# Introduction to Computer Science II
## Tools

# 1 Introduction

The programming for this class will require you to install some tools on your computer. For each such tool that you do not already have installed, follow the instructions here. Be sure that you have everything you need for the labs and projects that will begin in the first week of the semseter.

You will need the following tools:

1. **Java Development Kit (JDK) 21:** This software package will provide both the *Java compiler* (`javac`) and the *Java virtual machine (JVM)* (`java`).

2. **Visual Studio Code (vscode)**: This development environment provides a *source code editor* as well as good access to a *command line terminal* from which to compile and run your code.

3. **The Bourne-Again Shell (bash)**: The most common command-line interpreter.

Note that you may use whicever versions or alternatives of these tools that you like, but **we strongly suggest that you use the ones listed here**. The instructions for every assignment will be written assuming these tools. We will test your work using these tools. If you have difficulty with some other work, we won't be able to help you. If your code does not work with these tools, it will be considered flawed work. Everything will be easier if you install and use these tools.

# 2 Installation for *macOS*

**Installing Java:** To get the *Java Development Kit (JDK)* 21 on your own machine, do the following:

1. **Download:** Click or copy-and-paste this URI to download the Java 21 JDK installer:

   `https://download.oracle.com/java/21/latest/jdk-21_macos-aarch64_bin.dmg`

2. **Install:** Run the installer that you download.

**Installing a text editor:** You may use any text/programming editor or IDE that you like. We recommend (and will provide instructions and help for) *Visual Studio Code (vscode)*. To prepare *vscode*, follow these steps:

1. **Download:** Use the following link, and then select *macOS*, which will download the installer.

$$\texttt{https://code.visualstudio.com/download}$$

2. **Install and run:** From your `Downloads` folder, run the installer that you just downloaded, and follow its instructions. Then, search for `vscode` and open it.

3. **Configure command line:** From the `View` menu, select `Command Palette` (or type `Ctrl+Shift+P`). In the textbox, type `shell`, and a number of options with that keyword will appear. Find and seelect, `Shell Command: Install 'code' command in PATH`, and press `Enter`. This step will allow you to run *vscode* from the shell prompt (in *Terminal*) with the `code` command, which we will use later.

# 3 Installation for *Windows*

**Installing WSL:** On Windows, in order to have a command-line and Java environment that matches those on other systems, you are going to install *Windows Subsystem for Linux (WSL)*. Doing so will provide a command-line *shell*, called `bash`, as well as the Java tools necessary.

To install WSL and configure it for what we need, follow these steps (which are derived from the full WSL documentation):

1. **Open a Windows shell:** In the *Start* menu, search for `Terminal`. Open it.

2. **Install WSL:** At the prompt (`>`), enter the command:

   ```
   wsl --install -d Ubuntu-24.04
   ```

   A lot is going to happen as this command downloads and installed Ubuntu Linux and starts it. It is possible that Windows will want to restart your computer before it continues; if so, do that.

3. **Set up user info:** You will be prompted to choose a *username* and *password*. The username could be anything you like (although it may be easiest to have it match your college username). When you choose a password, you will see that nothing appears when you type—which is a normal security feature for password entry.

4. **Set up *Terminal***: At the top of the *Terminal* window, to the right of the *Windows PowerShell* tab, is a drop-down menu. Click on it, and select *Settings*, which will open a new tab.

   At the top of the settings that appear, for the *Default Profile*, select *Ubuntu-24.04*. Then, at the bottom-right, click *Save*. You can then close the *Settings* tab.

5. **Update Ubuntu:** Again, to the right of the *Windows PowerShell* tab, click the *plus* (+) icon to open a new tab. This one will be named *Ubuntu-24.04*, and will bring you to a new *shell prompt* at which you can type commands, looking something like (but with your own username and computer name):

   ```
   sfkaplan@my-computer:~$
   ```

   At this prompt, enter the following command to make sure that your installation is using the most up-to-date software packages:

   ```
   sudo apt -y update && sudo apt -y upgrade
   ```

6. **Install Java:** To install the *Java Development Kit (JDK)* 21, enter the following command:

   ```
   sudo apt -y install openjdk-21-jdk
   ```

**Installing a text editor:** You may use any text/programming editor or IDE that you like. We recommend (and will provide instructions and help for) *Visual Studio Code (vscode)*. To prepare *vscode* for use with WSL, follow these steps:

1. **Download:** Use the following link, and then select *Windows 10/11*, which will download the installer.

   https://code.visualstudio.com/download

2. **Install and run:** From your `Downloads` folder, run the installer that you just downloaded, and follow its instructions. Then, you can open the *Start* menu and enter `vscode` to find an open it.

3. **Install extensions:** When VSCode opens, type `Ctrl+Shift+X` (or, among the bar of icons on the left side of the window, click the boxes-icon that is second from the bottom).

   The *Extensions* search bar will appear on the left side of the screen. At the search box, enter `Remote Development`. The extension pack with that name will appear at the top of the list just under the search box; select it.

   A description of it will appear in the main window. Find and click the `Install` button.

4. You can now close the VSCode window; we will open it again later with the lab source code.