Installing Haskell and Related Libraries

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Contents

To have a fully working installation, we need several things installed.

1. a working terminal
2. a Haskell compiler (`ghci` and `ghc`)
3. the `cabal` program
4. the `stack` program
5. the `gnuplot` program
6. the *freeglut* library
7. the `LPFP` Haskell package

1 Get a terminal working.

1.1 Install a terminal program.

1.1.1 Mac and Linux instructions

You should have a unix-like terminal available out of the box. Search for "terminal".

1.1.2 Windows instructions

1. Install WSL.

   Our first step is to install WSL (Windows Subsystem for Linux).

   - Open PowerShell in administrator mode by right-clicking and selecting "Run as administrator".

- Enter the following command into the PowerShell.

  ```
  wsl --install
  ```

- If you run into trouble, consult the web page `https://learn.microsoft.com/en-us/windows/wsl/install`.

2. Open a Linux Terminal Window.

   - Look for a program called *Ubuntu* and click on it. This should open a Linux terminal window.

1.2 Open a terminal and check that it's working.

Search for a program called *Terminal* and start it. This should open a terminal window. Test your terminal by typing

```
pwd
```

You should get something back like `/home/smith`. If you get something that looks more like an error, please ask me.

2 Get a Haskell compiler working.

2.1 Check if you already have a Haskell compiler installed.

In your terminal, type

```
ghci
```

If you get the `ghci` command prompt, you have a Haskell compiler installed. You can test it by typing

```
2 + 3
```

and seeing that it reduces to 5. If you have a working Haskell compiler, skip to the next main section about Cabal. If you do not get a `ghci` command prompt, then a Haskell compiler is not installed, and we need to install it.

2.2 Installing a Haskell compiler

2.2.1 Windows and Linux instructions

Open a terminal and paste the following command into it.

```
sudo apt-get update
```

If that went smoothly then proceed with the following command. Otherwise please ask me about it.

```
sudo apt install curl g++ gcc gmp make ncurses realpath xz-utils pkg-config
```

If that went smoothly then proceed with the following command. Otherwise please ask me about it.

```
curl --proto '=https' --tlsv1.2 -sSf https://get-ghcup.haskell.org | sh
```

If you run into trouble, you can look at `https://www.haskell.org/ghcup/`.

Go back to the subsection entitled *Check if you already have a Haskell compiler installed* and confirm that it's working.

2.2.2 Mac instructions

Open a terminal and paste the following command into it.

```
curl --proto '=https' --tlsv1.2 -sSf https://get-ghcup.haskell.org | sh
```

If the computer says you need to install additional software, please let it do that.

If you run into trouble, you can look at `https://www.haskell.org/ghcup/`.

Go back to the subsection entitled *Check if you already have a Haskell compiler installed* and confirm that it's working.

3 Get Cabal working.

3.1 Check if you already have `cabal` installed.

In your terminal, type

```
cabal update
```

If you get a happy message back, then `cabal` is installed. If the computer tells you it doesn't know what `cabal` is, then `cabal` is not installed.

3.2 Install `cabal`.

Type the following command in a terminal.

```
ghcup tui
```

This should give you a list of programs you can install. Select the most recent version of `cabal` and hit "i" to install it. After that, you can hit "q" to quit `ghcup`. Test your `cabal` as in the previous subsection.

4 Get Stack working.

4.1 Check if you already have `stack` installed.

In your terminal, type

```
stack update
```

If you get a happy message back, then `stack` is installed. If the computer tells you it doesn't know what `stack` is, then `stack` is not installed.

4.2 Install `stack`.

Type the following command in a terminal.

```
ghcup tui
```

This should give you a list of programs you can install. Select the most recent version of `stack` and hit "i" to install it. After that, you can hit "q" to quit `ghcup`. Test your `stack` as in the previous subsection.

5 Get `gnuplot` working with Haskell.

Note in the instructions for this section that there is a difference between the `gnuplot` program and the `gnuplot` Haskell package.

5.1 Check if the `gnuplot` program is installed and working independently of Haskell.

Type the following in a terminal.

```
gnuplot
```

If the `gnuplot` program starts up and gives you a `gnuplot` prompt, then the `gnuplot` program is installed. You can test that gnuplot is working by typing the following at the gnuplot prompt.

```
plot cos(x)
```

You should get a window with a cosine curve in it. If the `gnuplot` program is correctly installed, you can skip the next subsection on installing the `gnuplot` program.

5.2 Install the `gnuplot` program.

5.2.1 Linux and WSL instructions

Open a terminal and type the following.

```
sudo apt install gnuplot
```

Conduct the test in the previous subsection to make sure `gnuplot` is working.

5.2.2 Mac instructions

1. Install the `brew` package manager.
2. Type the following in a terminal.

   ```
   brew install gnuplot
   ```

Conduct the test in the previous subsection to make sure `gnuplot` is working.

5.3 Install the `gnuplot` Haskell package.

In a terminal, type

```
cabal install --lib gnuplot
```

Check that the `gnuplot` Haskell package is installed correctly by starting `ghci`

```
ghci
```

and then at the `ghci` prompt typing

```
:m Graphics.Gnuplot.Simple
```

followed by

```
plotFunc [] [0,0.01..10] cos
```

You should get a window with a cosine plot in it.

6 Install the *freeglut* library.

6.0.1 Linux and WSL instructions

Open a terminal and type the following.

```
sudo apt install freeglut3-dev
```

6.0.2 Mac instructions

Open a terminal and type the following.

```
brew install freeglut
brew install pkg-config
```

7 Install the `LPFP` Haskell package.

In a terminal, type

```
stack install LPFP
```

To test things out, try the following command at the terminal.

```
LPFP-VisTwoSprings
```

A window should pop up with bouncing balls on springs. If you get that animation, then you are all set.