

Worksheet 6: If Statements

Lab worksheet: If statements

Control flow

What about if you want the program to do something, but only some of the time. Like say you're making a program to search through a database for a genotype match to an unknown sample. As the program runs through each entry in the database, you might want it to print out "Found a match! The sample matches individual X.," but only when the sample does in fact match individual X.

This is when it's nice to control the flow of the program. Conceptually, control flow allows you to specify which lines of code you want the program to execute when and under what circumstances.

If statements

One simple way to control the program flow is with an if statement. In pseudocode, an if statement takes the form

```
if(condition) {
  command
}
```

So when the *condition* is true, the *command* is executed. For example, consider the following script (available on iLearn as happyBirthday.R):

```
# get date and break it down
d = date()
year = as.numeric(substr(d, 21, 24))
month = substr(d, 5, 7)
date = as.numeric(substr(d, 9, 10))
day = substr(d, 1, 3)
hour = as.numeric(substr(d, 12, 13))
minute = as.numeric(substr(d, 15, 16))

# set birthmonth
mybirthmonth = "Feb"

# during mybirthmonth, print message
if (month == mybirthmonth) {
  print("Happy birth month!")
}
```

1. Run the script.
 - a. What is the output? (trick question?)
 - b. Why is that the output?
2. Change the value of birthmonth to "Sep" and run the script again.
 - a. What is the output?
 - b. Why is that the output?
3. Add additional variables and if statements so that the script
 - a. prints "Happy birth date!" on your birth date (date, not day).
 - b. prints "Happy birth day!!!!" on your birth day.

In some cases, you may want the program to execute one of several different commands under different conditions. For instance, you might want a greeting message to be dependent on the day of the week ("Happy Monday," "Have a great weekend", etc).

If else statements allow you to execute different commands under different conditions. Their general format is

```
if(condition a) {
  command a
} else if(condition b) {
  command b
} else {
  command c
}
```

So when the *condition a* is true, the *command a* is executed. If *condition a* is not true, the program moves on and checks *condition b*. If *condition b* is true, *command b* is executed. If checked, if *condition b* is not true, the program moves on executes *command c*. Only one of these three commands will be executed. This type of if statement chain can include as many if else statements as desired, with the optional catch-all else statement at the end. For example, we could add to our happyBirthday.R:

```
if(day=="Mon") {
  print("Happy Monday, welcome back.")
} else if(day=="Tue") {
  print("Happy Tuesday, getting things done.")
} else if(day=="Wed") {
  print("Happy humpday.")
} else if(day=="Thu") {
  print("Happy Thursday, almost there.")
} else if(day=="Fri") {
  print("Happy Friday, enjoy your weekend.")
}
```

4. Add to happyBirthday.R to create the following specialized messages
 - a. Add an else clause to your previous if statement so that on your birthday it says "Happy birthday!!!!" and on any other day it says "Happy unbirthday."
 - b. Add code so that the script prints four different messages depending on the time of day (for example, "Good morning" between 5am and 12pm, "Good afternoon" between 12pm and 5pm, "Good evening" between 5pm and 10pm, "Good night" between 11pm and 5am)