Chapter 0, Getting Started

John M. Morrison

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Contents

0 Introduction

In this chapter you will learn how to prepare your computer so it can do all of the things you will learn about in this book. There are three major things that need to be addressed: getting a text editor, installing Python, and installing Java. First, a couple of preliminary notes.

A Word About Your File System It is a smart idea to create a directory to hold all of your programs. Do this in your home directory. If you are using a text editor other than vim, avoid storing your stuff in the editor's directory tree; the path is long and annoying. If you upgrade your editor, you can lose all of your programs.

A Convention We shall refer to a *command window* as a PowerShell, cmd, or Mac/UNIX terminal window. The system prompt for any of these window will be shown as `unix>`.

We will run both Python and Java out of a command window, so get used to the command-line interface for your computer.

1 Server Access

If you are given a server account, you will need some (tiny) pieces of software to connect to it from your PC. This server will likely have both Python3 and Java installed.

Your system administrator will tell you three things about your account.

1. Your server's name, exxample `cs.ncssm.edu`
2. Your user name, example `hart21g`
3. A password

Windoze Obtain puTTY from
`https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html`".

This will enable you to connect to a server over the network. When you open PuTTy, a window will pop up. Put your server's name in the box labeled "hostname." Under Port, select 22. Then in the Saved Sessions area, type myLogin. Hit the Save button.

Now double-click on the word myLogin in the Saved session area. You will see a terminal window appear on your desktop.

Mac or UNIX Do this in a command window.

```
unix> ssh yourUserName@yourServerName
```

replacing yourUserName with your acutal user name and yourServerNamme with your server's name. A terminal session with the server will begin.

For Both You can enter your user name under `login:` and hit the ENTER key. Next, type your password under `password:`

Note: You will not see any characters appear when typing your pasword. If you have successfully logged in, type `exit` to cleanly log out.

Once you have the basics of login and logout mastered, the next step is to install file-transfer software. Go to the FileZilla download site at `https://filezilla-project.org/download.php?type=client` and download the client.

Once it's installed, fire it up. Enter your login name, server name, and password into the appropriate boxes. Select Port 22. Once you launch it, you will see your local machine on the left and the server on the right. File transfer works by drag-and-drop. It's butt simple, which is why we recommend it for everyone.

Editing Environments You will need a plain-text editor for creating source code files.

You cannot edit source code files using a word processor; they are full of hidden stuff for formatting that will prevent your programs from running. These editors color your code in a manner that makes it easy to spot misspellings and mistakes. Here are some recommended possibilities. All are free software.

- The Atom text editor is available here `http://atom.io`. It has many excellent features and provides syntax coloring for all major programming languages. It works on all platforms. Installation is quick and simple. It has extensions called *packages* that give it some useful capabilities.

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- Windoze users can download Notepad++ at `https://notepad-plus-plus.org` This is an excellent editor. It will replace the clunky and nigh useless Notepad.
- The VSCode editor comes with many superpowers, You can download it here: `https://code.visualstudio.com/`
- Macs and UNIX boxes come equipped with vi (vim). By default they have no `.vimrc` file. Create this in your home directory and enter this text into it.

  ```
  syntax on
  set et
  set tabstop=4
  set nohlsearch
  set number
  ```

  You can download vim for Windoze from `https://www.vim.org/download.php`.
- You can work with an IDE (I don't like these for beginners). NetBeans, IntelliJ, and Eclipse are all solid choices and are freely available.

2 Installing Python

The people at Python make this a very simple process. Go to `https://www.python.org`. Click on Downloads and select your operating system. Obtain the latest Python 3 installer; we will be using Python3 in this book. You should note that Python2 goes end of life in December 2020. When you install, watch for a checkbox asking if you want to update your `PATH`. Check that box to save having to edit your environment variables. To test it open a command window and do the following.

```
unix> python
Python 3.8.5 (default, Sep 4 2020, 02:22:02)
[Clang 10.0.0 ] :: Anaconda, Inc. on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

Your version number might differ; it should be at least Python 3.8.

3 Getting a JDK

To build Java programs on your box, you will need a Java Development Kit (JDK). This piece of software is available for all major computing platforms. We will step through the process for the Windoze, Mac and Linux platforms.

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- **Windoze/Mac** Go to `https://adoptopenjdk.net/`, and you can get the most current JDK (as of 11/2020, version 15). The site has complete instructions for doing the install. We will use Java 15, so make sure you are install that version or later.
  When the "custom install" window comes up, check the boxes for "update `PATH`" and "update JAVA_HOME." Then you will not need to edit your environment variables to get the commands `java` and `javac` onto your path so you can use them in the command-line interface.
  If it has installed
  properly, you should see this in a command window.

  ```
  (base) MAC:Fri Nov 27:15:27:java> java -version
  openjdk version "15.0.1" 2020-10-20
  OpenJDK Runtime Environment AdoptOpenJDK (build 15.0.1+9)
  OpenJDK 64-Bit Server VM AdoptOpenJDK (build 15.0.1+9, mixed mode, sharing)
  (base) MAC:Fri Nov 27:15:27:java>
  ```

- **Linux** You can install this from your package manager or install it from `adoptopenjdk`.

If you are going to work offine, you should also download the Java API documentation and install it on your machine. This documentation is a free "Encyclopaedia of Java" that will be extremely helpful.

How do I know it's working? Create this program in a file named `Foo.java`.

```
public class Foo
{
}
```

Now open a command window (cmd or PowerShell on windoze) and compile your Java program as follows.

```
unix> javac Foo.java
```

Then, list your files; you should see a file named `Foo.class`. If so, you are golden. Go ahead and remove it.

Exercise Take some time to customize your text editor. Here are some suggestions. The `.vimrc` file takes care of some of this if you are a vim user. In MacOSX or Linux, you can use your terminal preferences to make these changes. Here are some things you might like to do.

1. Change the background color from white to an off-white color such as `0xFFF8E7`. This is much easier on your eyes; staring at a white screen increases eye strain.
2. Adjust the font size to your liking, but do not change from a monospace font. We recommend a monospaced font such as Courier or Courier New.

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3. Have line numbers displayed, since error messages in Java often cite errors by line number.
4. You can have a dark background if you wish.
5. Set your indent level to 4 spaces.

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