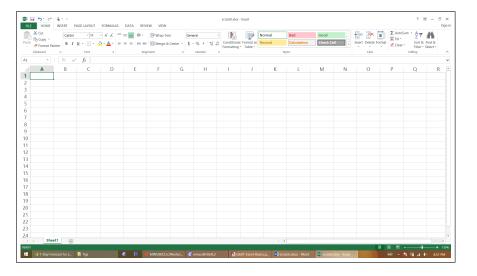
Applied Population Dynamics Lab 1 – Excel and R Basics



Column B

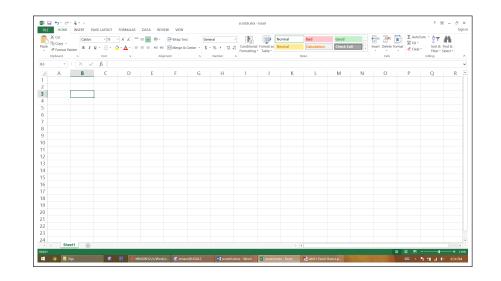
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To use auto-fill: begin a sequence, highlight the cells, and then drag the box at the bottom-right of the last cell.

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Dollar sign "locks" a reference so that auto-fill won't change it

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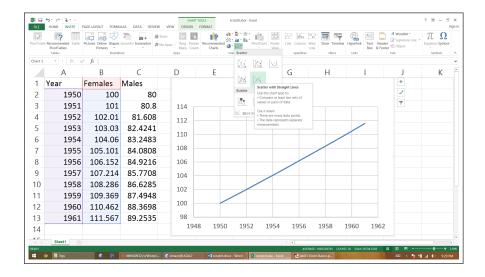
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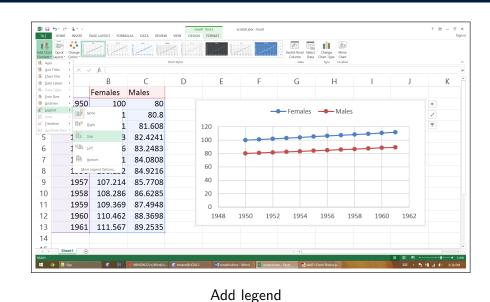
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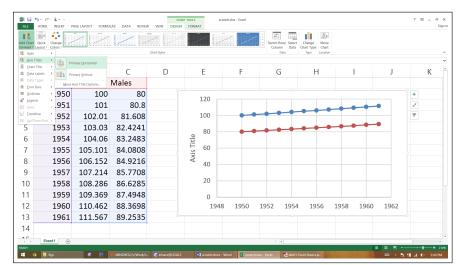


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CUSTOMIZE



CUSTOMIZE



Add axis labels

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Change line color

R can be downloaded here: https://www.r-project.org/

You can use the graphical user interface that comes with **R**, or you can run **R** through a system like **ESS+emacs** (https://vgoulet.act.ulaval.ca/en/home/) or **R Studio** (https://www.rstudio.com/).

Most people use **R Studio** these days.

Referencing Equations Graphics R 17 / 24	Referencing Equations Graphics R 18 / 24
Reproducing the Excel exercise	A SIMPLE POPULATION MODEL
Create an object called year to hold the sequence of years.	Create an empty vector to store the data on females. Set female abundance to 100 in the first year.
<pre>year <- 1950:1961 # A vector of integers year</pre>	<pre>females <- rep(NA, nYears) females[1] <- 100</pre>
Use the length function to determine the number of values in a	Use a "for loop" to compute female abundance in subsequent years.
vector.	<pre>for(t in 2:nYears) {</pre>

nYears <- length(year) nYears

[1] 12

We will use "for loops" for almost every population model that we implement in R

 $females[t] \leftarrow females[t-1] + females[t-1]*0.01$

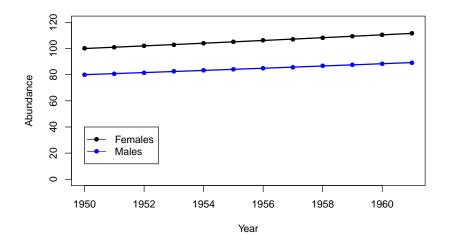
R

A SIMPLE POPULATION MODEL

	Put the objects in a data.frame
	<pre>model1 <- data.frame(year, females, males) model1</pre>
	## year females males
Generate the data on males	## 1 1950 100.0000 80.00000
	## 2 1951 101.0000 80.80000
using a single line of code.	## 3 1952 102.0100 81.60800
	## 4 1953 103.0301 82.42408
<pre>males <- females*0.8</pre>	## 5 1954 104.0604 83.24832
	## 6 1955 105.1010 84.08080
	## 7 1956 106.1520 84.92161
	## 8 1957 107.2135 85.77083
	## 9 1958 108.2857 86.62854
	## 10 1959 109.3685 87.49482
	## 11 1960 110.4622 88.36977
	## 12 1961 111.5668 89.25347

lines(males ~ year, data=model1, type="o", col="blue", lwd=2, pch=16)

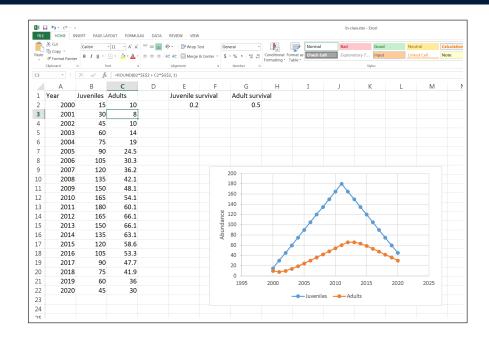
legend(x=1950, y=40, legend=c("Females", "Males"), col=c("black", "blue"), lty=1, pch=16)



Assignment

- 1. Create an Excel file and name it "Yourlastname_Yourfirstname".
- 2. Create the sheet shown on the next page using the techniques covered in this lab.
 - Use auto-fill to create the first two columns.
 - For the "Adults" column, use the equation shown for cells C3 through C22. Note: For cell C2, you can directly enter the value "10".
- 3. Copy "Sheet1" to a new sheet and change the color and thickness of the lines. You can pick any colors and thicknesses you want.
- 4. Grad students only: Do steps 1-3 using Excel, and also replicate the process using a "for loop" in a self-contained **R** script.
- 5. Upload the Excel workbook (with both sheets) to ELC. Grad students: upload the R script too.

Assignment



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