R Programming Fundamentals for Business Students--Conditionals

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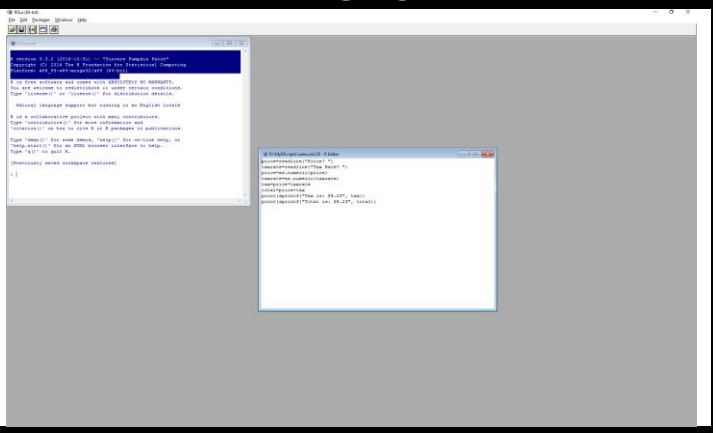
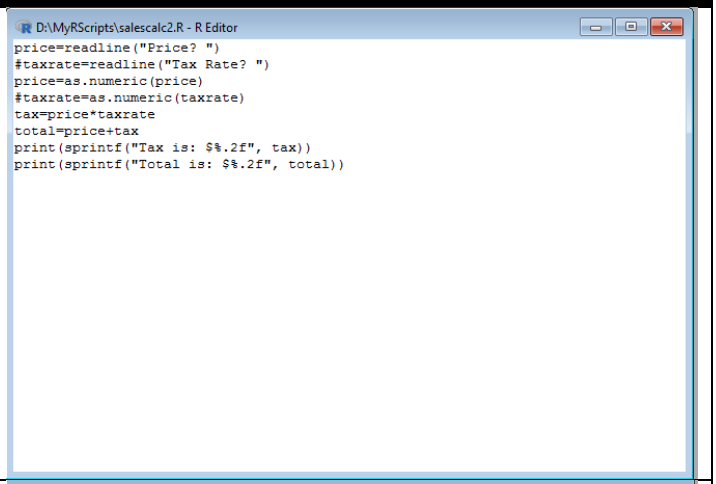
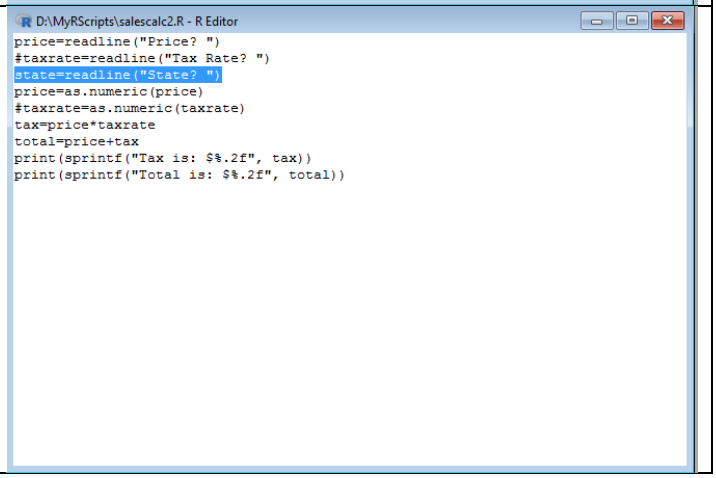
ACTION	REACTION
○ Startup R (not shown) ○ File > Change dir… to your workspace from the previous tutorial (not shown) ○ File > Open script… salescalc.R (not shown) ○ File > Save as… salescalc2.R In the previous tutorial we examined variables and formulas (equations) in R by programming a simple salescalc.R script. Next we'll build on salescalc.R and explore conditionals in salescalc2.R, by having have the user enter a state instead of a tax rate.	
COMMENTING OUT CODE	

○ Comment out the two taxrate equations by placing a # as the first character:
 	
`#taxrate=readline("Tax Rate? ")`
`#taxrate=as.numeric(taxrate)`
 	
Commenting means the computer ignores the code.
 	
We could have deleted the lines, but I wanted you to have them around for comparison purposes.
	

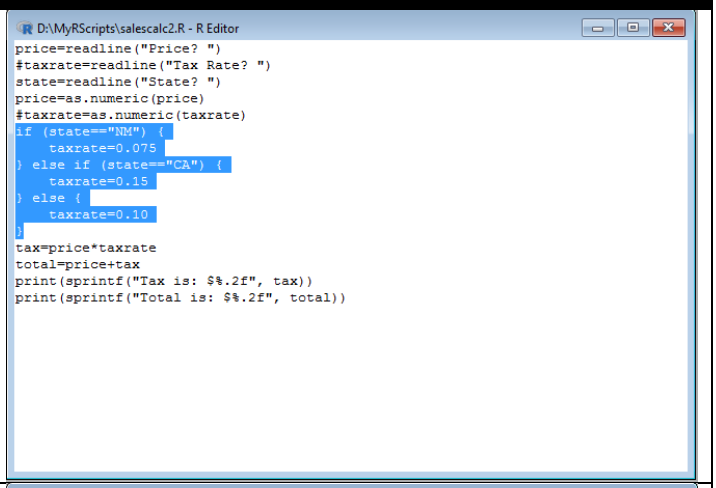
○ Type: `state=readline("State? ")` after the first `#taxrate` For the sake of instruction, let's assume there are only two states with different tax rates, NM (0.075) and CA (0.15). All other states have a 10% tax rate (0.10). Let us further assume that the user will type the state abbreviation in all caps. With these assumptions, let's program a conditional (if-then-else).	

CONDITIONALS

- After the second **`#taxrate=…`**, Type:

```
if (state==”NM”) {
   taxrate=0.075
} else if (state==”CA”) {
   taxrate=0.15
} else {
   taxrate=0.10
}
```

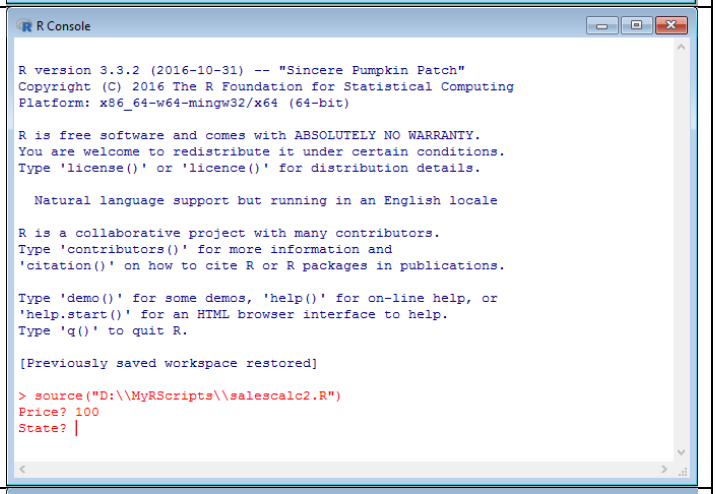
Operator precedence is PEMDAS: parens, exponent, multiplication-division, addition-subtraction



- Click File > Save
- Click on the R Console window
- Select the menu item File > Source R Code…
- Click on salescalc2.R
- Click the Open button
- Enter 100 for price

Yes, I didn’t show a lot of steps, but you should be used to saving and running from the previous tutorial.

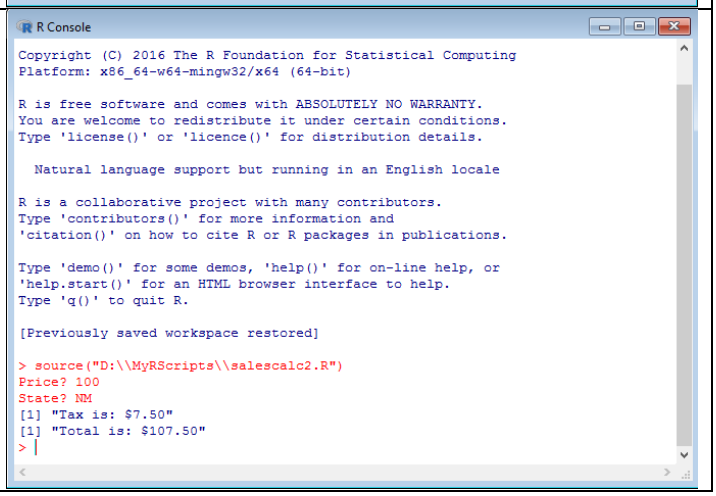
The code is waiting for you to enter NM, CA, or something else.



- Enter NM for the state, then press Enter

R prints the correct tax and total.

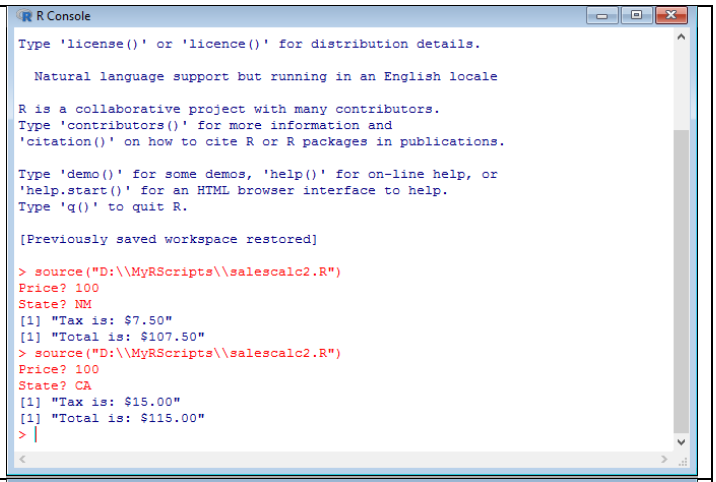
Let’s test CA next and then a state like NY, which should take R to the else (default) of 10%



- Select the menu item File > Source R Code…
- Click on salescalc2.R
- Click the Open button
- Enter 100 for price (you can of course try another price—it's just easy to calculate 15% of 100!)
- Enter CA for the state

R prints the correct Tax and Total.

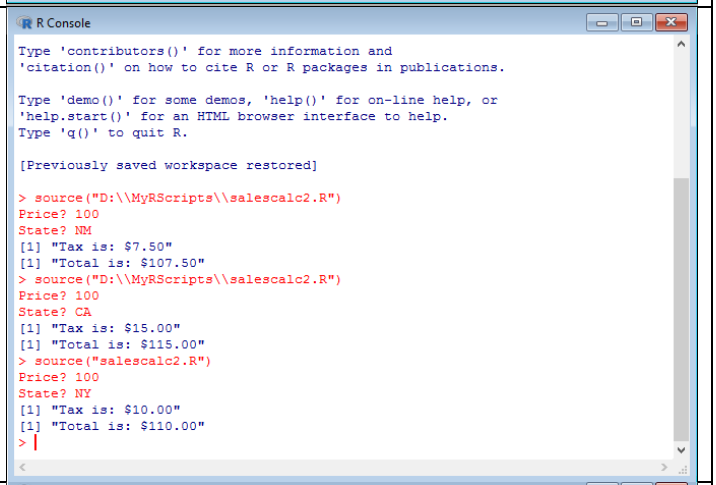
Finally, let's run the code with NY as the state, which isn't explicitly recognized by the if-statement, and so will default to a 10% tax rate.



- Type *source("salescalc2.R")* into the R Console. Note this is an alternative to using the menu to run (or source) your script.
- Enter 100 for price
- Enter NY for the state

R prints the correct Tax and Total!

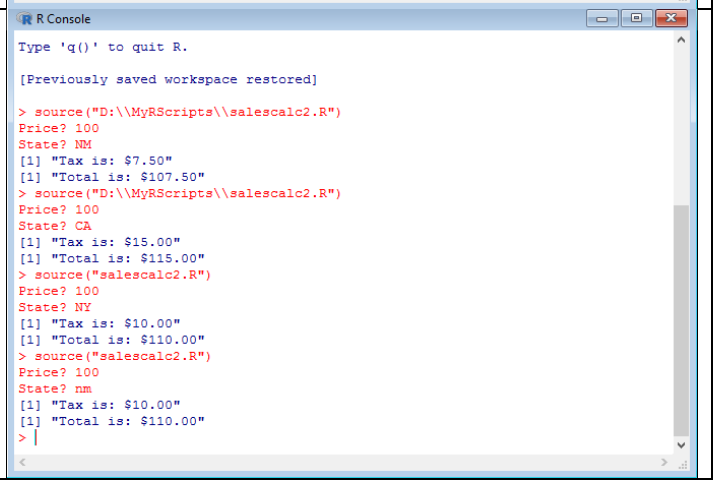
Here's the problem, if you enter NM as Nm or nm or nM, or if you enter CA as Ca or ca or cA, the code will default to 10% tax because it only recognizes all upper-case state letters. Let's test this.



- Type *source("salescalc2.R")* into the R Console. Note this is an alternative to using the menu to run (or source) your script.
- Enter 100 for price
- Enter nm for the state. Note this is all lower-case.

R prints an incorrect Tax and Total—$10 and $110 instead of $7.50 and $107.50

One way to fix this problem is to add multiple conditions in our if-statement to handle all the different ways of typing in the state.

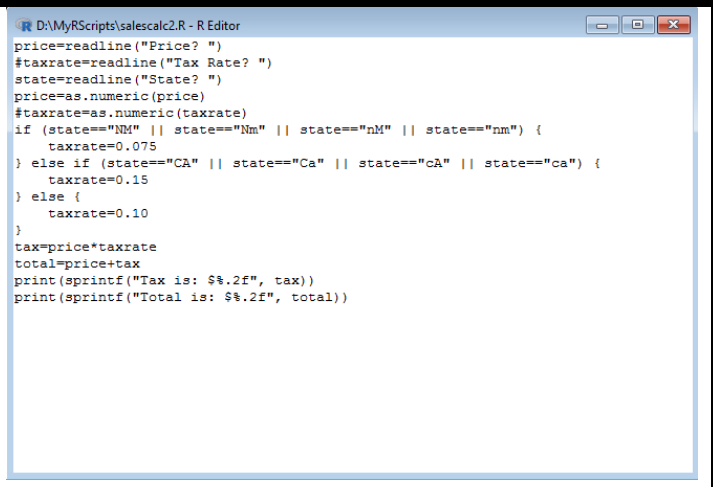


MULTIPLE CONDITIONS

- Modify the if statements to handle all the different ways of typing the state abbreviations for NM and CA, as follows:

```
if (state=="NM" || state=="Nm" ||
state=="nM" || state=="nm") {
…
… if (state=="CA" || state=="Ca" ||
state=="cA" || state=="ca") {
…
```

Note: **||** means "or". There is also **&&** (and). In addition to **==**, there is **<** (less than), **>** (greater than), **<=** (less than or equal), **>=** (greater than or equal), and finally **!=** (not equal).



- Ctrl-S to save your file. Note: this is a shortcut to using the menu to save.
- Type *source("salescalc2.R")* into the R Console.
- Enter 100 for price
- Enter nm for the state. Note this is all lower-case.

Go ahead and test on your own that the other variations of NM and CA work.

In the next tutorial, we'll look at loops.