

# Installation/Access Instructions for $\LaTeX$ (MikTeX), TeXMaker, R, RStudio, and SAS

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Fritz Scholz

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The following instructions should be carried out right away so that you are ready to use the software and to uncover any glitches in the process that remained. Turquoise boxed items are active links.

## 1 $\LaTeX$ and TeXMaker

$\LaTeX$  is a macro package based on TeX, developed by Donald Knuth, see  $\LaTeX$  wiki. Most versions of  $\LaTeX$  are free.

The  $\LaTeX$  version used in this course is MikTeX (free) for the Windows™ operating system. Our interface is TeXMaker, although there are others, see TeX editors.

Those with a Mac may wish to consult MacTeX to get the appropriate version.

### 1.1 Installing MikTeX:

⇒ <http://miktex.org/2.9/setup>. Then choose Basic MikTeX for Windows 32-bit or 64-bit, whichever applies and download the install file, `basic-miktex-2.9.5105-x64` for the 64-bit version, with possibly different version numbers. Execute (double click) it to install. Check the acceptance conditions. Under preferred paper size choose `letter` instead of the default `A4`. Follow the rest of the instructions, making default choices.

### 1.2 Installing TeXMaker:

⇒ <http://www.xmlmath.net/texmaker/download.html>.

There is also one for Mac or Linux.

Download appropriate version.

Execute (double click) `texmakerwin32_install.exe` in your download directory. Agree to the GPL license. Install.

After these two installations, double click on any `abc.tex` file, containing the appropriate document markup commands, for example the file `abc.tex` could just contain the following text

```
\documentclass{article}
\begin{document}
Hello World!
\end{document}
```

Double clicking this file will open up TeXMaker as an editor/interface for `abc.tex`.

If you don't yet have a file named `abc.tex`, go to a working directory of your choice, double click the Texmaker icon (create an icon from Program Files if necessary). This opens up a Texmaker session. Click File, then New, enter the above document text and Save as `abc.tex`. Of course, you can create this file with any other raw text editor, like Notepad. Don't use Word for this.

When looking at `abc.tex` from within Texmaker, click the first blue fat arrow with Quick Build next to it (you can make other choices instead of Quick Build, more on that later). If the PDF viewer does not show the result, click the next blue fat arrow with View PDF next to it, that should show you the result in a PDF viewer, provided there are no errors in your markup file `abc.tex`. This process will generate auxiliary files, such as `abc.log`, which may provide clues about any errors.

## 2 R and RStudio

R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS.

RStudio is an editor/interface for running R. This interface looks the same for all operating systems: Linux, Mac, or Windows. That's one reason for using it. However, in class demonstrations I may prefer the R GUI, since it shows more real estate on screen. Try to get used to both and you will see which you prefer.

### 2.1 Installing R:

Google CRAN.  $\implies$  The comprehensive R Archive Network. Choose the download appropriate for you. In my case (don't have a Mac) choose: Download R for Windows. Next choose base, choose the version appropriate for your version of Windows.

$\implies$  Download R 3.1.1 (or whatever newer version there is then) for Windows.

Execute (double click) `R-3.1.1-win.exe` in the Download directory.

Choose English as language, otherwise I cannot provide help, e.g. in Mandarin, etc. Click next on all prompts during installation. At the end click Finish.

You should see 1 or 2 blue R icons on your desktop. You can double click on either to start an R session, using the R GUI, but we defer and will use RStudio after we have installed it. If you opened an R GUI you can terminate the R session by typing `q()` or by choosing File and then Exit.

### 2.2 Installing RStudio:

Google RStudio or  $\implies$  <http://rstudio.org/>. Download RStudio for your system. Choose Download RStudio for Windows, Mac or Linux. Choose Download RStudio Desktop. Install (double click) the downloaded installer `RStudio-0.98.1083.exe` (or a newer version) in your Download directory. Run that install file  $\implies$  hit Next, Next, Install, Finish.

In Windows, in the All Programs menu open the RStudio folder and drag the blue RStudio icon to your bottom tool bar for a quick opening of R, by clicking on that blue R tool bar icon.

In the console window on the left at the `>` prompt type

```
hist(rnorm(1e6), nclass=101, col=c("blue", "orange"))
```

Note the autocompletion of parentheses. Hit enter and a graph of the histogram should appear on the right. After that type `q()` at the command prompt `>` in the left console and respond with `y` or `n`, or `c`.

It is a good idea to create separate workspaces for different projects. Within RStudio  $\implies$  File  $\implies$  New Project  $\implies$  New Directory  $\implies$  Empty Project  $\implies$  Create New Project, then Browse to navigate to a location for your working directory and, when prompted, fill in the name for that new project directory, say `Project1`. That will open a fresh instance of RStudio from that project directory. After exiting that RStudio session (using `q()`) you can open an R session by double clicking on its blue R file icon in such a project directory or open a corresponding RStudio session by double clicking the light blue cube icon with an R inside.

### 3 Access to SAS

SAS is a commercial software with a yearly license fee. The Statistics Department has a site license. You access SAS via the virtual lab. How to get there? In Windows  $\Rightarrow$  All Programs  $\Rightarrow$  (Windows) Accessories  $\Rightarrow$  Remote Desktop Connection. In the pop up panel in the Computer field type `ts.stat.washington.edu` and for user id use `NETID\yourUWuserName` and login using the password associated with `yourUWuserName`. This will open your remote desktop or virtual lab.

If you need access using a Mac with OS X, consult Documentation Wiki in <http://www.stat.washington.edu/computing/> and look under Terminal Servers  $\Rightarrow$  How to Connect to the Terminal Servers. In the past we have encountered connectivity issues on campus (slow response), but not from home. If you encounter problems let us fix them as soon as possible. There is also the option of Parallels which makes your Mac look like a Windows machine. End of Mac specifics.

Don't be surprised seeing different desktops in repeated invocations of the virtual lab. There are two servers behind `ts`, namely `ts1` and `ts2`, and you are assigned one of them randomly each time. Those two servers show different desktops, at least for now.

When a terminal session opens it may inform you that new updates are available for installations. Please ignore those, you can't do any updating anyway due to permissions.

Once you are logged in via the virtual lab, go to the SAS folder under All Programs and click on SAS 9.4 (English) to start SAS, or drag and drop it on the task bar at the bottom of the screen, for faster access to SAS in future sessions. You can then access SAS from the task bar by clicking on its icon there. More on using SAS later. For now just terminate the program, either by clicking the  $\times$  in the upper right corner of the SAS window or choose File and Exit from the top menu bar of the SAS window. This was just done to confirm your access to SAS.

When done with SAS make sure you close it and also log out from the virtual lab. That frees up resources for others. If you don't close SAS it will be there in the same state when you log in again to the virtual lab, i.e., it keeps running and ties up licenses. You might also get confused because of the 2 terminal servers behind `ts`.

### 4 Access to UDrive

Within the virtual lab you have access to any of your files on the UDrive `U:`, which you can see under Computer.

On campus you should also have access to your UDrive from your physical laptop. Put `\\udrive.uw.edu\udrive` in the Run window, that you can access via  $\Rightarrow$  All Programs  $\Rightarrow$  Accessories  $\Rightarrow$  Run (in Windows 8.1: use the Windows key together with R to open the Run window. For later convenience create a UDrive shortcut on your physical laptop desktop. Right click any empty part of that desktop  $\Rightarrow$  New  $\Rightarrow$  Shortcut, enter in location `\\udrive.uw.edu\udrive`  $\Rightarrow$  Next, then type in the name for this shortcut, say UDrive.

That would let you transfer any files from your physical machine to the UDrive and vice versa. (How that is handled by Mac users I don't know.) For doing the same off campus I was told that you should use an FTP process. The FileZilla Client (not FileZilla Server) should be an appropriate tool. Download it following the link <http://download.cnet.com/topics/filezilla> and install it. Don't follow the link provided by the UW. It leads to sourceforge which unfortunately provides a version loaded with all kinds of malware (browser hijackers, etc.). Then

Open FileZilla

Type in `sftp.udrive.uw.edu` for host.

Enter in your NetID (without `NetID\` in front) and password.

For port, type in "22."

Click on "QuickConnect."

It may ask you for confirmation regarding the server. Accept the dialogue.

Double click on "udrive" on the right side of the window.

This will open your udrive folder.

Drag and drop files between the left side of the window (your computer) and the right side of the window (the U Drive)

Having done this successfully, you may not want to memorize these steps. Instead you can enter them in the FileZilla toolbar under File ⇒ Site Manager ... and enter the relevant info there. Under My Sites enter U Drive (or whatever you prefer), under Protocol choose SFTP - SSH File Transfer Protocol, for Logon Type choose normal and the rest is as before. After that you can initiate an SFTP session by going to Site Manager ... and double clicking the name you chose under My Sites.

## 5 Installing SAS Data and Code Files from Ron Cody

On the U Drive (\\udrive.uw.edu\udrive) create a folder learn, i.e., \\udrive.uw.edu\udrive\learn. Download <http://support.sas.com/publishing/bbu/zip/60864.zip> to \\udrive.uw.edu\udrive\learn and unpack its contents there.

Look at the unpacked instructions file Descriptions.pdf and make the suggested modifications to the file Create\_Datasets.sas, replacing c:\books\learning with \\udrive.uw.edu\udrive\learn throughout that file. Start SAS and open Create\_Datasets.sas and run it, by ⇒ File ⇒ Open Program, and under File name enter \\udrive.uw.edu\udrive\learn\Create\_Datasets.sas and then Open. This will dump the contents of the SAS command file into the SAS Editor. Then run it, by clicking on the running figure icon  on the SAS Application Toolbar. Exit SAS. You will see that a whole bunch of SAS data sets, such as blood.sas7bdat, have been added to your \\udrive.uw.edu\udrive\learn.

After that you can access these data sets in a SAS program by starting out with

```
libname mydata "\\udrive.uw.edu\udrive\learn";  
run;
```

Instead of mydata you can choose any other name of up to 8 character length. This will make all the data sets visible in SAS via ⇒ Explorer ⇒ Libraries ⇒ Mydata. Double clicking on any of the data sets there, e.g., blood, will give you a VIEWTABLE view of that data set. In any SAS program, after the above two lines, you can reference any of these data sets, such as blood, via data = mydata.blood;

A better way to link to U Drive (\\udrive.uw.edu\udrive) each time you open a terminal server session is to do the following in a terminal server session: go to Computer and on the upper control bar click Map network drive, then enter U: under Drive and \\udrive.uw.edu\udrive under Folder and check Reconnect at logon. That should then result in an always functioning \\udrive.uw.edu\udrive connection from your terminal server under Computer.