Applied Economic Forecasting

Tutorial on R Studio II

Spring 2020

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In class, you can download this set of code here

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Comments

Whenever possible, use comments! Anything following the symbol # will not be run in R. Comments are notes we leave ourselves so we know:

- Exactly who wrote the code (important in companies where many people may work on a project)
- The purpose of the code!
- What our thought process was at a particular line of code.

I promise that this will become useful when you come back to your code after an extended time. I cannot tell you the number of times I have had a moment of pure genius while coding and I spend hours on a different day trying to understand why I coded it like that or what I actually did.

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For example, below is the type of comments that I always include in my programs

```
# Project: 'Tutorial on R Studio II'
# Author:  Shamar Stewart
# This program illustrates some basic programming philosophy
# and R operations
```

You can also understand the following code without even knowing what exactly each line of command does because I tell you what they are!

```
# Set seed number so that all the results based on
# random samples are reproducible.
set.seed(12345)
# Then create a normally distributed random variable, x,
# with 500 observations.
x <- rnorm(500)
# Notice '<-' is the universal assignment operator in R
# (I prefer this to '=')
```

R Script

Task 1 (-cont.-)

At the top of the previous script, write the following comments:

1. The project
2. The author
3. The purpose of this program

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R Basics

Arithmetic

```
  1 + 1 #add numbers
```

```
## [1] 2
```

```
  8 - 4 #subtract them
```

```
## [1] 4
```

```
  13/2 #divide
```

```
## [1] 6.5
```

```
  4*pi #multiply
```

```
## [1] 12.56637
```

```
  2^10 #exponentiate
```

```
## [1] 1024
```

Task 1 (-cont.-)

In one step:

1. Compute the difference between 2019 and the year you started at Virginia Tech
2. Divide this by the difference between 2019 and the year you were born.
3. Multiply this with 100 to get the percentage of your life you have spent at this university. Use brackets if you need them.
4. Assign this to a variable of your choosing

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Logical Comparison

```
3 < 4
```

```
## [1] TRUE
```

```
3 > 4
```

```
## [1] FALSE
```

```
# Try 3 = 4
3 == 4
```

```
## [1] FALSE
```

```
3 != 4
```

```
## [1] TRUE
```

```
10 - 6 == 4
```

```
## [1] TRUE
```

```
# Notice the difference between single and double equal
```

Strings (text)

```
  #R delimits strings with EITHER double or single quotes.
  #  There is only a very minimal difference

message1 <- 'Let us get to coding!'
message2 <-  "Please get to coding!"
print(message1)
```

```
## [1] "Let us get to coding!"
```

```
print(message2)
```

```
## [1] "Please get to coding!"
```

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Variables

- variable are used to store values and results. Assignment to a variable happens from right to left - the value on the right side gets assigned to the name on the left side. You can use nearly anything as a variable name in R. The only rules are:
  1. "." and "_" are OK, but no other symbols.
  2. Your variable name must not start with a number or _ (2squared and _one are illegal).
- A note for those of you who have programming experience: while R supports object-oriented programming, periods "." do not have a special meaning in the language. For historical reasons, R programmers often use periods in place of underscores in variable names, but either works. Just be consistent to keep your code readable.
- `R` is case sensitive. Capitalization of variable names matter.

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```r
x <- 42
x/2
# [1] 21

# redefine x
x <- x + 3
x
# [1] 45

# if we assign something else to x, the old value is deleted
x <- "Hokies!"
x
# [1] "Hokies!"

foo <- 3
bar <- 5
foo.bar <- foo + bar
foo.bar
# [1] 8
```

Clearing the memory

To remove all variables in memory:

```
#    ls() # List of all variables in memory
    rm(list=ls())
```

- I usually place this at the begining of my R script (just after the document details).