

R Lesson 6

Text Output Functions

Functions to concatenate vectors



Text Output Functions

- General Forms:

```
cat(... , file = "", sep = " " )
```

```
paste(..., sep = " ", collapse = NULL)
```

- ... - R objects to be concatenated
- *file* – path and name of optional output file (cat)
- *sep* – character string to separate elements or terms
- *collapse* – optional string to separate results (paste)

Text Output Functions

- Backslash characters allow you to generate control characters, importantly:
 - newline: `\n`
 - tab: `\t`
 - Example: `cat ("5\t9\n\n")`

Comparison of cat and paste

cat

- converts its arguments to character vectors
- concatenates them to a single character vector
- appends sep= string(s) to each element and then outputs them
- No linefeeds are output unless requested by "\n"
- writes to file if specified

paste

- vectors are concatenated term-by-term
- recycles as needed
- terms separated by sep
- elements separated by collapse value
- may be used for assignment
- often combined with cat

cat/paste Examples

- cat

`cat(Country, Capital, sep=',')`

Austria,Denmark,Finland,Iceland,Vienna,Cope
nhagen,Helsinki,Reykjavik

- paste

`paste(Country, Capital, sep=',')`

[1] "Austria,Vienna"

"Denmark,Copenhagen" "Finland,Helsinki"

[4] "Iceland,Reykjavik"



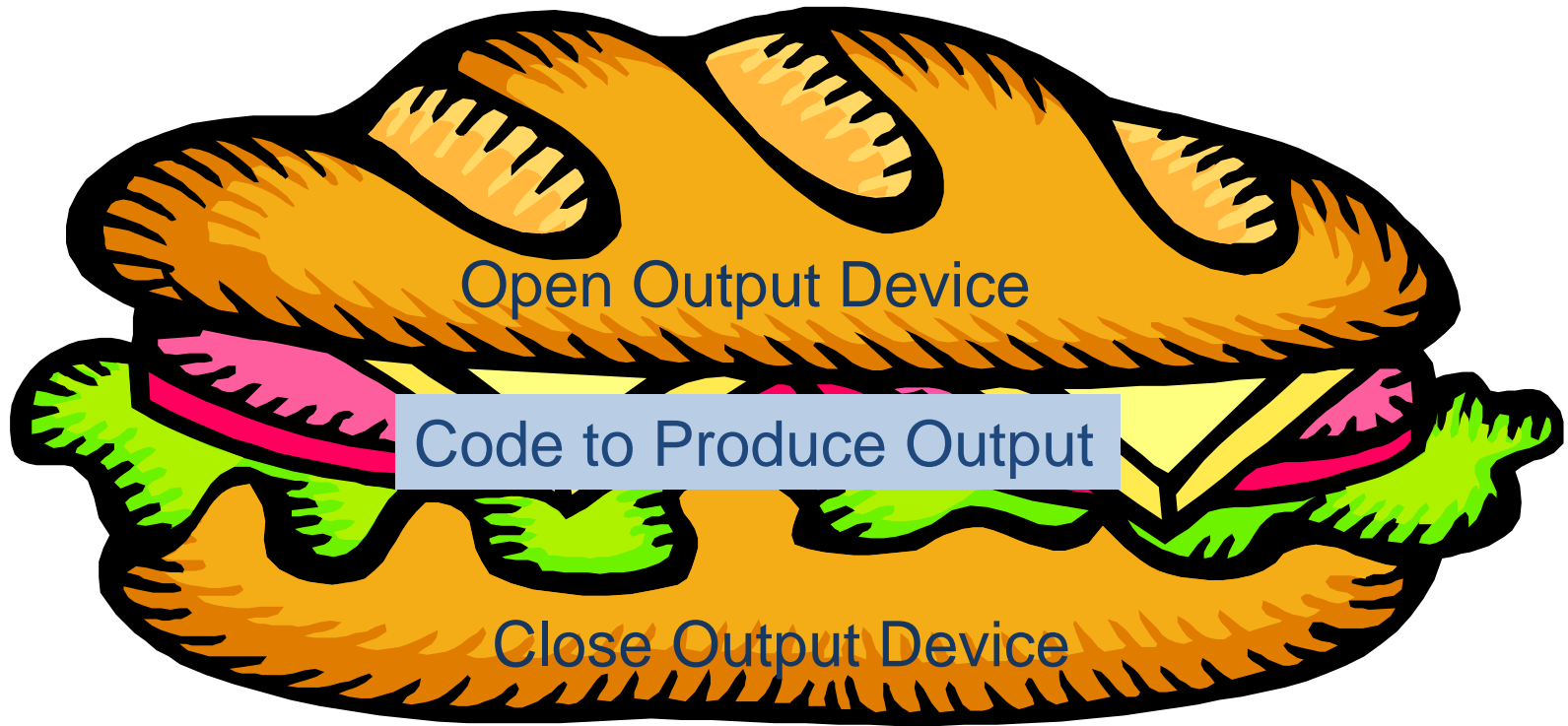
Quirky Things About R

- Case sensitive
- Indexing opposite of Excel: rows then columns
- Not all things are created equal
 - Use = to specify values to function arguments
 - Use == for logical test of equality
 - Use <- or -> the way we normally think of equals
 $y <- m(x) + b$
- Use \\ or / in windows paths instead of \
- Recycling occurs when two objects of unequal length are combined

Quirky Things About R

- Data types can be and often are coerced into other types
 - TRUE and FALSE coerce to 1 and 0
 - as.numeric
 - as.character
 - as.factor
- No function for statistical MODE
- Enclose an assignment in () to assign & display
- !x – x must resolve to a logic value

The Output Sandwich



Output Devices

- ?Devices
 - *Provides a list and explanation of devices*
- Screen device opens if none specified
 - *Use console menu to save results*
- Bitmap devices (single image)
 - png()
 - jpeg()
 - bmp()
 - tiff()

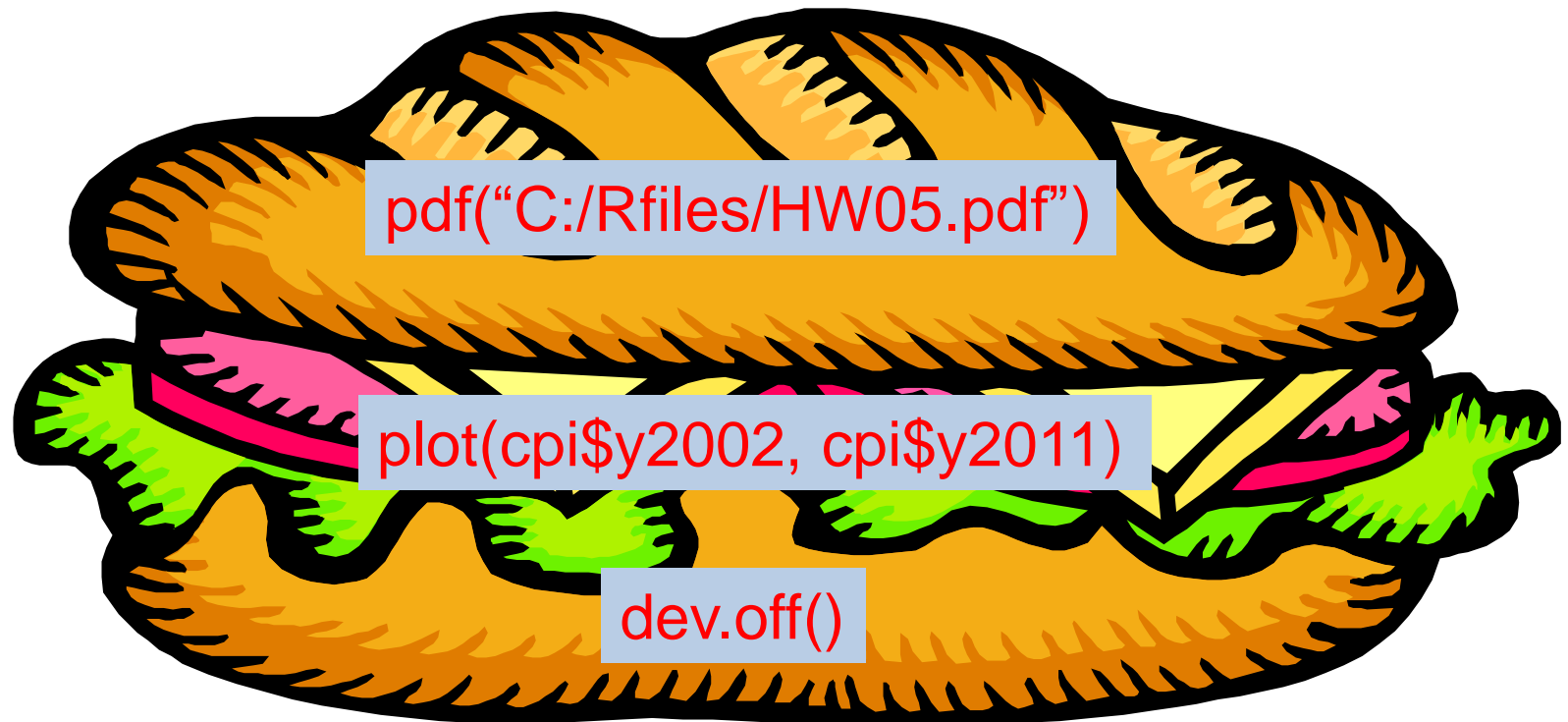


Output Devices

- File devices (multiple images)
 - `postscript()`
 - `pdf()`
 - `pdf(file, width, height)` #7x7 inches by default
 - `pdf("C:/Rfiles/HW05.pdf")`
- Close the device when finished
 - `dev.off()`
 - `graphics.off()`



Output Sandwich Example



Generic X-Y Plotting

- General Form:

```
plot(x, y, ...)
```

- *x*: vector of horizontal values or object with plot method
- *y*: vector of vertical values (optional depending on *x*)
-: arguments such as graphical parameters

- Example

```
plot(cpi$y2002,cpi$y2011)
```



Graphics Parameters

- Built-in, global parameters affect graphics objects and devices
- `par()` outputs the (long) list of options & current values
- Read `?par` for all the details!

Graphics Parameters

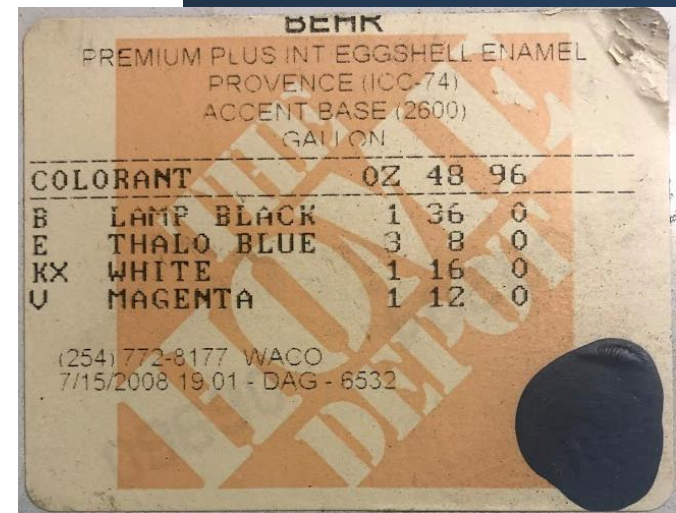
- Example:

```
plot(x, y, type="p", pch=1, col="black")
```

- *type*: how to plot (not a global parameter)
 - *p* – points
 - *l* – line
 - *b* – both
- *pch*: vector of numbers defining the plot symbol
- ?points
 - *help page that provides a definition of all the available plot characters*

Graphics Color Parameters

- *col*: vector of any of three kinds of R color specs
 - a color name i.e. “maroon”
 - use `colors()` to see a list of available color names
 - a hexadecimal string of the form “#rrggbb”
 - a positive integer *i* meaning `palette()[i]`



Helpful Color Info

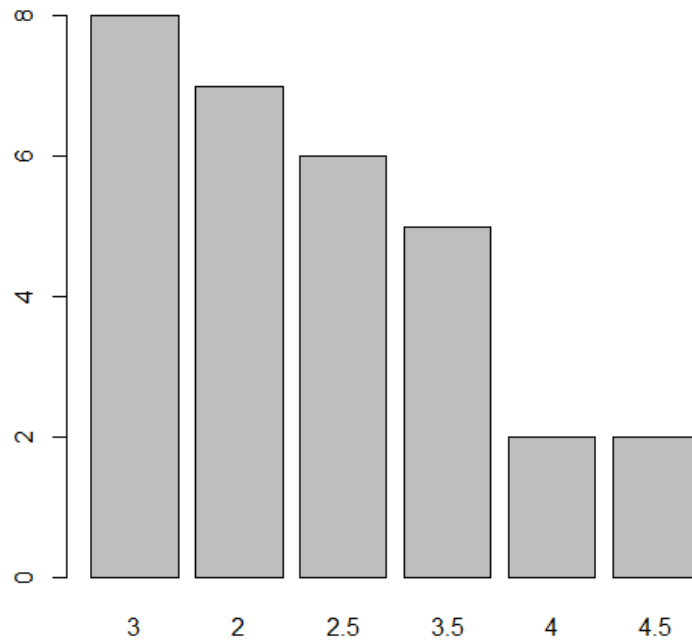
- `colors()`
 - *displays in the console a list of all color names*
- `palette()`
 - *displays vector of colors in the current palette*



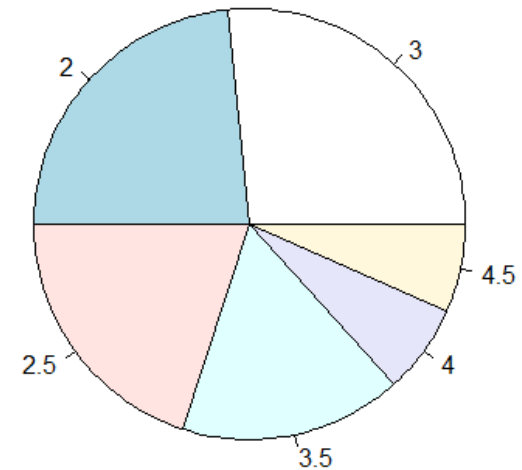
Higher Level Graphics

For categorical variables:

Bar Plot



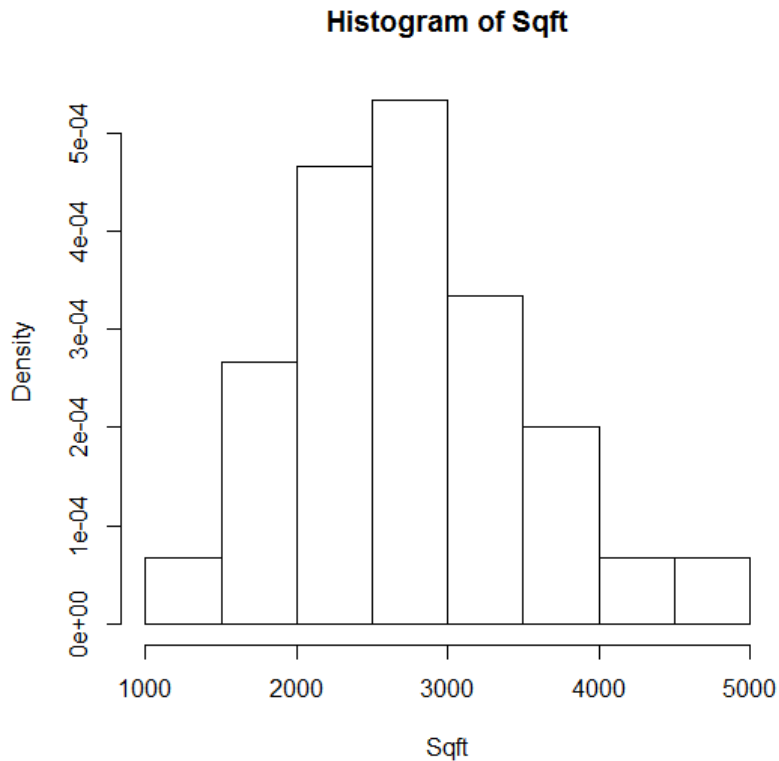
Pie Chart



Higher Level Graphics

For continuous variables:

Histogram



Boxplot

