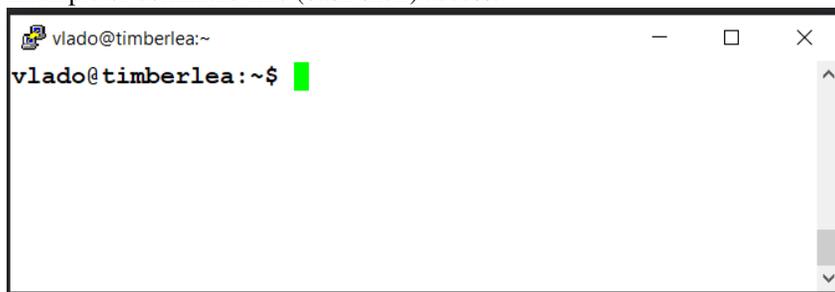
- Double-click the PuTTY icon, and the following window should appear:



You should fill in the basic information: `timberlea.cs.dal.ca` for the Host Name. Make sure that the port number is 22; i.e., Connection type is SSH. You click 'Open' and the login process should start. You are likely to receive a warning about an unknown host key. Normally, this is something that you should be careful about and try to make sure that the offered fingerprint matches the fingerprint of the server, but in a relatively secure network you can accept this connection. Once accepted, the host key is stored with PuTTY and this warning should not appear again.

## Hands-on Exercises

- You should use PuTTY or another client to login to `timberlea`
- FileZilla is a good tool to copy files back and forth, but does not provide access to command-line (shell)
- The following exercises should be finished and will be graded as a part of Assignment 2
- Example of command-line (bash shell) access:



## Creating a Simple Web Page

- Try command: `pwd`

- Enter directory: `public.html`
- Create directories: `dgin5201/e1`
- Set permissions for this directory to be all-accessible: `chmod` command
- Go to directory `dgin5201/e1` and create file `index.html` with the following content:  

```
<html><body>  
This is a very small HTML file.  
</body></html>
```
- Make `index.html` all-readable and access it over Web