Notes

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Types

Numeric

```
x <- 2
mode(x)
```

```
## [1] "numeric"
```

```
typeof(x)
```

```
## [1] "double"
```

```
y <- as.integer(2)
typeof(x)
```

```
## [1] "double"
```

Complex

```
z <- 2 + 5i
mode(z)
```

```
## [1] "complex"
```

```
typeof(z)
```

```
## [1] "complex"
```

Character

```
name <- "Something :)"
typeof(name)
```

```
## [1] "character"
```

Boolean

```
boolT <- TRUE
boolF <- F
typeof(boolT)
```

```
## [1] "logical"
```

Data Types:

- Vectors
- Scalars
- Matrices
- Arrays
- Lists (can have different modes)
- Dataframes (can have different modes)

Functions

Building Vectors

```
5:10
```

```
## [1]  5  6  7  8  9 10
```

```
rep("hello", 5)
```

```
## [1] "hello" "hello" "hello" "hello" "hello"
```

```
v <- c()
v[1] <- 6
v[3] <- 5
v
```

```
## [1]  6 NA  5
```

Concatenate

```
c(c(1,2), c(3,4,5))
```

```
## [1] 1 2 3 4 5
```

Matrix

```
matrix(1:9,nrow=3, ncol=3)
```

```
##      [,1] [,2] [,3]
## [1,]    1    4    7
## [2,]    2    5    8
## [3,]    3    6    9
```

```
matrix(1:9,nrow=3, ncol=3, byrow=T)
```

```
##      [,1] [,2] [,3]
## [1,]    1    2    3
## [2,]    4    5    6
## [3,]    7    8    9
```

```
lol <- matrix(nrow=2, ncol=3)
lol[1,2] <- 3
rbind(lol, c(4:6))
```

```
##      [,1] [,2] [,3]
## [1,]   NA    3   NA
## [2,]   NA   NA   NA
## [3,]    4    5    6
```

Help

```
?str
??"hilbert matrix"
```

Subsets

```
tmp <- c(11, 12, 13, 14, 15)
tmp[2:4]
```

```
## [1] 12 13 14
```

```
tmp[c(1,4)]
```

```
## [1] 11 14
```

```
tmp[c(2,5)] <- 3
tmp
```

```
## [1] 11  3 13 14  3
```

```
tmp[-1]
```

```
## [1]  3 13 14  3
```

```
tmp[-c(1,4)]
```

```
## [1]  3 13  3
```

```
tmp <- matrix(1:6, nrow=2, ncol=3)
tmp[,2:3]
```

```
##      [,1] [,2]
## [1,]    3    5
## [2,]    4    6
```

```
tmp[1,]
```

```
## [1] 1 3 5
```

Installing Packages

```
#install.packages("ggplot2")
#install.packages("pixmap")
```

Importing Packages

```
library("ggplot2")
library("pixmap")
```

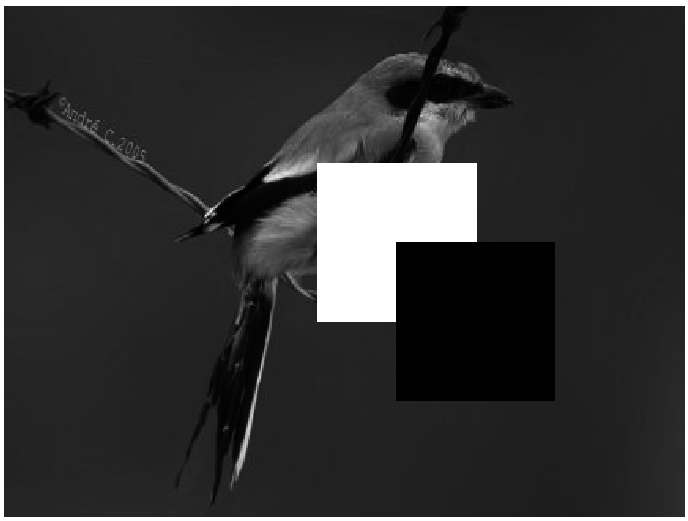
Manipulating images as matrices

```
bird <- read.pnm("bird.pgm")
```

```
## Warning in rep(cellres, length = 2): 'x' is NULL so the result will be NULL
```

```
plot(bird)
```

```
bird@grey[100:200, 200:300] <- 1
bird@grey[150:250, 250:350] <- 0
plot(bird)
```



Matrix Operations

```
mat1 <- rbind(c(1,2),c(4,3))
mat2 <- 3*mat1
mat2 == mat1 + mat1 + mat1
```

```
##      [,1] [,2]
## [1,] TRUE TRUE
## [2,] TRUE TRUE
```

```
transpose <- t(mat2)
determinant <- det(mat2)
inverse <- solve(mat2)
eigenvals <- eigen(mat2)$val
eigenvecs <- eigen(mat2)$vec
svd_D <- svd(mat2)$d
```

Other functions:
• length(x) : Length of a vector x
• sum(x) : Sum of a vector x \ • mean(x) : Arithmetic mean of a vector x \ • quantiles(x) : Sample quantiles of a vector x \ • max(x) : Maximum of a vector x \ • min(x) : Minimum of a vector x \ • sd(x) : Standard deviation of a vector x \ • var(x) : Variance of a vector x \ • summary(x) : Summary statistics of vector x