

Part II

Appendix

Appendix A

Installations and Working Environment

A.1 Windows prerequisites

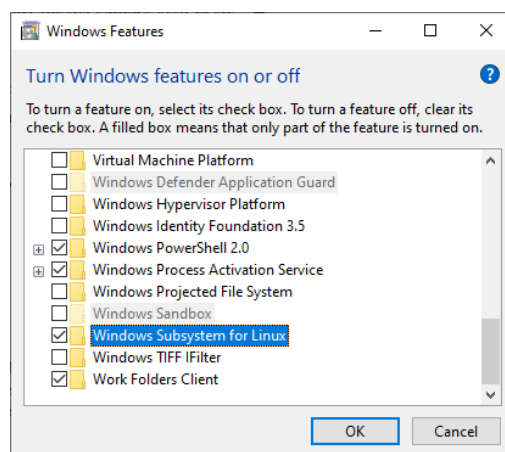
For using Lex & Yacc in Windows we recommend setting up the Windows Subsystem for Linux. However, if you prefer, you can also use a Linux virtual machine and jump directly to the Lex & Yacc installation instructions.

A.1.1 Setting up Windows Subsystem for Linux

1. Preconditions: Windows 10, x86

2. Activating the WSL

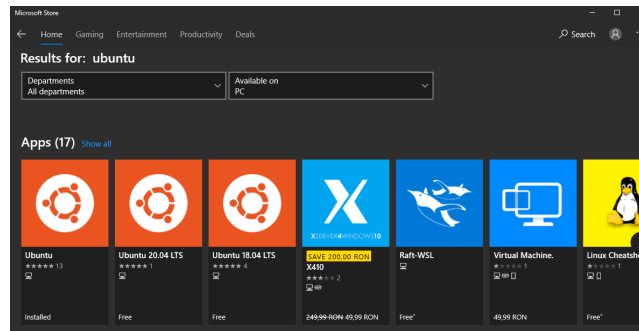
- Go to Control Panel → Programs → Turn Windows Features on or off
- Give Administrator rights to the actions (if prompted)
- In the displayed list of programs, check Windows Subsystem for Linux and press OK



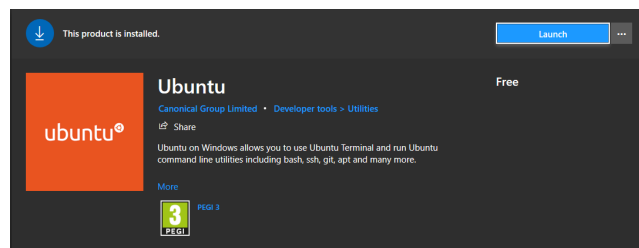
- Restart the computer when the installation is finalized

3. Installing a Linux distribution

- Open the Microsoft Store app and use the Search bar in the top right corner, write Ubuntu, and from the results select Ubuntu
- Once you are on the Ubuntu app page, press Get



- When the installation is complete, press Launch. A terminal should open to finalize the installation, which will take a couple more minutes. When Ubuntu is ready to use, you will have to create an account.

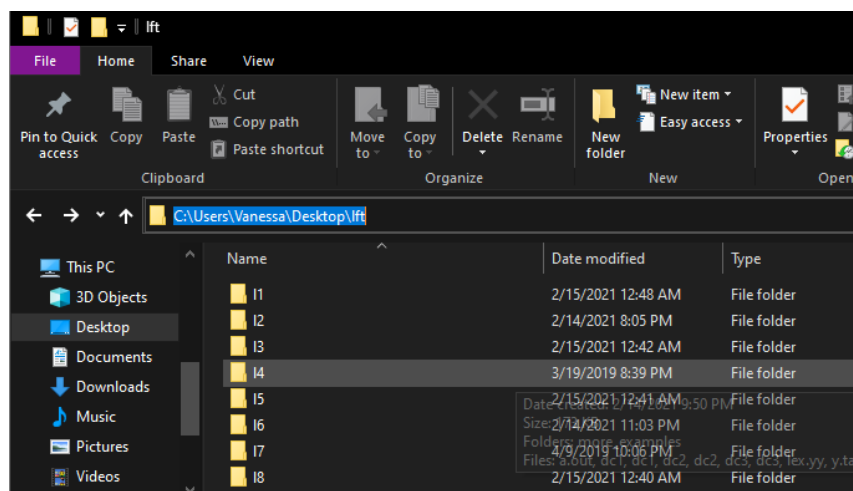


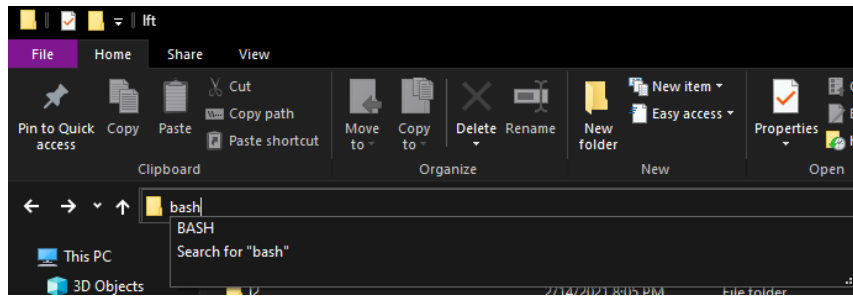
- Input a username, password and password confirmation as prompted in the terminal. The newly created user will be the sudo (admin) for the Linux subsystem and will be automatically logged in at each terminal launch. Now you should be able to use Linux on your Windows devices without the need of using a VM

```
Installing, this may take a few minutes...
Please create a default UNIX user account. The username does not need to match your Windows username.
For more information visit: https://aka.ms/wslusers
Enter new UNIX username: admin
adduser: The group 'admin' already exists.
Enter new UNIX username: russell
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
Installation successful!
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
```

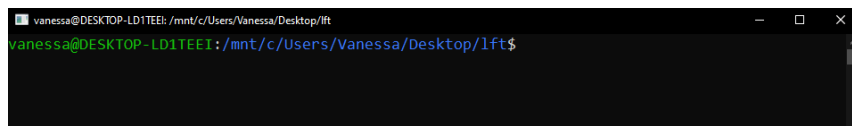
4. Launching Terminal

- To launch the Linux terminal in the desired path, go to the path using File Explorer
- Select the displayed path





- Replace the path with the **bash** command and press enter
- A Linux terminal should pop up at the targeted path



A.2 Lex & Yacc Set-up

By now you should have a Linux terminal available (in WSL, a VM or directly on a Linux operating device).

A.2.1 Lex (Flex)

To set up and build a LEX file, follow the steps below:

1. Installing LEX

```
> sudo apt install flex
```

Terminal

2. Translating the source file into a target language using LEX. If no name is specified for the output file, the default output file will be lex.yy.c.

```
> lex [-o file_name.c] lex_source_file.l
```

Terminal

3. Optional: Listing all LEX commands.

```
> lex -h;
```

Terminal

4. Compiling a generated program (usually together with a library of LEX subroutines)

```
> gcc nume_fis.c -ll
```

Terminal

A.2.2 Yacc (Bison)

1. Installing Yacc:

```
> sudo apt-get install bison
```

Terminal

2. Compiling Yacc:

```
\item yacc [-vlt] [-o file_name.c] [-d] yacc_source_file.y
```

Terminal

- **-v** generates an y.output file that describes the analysis tables and reports conflicts generated by ambiguity in the grammar.
- **-d** generates an y.tab.h file with `#define` instructions that associate token codes fixed by Yacc with tokens defined by the user. This option allows some source files other than y.tab.c (default), respectively file_name.c (-o option) to access token codes.

3. Optional: Listing all Yacc commands.

```
> yacc -h
```

Terminal

4. Compiling Lex & Yacc together: To compile both the lexical and syntactical analyzers, run:

```
> gcc [lex.yy.c/lex_generated_file.c] y.tab.c
```

Terminal

You may want to add `-ly -ll` when compiling if you plan to use functions that are predefined in the lex/yacc libraries, such as `main`, `yyerror` etc.



Note A.2.1

If you have issues with trying to use `-ly`, please install the `libbison-dev` library.

```
> apt install libbison-dev
```

A.3 Development environment

The recommended development environment for Lex and Yacc is Visual Studio Code. Installation instructions: <https://code.visualstudio.com/>

Visual Studio Code

1. Install the Yacc/Bison plugin: <https://marketplace.visualstudio.com/items?itemName=luniclynx.bison>
2. Install the Lex/Flex plugin: <https://marketplace.visualstudio.com/items?itemName=luniclynx.lex>