

# Problem Set 0: Getting Set Up!

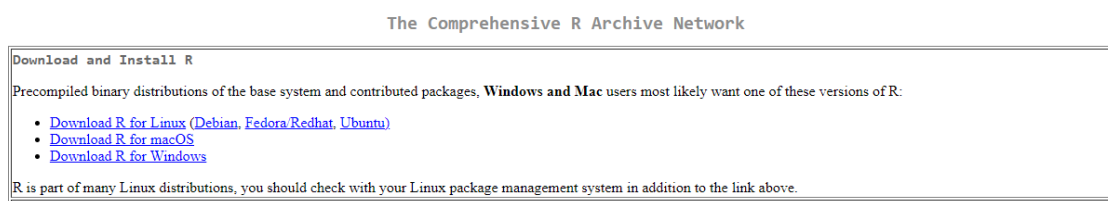
The rest of the semester will see you working on data science questions using `R`. As such, your first homework assignment is:

1. Install `R` on your computer.
2. Install `RStudio` on your computer.
3. Create a `directory` (i.e., a folder with a set of subfolders) for this class.
4. Create a new `.Rmd` file and `Save as...`
5. Modify the `.Rmd` file and `knit` it.

## 1. Installing R

`R` is going to be the only programming language we will use. `R` is an extensible statistical programming environment that can handle all of the main tasks that we'll need to cover this semester: getting data, analyzing data and communicating data analysis.

Download `R` here: <https://cran.r-project.org/> (<https://cran.r-project.org/>). Make sure to choose the version that works with your operating system!



## 2. Installing RStudio

When we work with `R`, we communicate via the command line. To help automate this process, we can write scripts, which contain all of the commands to be executed. These scripts generate various kinds of output, like numbers on the screen, graphics or reports in common formats (pdf, word). Most programming languages have several **I**ntegrated **D**evelopment **E**nvironments (IDEs) that encompass all of these elements (scripts, command line interface, output). The primary IDE for `R` is `RStudio`.

Download `RStudio` here: <https://rstudio.com/products/rstudio/download/> (<https://rstudio.com/products/rstudio/download/>). You need the free `RStudio` desktop version.

RStudio Desktop Open Source License	RStudio Desktop Pro Commercial License	RStudio Server Open Source License	RStudio Workbench Commercial License
<b>Free</b>	<b>\$995</b> /year	<b>Free</b>	<b>\$4,975</b> /year (5 Named Users)
<a href="#">DOWNLOAD</a> <a href="#">Learn more</a>	<a href="#">BUY</a> <a href="#">Learn more</a>	<a href="#">DOWNLOAD</a> <a href="#">Learn more</a>	<a href="#">BUY</a> <a href="#">Evaluation   Learn more</a>
Integrated Tools for R	✓	✓	✓
Priority Support	✓		✓
Access via Web Browser		✓	✓
RStudio Professional Drivers	✓		✓
Connect to RStudio Workbench remotely	✓		
Enterprise Security			✓

### 3. Setting up Directories

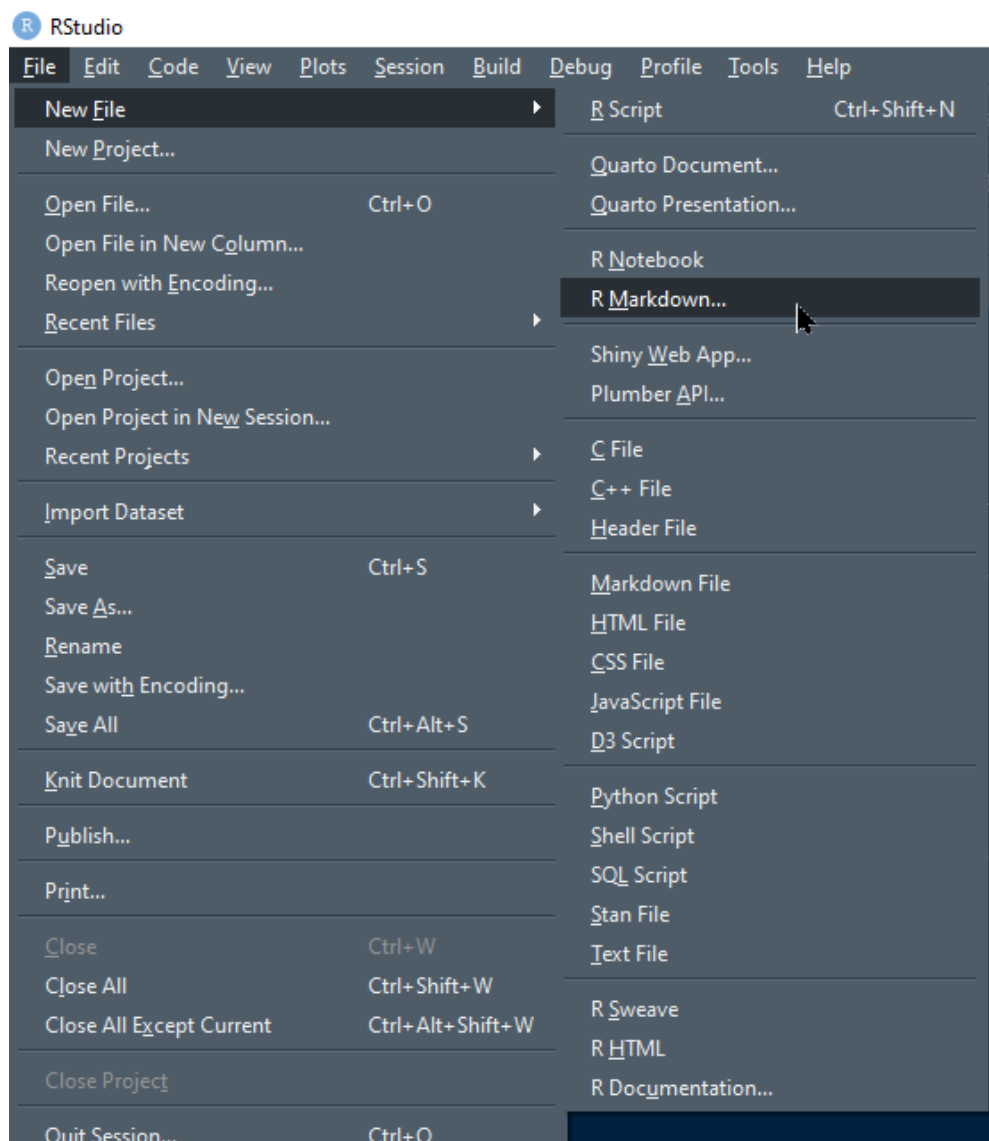
In each class, we're going to include some code and text in one file, and data in another file. You'll need to download both of these files to your computer. You need to have a particular place to put these files. Computers are organized using named directories (sometimes called folders). Don't just put the files in your Downloads directory. One common solution is to create a folder on your computer named after the class: `ds_1000`.

You could just throw everything related to the class into this folder. However, this will quickly get messy. I recommend you create a "sub-folder" (or "sub-directory") within `ds_1000` called `Lecture_1`. (You might also want to create similar sub-folders for `Lecture_2`.) Inside `Lecture_1`, create two additional sub-folders: `code` and `data`. When you're done, your class directory should look like this:

```
- ds_1000
  - Lecture_1
    - code
    - data
```

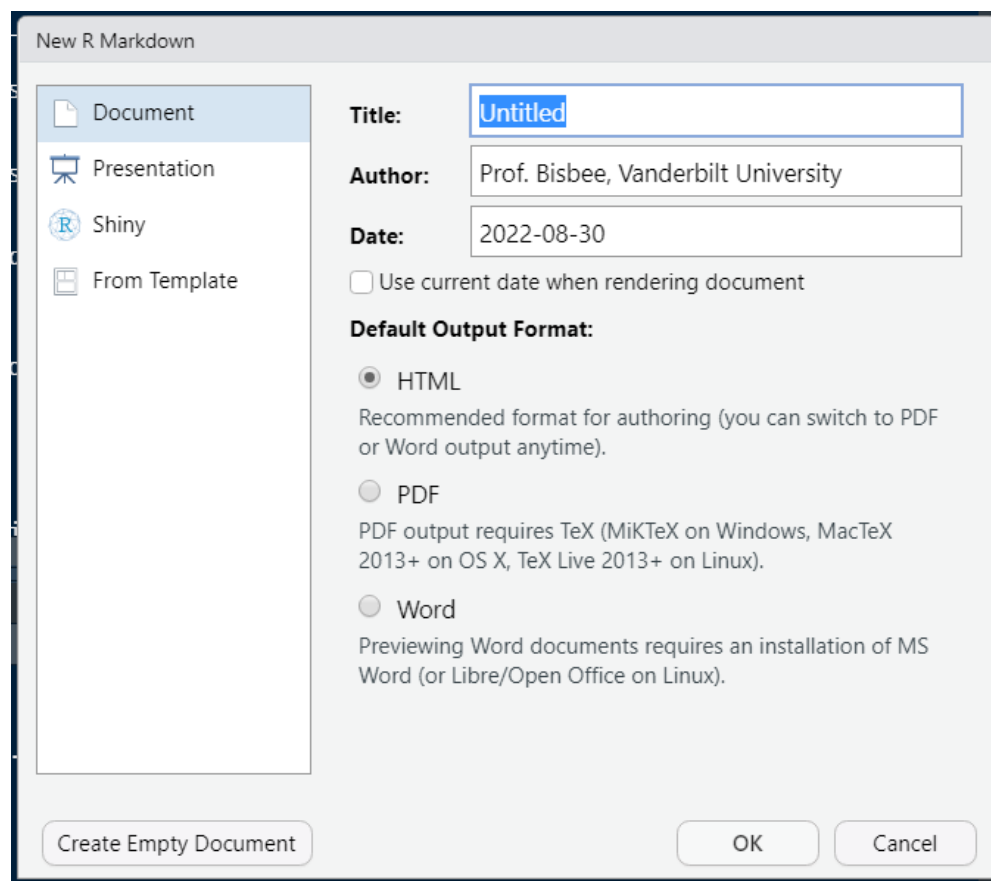
### 4. Create an .Rmd file

Open RStudio, then create a new .Rmd file. To do this, click on `File` → `New File` → `R Markdown...`



## Settings for .Rmd file

You will then be asked to determine a bunch of settings for this .Rmd document. For example, you can choose whether you want to create a “Document”, “Presentation”, “Shiny”, or “From Template” on the left. You can set the “Title:” “Author:” and “Date:” on the top-right. And you can choose the “Default Output Format:” to be either “HTML”, “PDF”, or “Word”. You should **not change any of these settings**. Their defaults (“Document”, “Untitled”, “[Your name]”, “[Today’s Date]”, and “HTML”) are sufficient. Just click “OK”.



The "New R Markdown" dialog box is shown. On the left, a sidebar lists options: Document (selected), Presentation, Shiny, and From Template. On the right, there are input fields for Title (Untitled), Author (Prof. Bisbee, Vanderbilt University), and Date (2022-08-30). Below these is an unchecked checkbox "Use current date when rendering document". Under "Default Output Format", three radio buttons are shown: HTML (selected), PDF, and Word. Descriptive text follows each format option. At the bottom are three buttons: "Create Empty Document", "OK", and "Cancel".

Title:

Author:

Date:

☐ Use current date when rendering document

**Default Output Format:**

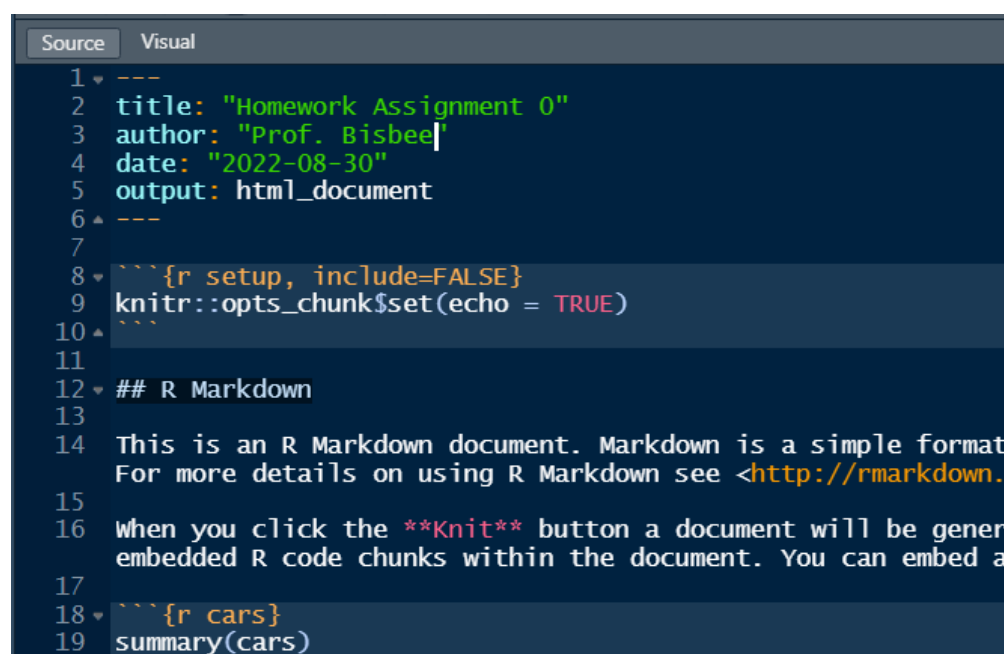
☒ HTML  
Recommended format for authoring (you can switch to PDF or Word output anytime).

☐ PDF  
PDF output requires TeX (MiKTeX on Windows, MacTeX 2013+ on OS X, TeX Live 2013+ on Linux).

☐ Word  
Previewing Word documents requires an installation of MS Word (or Libre/Open Office on Linux).

## Saving .Rmd file

This will open a new .Rmd file! Now you should change the title of the file to "Homework Assignment 0" and the author to your name. You should then save the file in your code folder with the file name [Last Name]\_PS0.Rmd by clicking File → Save As...



The image shows the source code of an R Markdown file in a dark-themed editor. The code includes a YAML header with title, author, date, and output format. It also contains R code chunks for setting up knitr and a cars dataset, followed by a text paragraph and another R code chunk for summarizing the cars dataset.

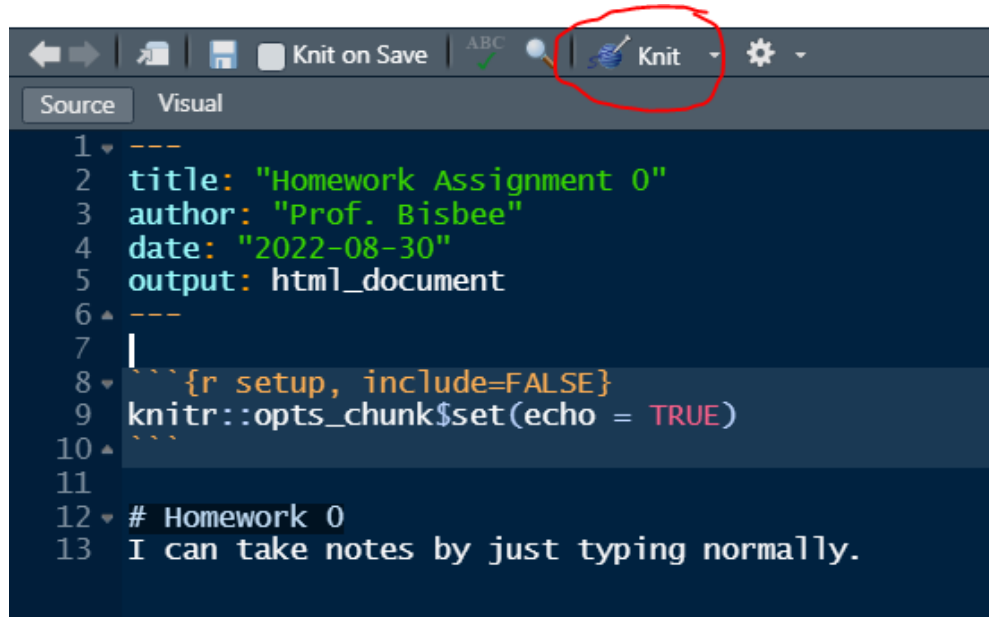
```
1 ---
2 title: "Homework Assignment 0"
3 author: "Prof. Bisbee"
4 date: "2022-08-30"
5 output: html_document
6 ---
7
8 ```{r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10 ```
11
12 ## R Markdown
13
14 This is an R Markdown document. Markdown is a simple format
15 For more details on using R Markdown see <http://rmarkdown.
16
17 when you click the **Knit** button a document will be gener
18 embedded R code chunks within the document. You can embed a
19
20 ```{r cars}
21 summary(cars)
```

## 5. Modify and knit

Now, **delete all of the default text** in your `.Rmd` file from line 12 down to the bottom. Then write the following on line 12:

```
# Problem Set 0  
I can take notes by just typing normally.
```

Now let's `knit` the file by clicking the `Knit` button on the top of the window. You should see a new window pop-up that shows the processed code! This `.html` document should also appear in your `code` folder with the same file name as your `.Rmd` file.



## Inserting R Code

The final part of the homework assignment is to insert a `chunk` of `R` code. On line 15 type the following:

```
```${r}  
2+2  
```
```

Then `knit` a final time and open the `.html` file that is created in your `code` folder. It should be called `[Your Last Name]_PS0.html`. You should open this in Google Chrome, and then right-click anywhere on the opened file and click "Print...".

# Problem Set #0

Prof. Bisbee, Vanderbilt University  
2022-12-23

## Homework 0

I can take notes just by typing normally.

2+2

## [1] 4

Back

Alt+Left Arrow

Forward

Alt+Right Arrow

Reload

Ctrl+R

Save as...

Ctrl+S

Print...

Ctrl+P

Cast...

Search images with Google

Translate to English

Block element...

Exclude from dark mode

LastPass

Mute Tab

PixelZoomer

Start timer

View page source

Ctrl+U

Inspect

Then choose “Save as PDF...”

Problem Set #0

Prof. Bisbee, Vanderbilt University  
2022-12-23

Homework 0

I can take notes just by typing normally.

2+2

## [1] 4

Print

1 sheet of paper

Destination

Microsoft Print to PDF

Microsoft Print to PDF

Save as PDF

See more...

Pages

Layout

Portrait

Color

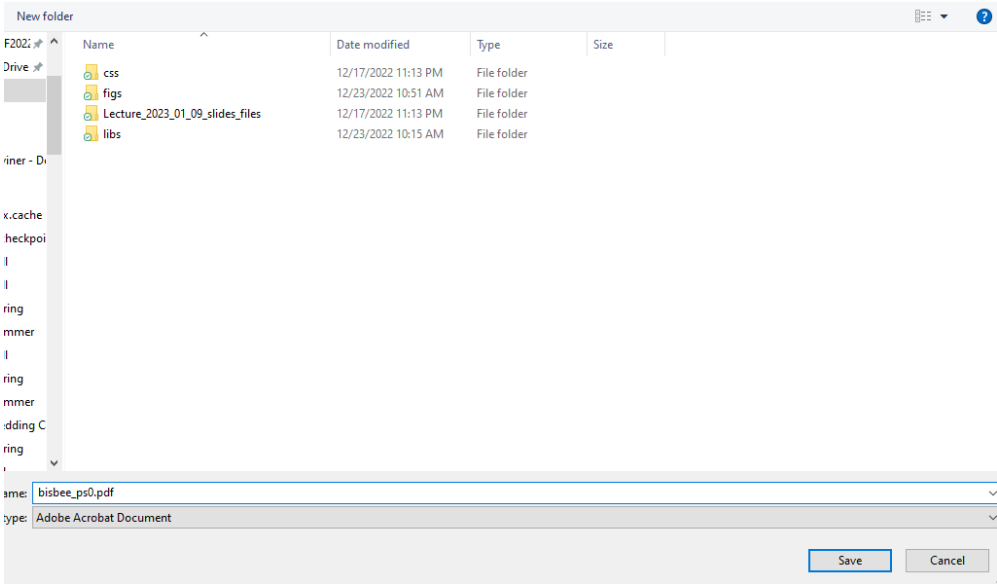
Color

More settings

Print

Cancel

and save it as [Your Last Name]\_ps0.pdf .



Finally, upload the PDF to Brightspace under the Problem Set 0 assignment!