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The *R* Workshop

Applying the Integrated Suite of Software Facilities for Statistical Computing and Graphics

University of Georgia
Department of Workforce Education, Leadership, and Social Foundations
College of Education Research Office

January 23-January 24, 2012

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5. Advanced Programming

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Conditional Execution

- A conditional statement by 'if-else'

```
> if (x<3) print("x<3") else print("x>4")
```

- Commands can be grouped by braces

```
> x <- 4
> if ( x < 3 ) {print("x<3"); z <- "M"} else
{print("x>3"); z <- "F"}
```

Iteration, loop

- Loop: A repeatedly executed instruction cycle
- for-loop: loop over all elements in a vector

```
x <- 1:10
n <- length(x)
y <- rep(0, n)
for ( i in 1:n ) {
   y[i] <- x[i]^2
}
z <- x^2
print(cbind(y, z))
```

Iteration, loop

- while-loop: for which we don't know in advance how many iterations where will be

```
n <- 0
sum.so.far <- 0
while ( sum.so.far <= 1000 ) {
   n <- n+1
   sum.so.far <- sum.so.far + n
}
print(c(n, sum.so.far))
sum(1:45)
```

✓ **Whenever possible, try to avoid loops !**

Applying a function to every row/column

- To apply a function to every row[or column], use `apply()`.

```
> A <- matrix(1:20, 4, 5)
> apply(A, 1, sum)    # to every row
> apply(A, 2, sum)    # to every column
```


Writing New Functions

```
my.stat <- function(x)
  {
     m <- mean(x); s <- sd(x)
     res <- list(x=x, m=m, s=s)

     par(mfrow=c(1,2))
     boxplot(x, main="Boxplot")
     hist(x, prob=T, col="lightgray", main="Histrogram",
          xlab="data")
     z <- seq(from=min(x), to=max(x), by=0.01)
     lines(z, dnorm(z, mean=3, sd=1), col=2, lwd=3, lty=2)
     return(res)
  }

  X <- rnorm(1000, mean=3, sd=1)
  my.stat(x=X)
```

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