Elements of Programming in R

Data structures

- Scalars and vectors
- Lists
- Data frames
- Factors
- Environments

Control Structures

The help page for *Control* describes several control structures, such as:

- `if (condition) { … }`
- `if (condition) { … } else { … }`
- `for (x in vector) { … }`
- `for (x in list) { … }`
- `while (condition) { … }`
- `return(expression)`

Functions

Functions are introduced by the `function` keyword. Assign the function to a name like this:

```
gcd = function(a, b) {
      if (b == 0) {
            return(a)
      } else {
            return(gcd(b, a %% b))
      }
}
```

If you don't explicitly `return` a value, the function returns the last expression in the body.

Variables Inside Functions

- To create a local variable, simply assign a value to it: `x <- 3`
- To set a global variable, use the special assignment operator: `glbl <<- 4`

Debugging

Read the help pages for these functions:

- `debug` - Invoke the debugger when a function is called
- `undebug` - Stop invoking the debugger
- `browser` - Set a breakpoint in a function
- `trace` - Trace calls to a function

- `debugonce` - Debug a function the first time it's called

Resources

- Norman Matloff's book on *The Art of R Programming*
- Hadley Wickham's tutorial on *Advanced Programming in R*