

# R Statistical Language

R is a statistical programming language whose software environment is distributed by the R Foundation. The R Foundation is part of the Free Software Foundation's GNU project, meaning anyone can freely download, customize, or create packages for statistical analysis and visualization under the GNU General Public License. Therefore, R has become one of the best platforms for developing statistical models and methods, from descriptive statistics to cutting-edge mathematical and statistical models.

R is our primary tool for learning statistics and data analysis skills over the semester. In this notebook, we will:

- [Installing R](#)
- [Connecting R to JupyterLab](#)
- [Final Check](#)

The R installation is **optional** because you can use R through Kaggle for most course practices and exercises.

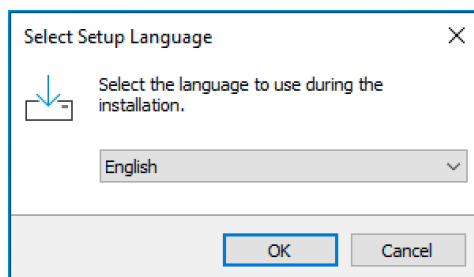
## Installing R

The installation of R is fairly easy. However, it is slightly different from your computer operating system environment.

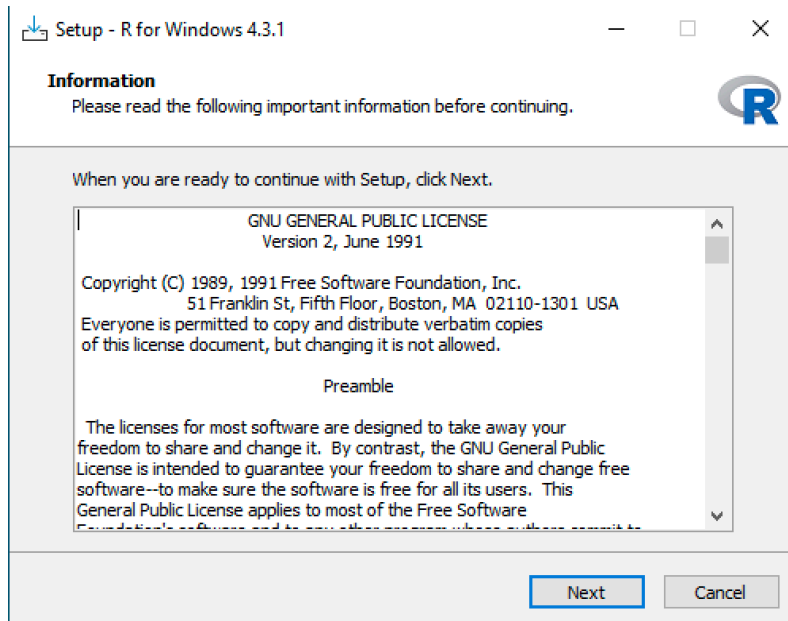
### Windows

Please go to the base distribution [download](#) site. Click the **Download R-\*.\*.\*** for Windows. **\*.\*.\*** will indicate the currently stable version. You can read the [README](#) file and [New features in this version](#) to understand the structure of installation packages and what features are added or upgraded in the current version.

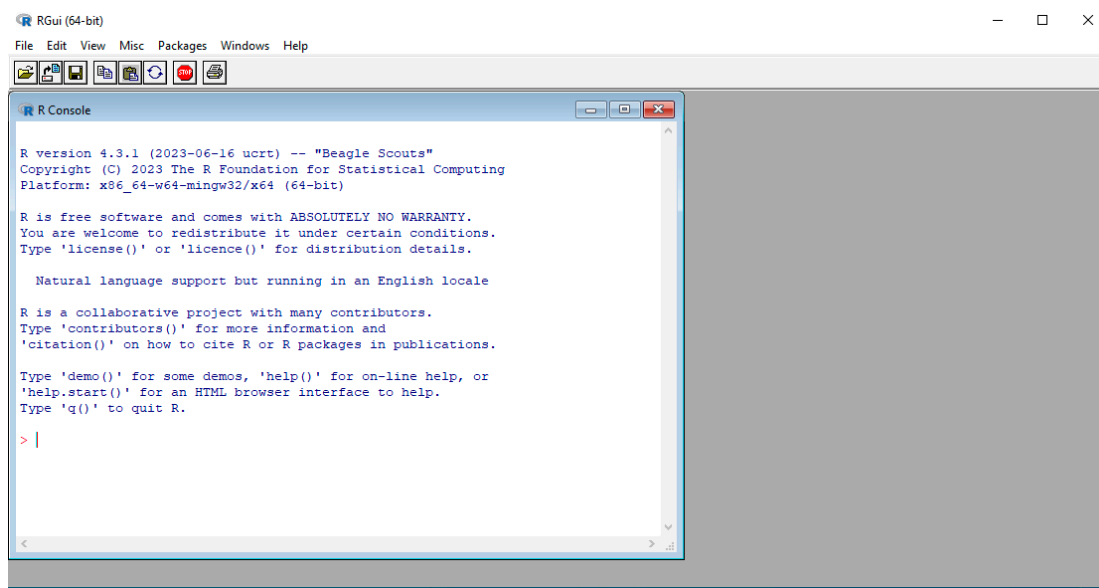
Once you run the executable files downloaded, please allow the app to make changes to your advice. After selecting the installation language,



follow the installation instructions.

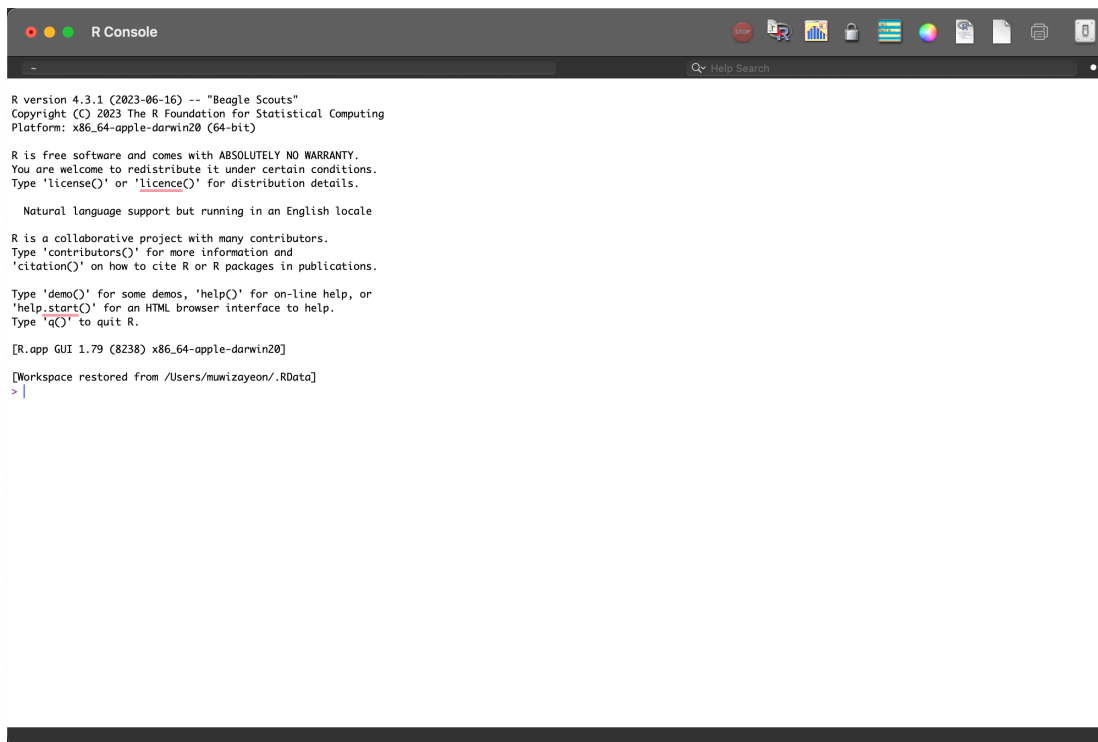


After completing the installation, you can begin writing R codes by opening the R GUI. Simply type `Rgui` in the search bar to access it. If you see the provided images on your monitor, the installation succeeded.



## macOS

Please go to the [R for macOS](#) page. If you have the Apple silicon (M1/M2) version of Mac, you have to download and install `R-*.*. *-arm64.pkg` while `R-*.*. *-x86_64.pkg` for the older Intel Mac. The page also includes an installation package for the legacy macOS/OS X system. Once the installation is properly completed, you can launch the R Console as the following image.



```
R version 4.3.1 (2023-06-16) -- "Beagle Scouts"
Copyright (C) 2023 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin20 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[R.app GUI 1.79 (8238) x86_64-apple-darwin20]
[Workspace restored from /Users/muwizayeon/.RData]
> |
```

## Linux

Not everyone uses the Linux operating system, but if you do, kindly install R according to your specific distribution ([Debian](#), [Fedora/Redhat](#), or [Ubuntu](#)).

## Connecting R to JupyterLab

### Windows

Once you succeed in installing and launching JupyterLab, it is time to connect R to JupyterLab. To do this:

1. Open **Command Prompt** or **PowerShell** and launch the command version R. **Do not use the GUI version.** To connect JupyterLab and the R kernel, R has to recognize your Python virtual environment. If you launch the GUI version R application from the taskbar, your R will be assigned as a different process from your activated Python virtual environment. In the **Command Prompt**, activate your Python virtual environment first if you have not done so. Then, type the following command.

```
# In case you do not activate your Python virtual environment
(Your virtual environment name)\Scripts\activate

"C:\Program Files\R\R-(4.X.X)\bin\R.exe"
```

```

Rterm (64-bit)
C:\Users\muwizayeon>jupyterlab\Scripts\activate
(jupyterlab) C:\Users\muwizayeon>"C:\Program Files\R\R-4.3.1\bin\R"
R version 4.3.1 (2023-06-16 ucrt) -- "Beagle Scouts"
Copyright (C) 2023 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

  Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
>

```

2. Once you launch the command version R, then install IRkernel package using the following command:

```
install.packages("IRkernel")
```

3. Finally, install specification by using the following command:

```
IRkernel::installspec()
```

```

Rterm (64-bit)
C:\Users\muwizayeon>jupyterlab\Scripts\activate
(jupyterlab) C:\Users\muwizayeon>"C:\Program Files\R\R-4.3.1\bin\R"
R version 4.3.1 (2023-06-16 ucrt) -- "Beagle Scouts"
Copyright (C) 2023 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

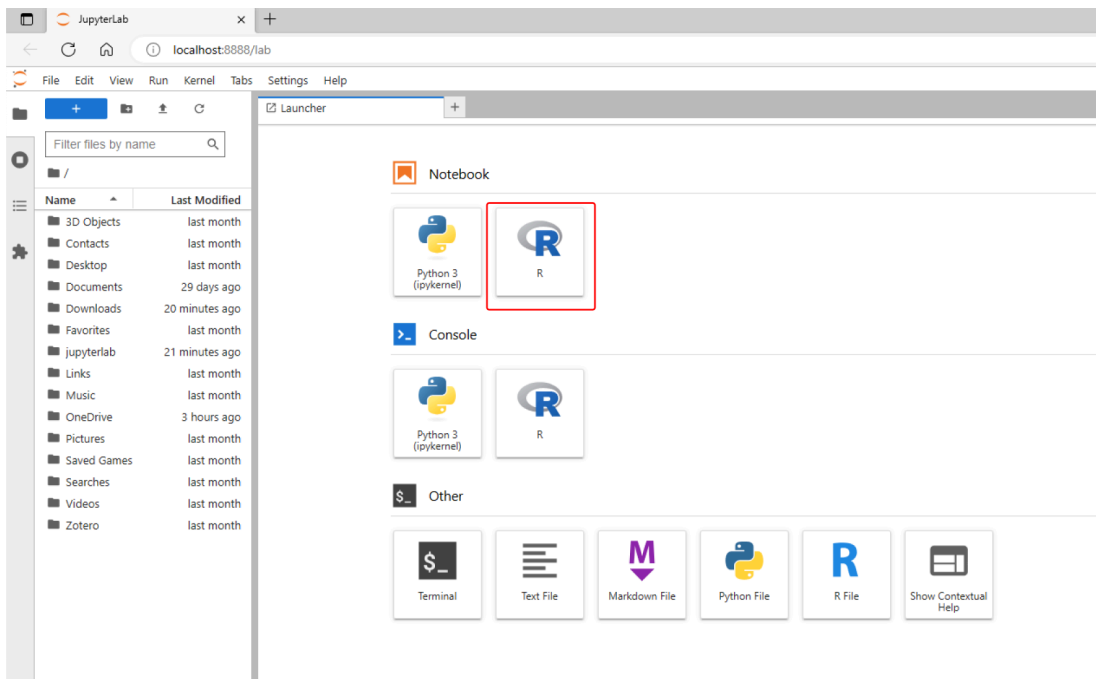
  Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
> IRkernel::installspec()
>

```

4. Once you quit the R by using `quit("no")`, you can confirm the R notebook icon in JupyterLab after launching it by the command `jupyter lab`.



## macOS

Basically, the procedure is the same with Windows, except you can install all necessary packages on **Terminal**.

1. Open **Terminal** application. Then activate the virtual environment and launch R term.

```
source ~/jupyterlab/bin/activate
R
```

2. Then install the packages in the following ways

```
install.packages("IRkernel")
IRkernel::installspec()
```

3. Quit R console by `quit("no")`. Then check JupyterLab to confirm install is properly finished. Once you find the R Notebook icon, Your installation process is completed.

## Final Check

Let's print `Hello!! World.` to confirm that R is properly operated on JupyterLab Notebook. Please Click the R icon notebook after launching JupyterLab. JupyterLab will open a `untitled.ipynb`. You can write `print("Hello!! World.")` in the cell and `Shift + Enter`. Then you can confirm that R operates in JupyterLab as in the following image. Congratulation!!

