```
R version 3.0.3 (2014-03-06) -- "Warm Puppy"
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Platform: x86_64-apple-darwin10.8.0 (64-bit)

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[R.app GUI 1.63 (6660) x86_64-apple-darwin10.8.0]

> getwd
function ()
.Internal(getwd())
<bytecode: 0x10227fae0>
<environment: namespace:base>
> getwd()
[1] "/Users/kiichi"
> getwd()
[1] "/Users/kiichi/work/r"
> dir()
[1] "prj"  "test"
> getwd()
[1] "/Users/kiichi/work/r/class"
> dir()
character(0)
> cd
Error: object 'cd' not found
> myfunction <- function(x){
+   y <- rnorm(100)
+   mean(y)
+ }
> ls()
[1] "myfunction"
> myfunction(100)
[1] 0.09907926
> myfunction(100)
[1] 0.1401402
> myfunction(100)
[1] -0.006623611
> myfunction(100)
[1] -0.02870747
> dir()
[1] "myfunction.R"
> source("myfunction.R")
> myfunction()
[1] 0.03340083
> source("myfunction.R")
> ls()
[1] "myfunction" "second"
> second(1000)
[1] 1000.909
> second(1000)
[1] 999.0027
> second(1000)
[1] 998.7311
> second(1000)
[1] 1000.974
```

```
> second(1000)
[1] 1000.134
> second(1000)
[1] 1001.176
> second(1000)
[1] 998.5188
> second(1000)
[1] 999.5175
> second(1000)
[1] 1000.248
> second(1000)
[1] 1000.359
> second(1000)
[1] 1000.034
> second(1000)
[1] 999.0011
> second(1000)
[1] 1001.892
> second(1000)
[1] 999.478
> second(1000)
[1] 1000.394
> second(1000)
[1] 998.9048
> second(1000)
[1] 999.6841
> second(1000)
[1] 1000.546
> second(1000)
[1] 1000.508
> second(1000)
[1] 998.9601
> second(4:10)
[1] 4.434820 5.581912 5.704768 7.379326 7.865200 9.456462 8.977614
> x <- 1
> 1.length
Error: unexpected symbol in "1.length"
> x.length
Error: object 'x.length' not found
> print(x)
[1] 1
> msg <- "message"
> y <- 1L
> print(y)
[1] 1
> x
[1] 1
> y
[1] 1
> msg
[1] "message"
> x <- #@##
+
+ dsa"
+ ""
Error: unexpected string constant in:
"dsa"
""
> #hgjgj
> x <- 1:20
> x
 [1]  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20
> x <- 1:100
> x
  [1]   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25
 [26]  26  27  28  29  30  31  32  33  34  35  36  37  38  39  40  41  42  43  44  45  46  47  48  49  50
 [51]  51  52  53  54  55  56  57  58  59  60  61  62  63  64  65  66  67  68  69  70  71  72  73  74  75
 [76]  76  77  78  79  80  81  82  83  84  85  86  87  88  89  90  91  92  93  94  95  96  97  98  99 100
```

```
> x
  [1]   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
 [16]  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30
 [31]  31  32  33  34  35  36  37  38  39  40  41  42  43  44  45
 [46]  46  47  48  49  50  51  52  53  54  55  56  57  58  59  60
 [61]  61  62  63  64  65  66  67  68  69  70  71  72  73  74  75
 [76]  76  77  78  79  80  81  82  83  84  85  86  87  88  89  90
 [91]  91  92  93  94  95  96  97  98  99 100
> x
  [1]   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24
 [25]  25  26  27  28  29  30  31  32  33  34  35  36  37  38  39  40  41  42  43  44  45  46  47  48
 [49]  49  50  51  52  53  54  55  56  57  58  59  60  61  62  63  64  65  66  67  68  69  70  71  72
 [73]  73  74  75  76  77  78  79  80  81  82  83  84  85  86  87  88  89  90  91  92  93  94  95  96
 [97]  97  98  99 100
> x <- c(0.5,0.6)
> x
[1] 0.5 0.6
> x <- c(TRUE,FALSE)
> x
[1]  TRUE FALSE
> x <- c(T,F)
> x
[1]  TRUE FALSE
> x <- c("A","B","C")
> x
[1] "A" "B" "C"
> x <- 100:200
> x
  [1] 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123
 [25] 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147
 [49] 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171
 [73] 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195
 [97] 196 197 198 199 200
> x <- c(1+0i, 2+4i)
> x
[1] 1+0i 2+4i
> x <- c(1.7,"a")
> x
[1] "1.7" "a"
> x <- c(1.7,"a","b")
> x
[1] "1.7" "a"   "b"
> x <- c(1.7,"a","b",2,3,4)
> x
[1] "1.7" "a"   "b"   "2"   "3"   "4"
> x <- c(T,2)
> x
[1] 1 2
> x <- c(T,2,4,45,6,)
Error in c(T, 2, 4, 45, 6, ) : argument 6 is empty
> x <- c(T,2,4,45,6,2)
> x
[1]  1  2  4 45  6  2
> x <- c("a",2,3,"b")
> x
[1] "a" "2" "3" "b"
> class(x)
[1] "character"
> as.numeric(x)
[1] NA  2  3 NA
Warning message:
NAs introduced by coercion
> as.numeric(x)
[1] NA  2  3 NA
Warning message:
NAs introduced by coercion
> x
[1] "a" "2" "3" "b"
```

```
> y <- as.numeric(x)
Warning message:
NAs introduced by coercion
> y
[1] NA  2  3 NA
> y<- as.character(x)
> y
[1] "a" "2" "3" "b"
> y<- as.numeric(x)
Warning message:
NAs introduced by coercion
> y
[1] NA  2  3 NA
> as.logical(x)
[1] NA NA NA NA
> as.logical(y)
[1]   NA TRUE TRUE   NA
> as.complex(x)
[1]   NA 2+0i 3+0i   NA
Warning message:
NAs introduced by coercion
> x
[1] "a" "2" "3" "b"
> m <- matrix(nrow=2,ncol=3)
> m
     [,1] [,2] [,3]
[1,]   NA   NA   NA
[2,]   NA   NA   NA
> dim(m)
[1] 2 3
> attributes(m)
$dim
[1] 2 3

> a <- attributes(m)
> class(a)
[1] "list"
> $dim
Error: unexpected '$' in "$"
> dim
function (x)  .Primitive("dim")
> m <- matrix(1:6, nrow=2,ncol=3)
> m
     [,1] [,2] [,3]
[1,]    1    3    5
[2,]    2    4    6
> m <- matrix(2:6, nrow=2,ncol=3)
Warning message:
In matrix(2:6, nrow = 2, ncol = 3) :
  data length [5] is not a sub-multiple or multiple of the number of rows [2]
> m
     [,1] [,2] [,3]
[1,]    2    4    6
[2,]    3    5    2
> m <- matrix(2:100, nrow=2,ncol=3)
Warning message:
In matrix(2:100, nrow = 2, ncol = 3) :
  data length [99] is not a sub-multiple or multiple of the number of rows [2]
> m
     [,1] [,2] [,3]
[1,]    2    4    6
[2,]    3    5    7
> m <- matrix(2:8, nrow=2,ncol=3)
Warning message:
In matrix(2:8, nrow = 2, ncol = 3) :
  data length [7] is not a sub-multiple or multiple of the number of rows [2]
> m <- matrix(2:7, nrow=2,ncol=3)
> m
```

```
     [,1] [,2] [,3]
[1,]    2    4    6
[2,]    3    5    7
> m <- 1:10
> dim(m)
NULL
> dim(m) <- c(2,5)
> m
     [,1] [,2] [,3] [,4] [,5]
[1,]    1    3    5    7    9
[2,]    2    4    6    8   10
> x <- 1:3
> x
[1] 1 2 3
> y <- 10:12
> y
[1] 10 11 12
> cbind(x,y)
     x  y
[1,] 1 10
[2,] 2 11
[3,] 3 12
> z <- cbind(x,y)
> z
     x  y
[1,] 1 10
[2,] 2 11
[3,] 3 12
> rbind(x,y)
  [,1] [,2] [,3]
x    1    2    3
y   10   11   12
> x <- list(1,"a",TRUE,1+4i)
> x
[[1]]
[1] 1

[[2]]
[1] "a"

[[3]]
[1] TRUE

[[4]]
[1] 1+4i

> x <- factor(c("yes","yes","no","yes","no"))
> x
[1] yes yes no  yes no
Levels: no yes
> table(x)
x
 no yes
  2   3
> survey <- c("yes","yes","no","yes","no")
> table(survey)
survey
 no yes
  2   3
> unclass(survey)
[1] "yes" "yes" "no"  "yes" "no"
> unclass(x)
[1] 2 2 1 2 1
attr(,"levels")
[1] "no"  "yes"
> sf <- factor(survey)
> table(sf)
sf
```

```
 no yes
  2   3
> unclass(sf)
[1] 2 2 1 2 1
attr(,"levels")
[1] "no"  "yes"
> lvl = c("yes","no")
> sf <- factor(survey, levels=lvl)
> sf
[1] yes yes no  yes no
Levels: yes no
> table(sf)
sf
yes  no
  3   2
> is.na(NA)
[1] TRUE
> is.na("A")
[1] FALSE
> is.nan(NaN)
[1] TRUE
> is.nan(a)
Error in is.nan(a) : default method not implemented for type 'list'
> is.nan()
Error in is.nan() : 0 arguments passed to 'is.nan' which requires 1
> is.nan(x)
[1] FALSE FALSE FALSE FALSE FALSE
> is.na(x)
[1] FALSE FALSE FALSE FALSE FALSE
> z <- c(1,2,NA,10,3)
> z
[1]  1  2 NA 10  3
> is.na(z)
[1] FALSE FALSE  TRUE FALSE FALSE
> is.nan(z)
[1] FALSE FALSE FALSE FALSE FALSE
> z <- c(1,2,NA,NA,NaN,10,3)
> is.nan(z)
[1] FALSE FALSE FALSE FALSE  TRUE FALSE FALSE
> is.na(z)
[1] FALSE FALSE  TRUE  TRUE  TRUE FALSE FALSE
> class(c)
[1] "function"
> dir(c)
Error in dir(c) : invalid 'path' argument
> c
function (..., recursive = FALSE)  .Primitive("c")
> x <- data.frame(foo = 1:4, bar = c(T,T,F,F))
> x
  foo   bar
1   1  TRUE
2   2  TRUE
3   3 FALSE
4   4 FALSE
> x <- data.frame(foo = 1:4, bar = c(T,T,F,F,T))
Error in data.frame(foo = 1:4, bar = c(T, T, F, F, T)) :
  arguments imply differing number of rows: 4, 5
> x
  foo   bar
1   1  TRUE
2   2  TRUE
3   3 FALSE
4   4 FALSE
> x <- data.frame(foo = 1:5, bar = c(T,T,F,F,T))
> x
  foo   bar
1   1  TRUE
2   2  TRUE
```

```
3   3 FALSE
4   4 FALSE
5   5  TRUE
> nrow(x)
[1] 5
> nrow(y)
NULL
> nrow(x)
[1] 5
> ncol(x)
[1] 2
> x <-1:3
> names(x)
NULL
> names(x) <- c("foo","bar","norf")
> x
 foo  bar norf
   1    2    3
> names(x)
[1] "foo"  "bar"  "norf"
> x <- list(a=1,b=2,c=3)
>
> x
$a
[1] 1

$b
[1] 2

$c
[1] 3

> m<-matrix(1:4,nrow=2,ncol=2)
> m
     [,1] [,2]
[1,]    1    3
[2,]    2    4
> dimnames(m) <- list(c("a","b",c("c","d"))
+ a
Error: unexpected symbol in:
"dimnames(m) <- list(c("a","b",c("c","d"))
a"
> dimnames(m) <- list(c("a","b"),c("c","d"))
> m
  c d
a 1 3
b 2 4
> m[[1]]
[1] 1
> m[[2]]
[1] 2
> m[[4]]
[1] 4
> m[[5]]
Error in m[[5]] : subscript out of bounds
> x <- c("a","b","c","d")
> x[1]
[1] "a"
> x[3]
[1] "c"
> x[1:2]
[1] "a" "b"
> x[x>"a"]
[1] "b" "c" "d"
> x[x>"b"]
[1] "c" "d"
> u <- x > "a"
> u
```

```
[1] FALSE  TRUE  TRUE  TRUE
> u <- x > "b"
> u
[1] FALSE FALSE  TRUE  TRUE
> x[u]
[1] "c" "d"
> x <- matrix(1:6,2,3)
> x
     [,1] [,2] [,3]
[1,]    1    3    5
[2,]    2    4    6
> x[2,3]
[1] 6
> x[2,2]
[1] 4
> x[2]
[1] 2
> x[2,-1]
[1] 4 6
> x[2,]
[1] 2 4 6
> x[1,]
[1] 1 3 5
> x[,2]
[1] 3 4
> x <- matrix(1:6,2,3)
> x
     [,1] [,2] [,3]
[1,]    1    3    5
[2,]    2    4    6
> x[1,2]
[1] 3
> x[1,2, drop=FALSE]
     [,1]
[1,]    3
> x[1,, drop=FALSE]
     [,1] [,2] [,3]
[1,]    1    3    5
> x[2,, drop=FALSE]
     [,1] [,2] [,3]
[1,]    2    4    6
> x <- matrix(1:6,2,3)
> x[1,]
[1] 1 3 5
> x[1,,drop=FALSE]
     [,1] [,2] [,3]
[1,]    1    3    5
> x
     [,1] [,2] [,3]
[1,]    1    3    5
[2,]    2    4    6
> x <- list(foo=1:4,bar=0.6)
> x
$foo
[1] 1 2 3 4

$bar
[1] 0.6

> x[[1]]
[1] 1 2 3 4
> x[[2]]
[1] 0.6
> x$bar
[1] 0.6
> x$foo
[1] 1 2 3 4
> x[["bar"]]
```

```
[1] 0.6
> x[["foo"]]
[1] 1 2 3 4
> x["foo"]
$foo
[1] 1 2 3 4

> x["bar"]
$bar
[1] 0.6

> x <- list(foo=1:4,bar=0.5,baz="hello")
> x
$foo
[1] 1 2 3 4

$bar
[1] 0.5

$baz
[1] "hello"

> x[c(1,3)]
$foo
[1] 1 2 3 4

$baz
[1] "hello"

> x[c(1:3)]
$foo
[1] 1 2 3 4

$bar
[1] 0.5

$baz
[1] "hello"

> name<-"foo"
> x[[name]]
[1] 1 2 3 4
> x
$foo
[1] 1 2 3 4

$bar
[1] 0.5

$baz
[1] "hello"

> x$name
NULL
> x$foo
[1] 1 2 3 4
> x<-list(a=list(10,20,20),b=c(22,11,2.3))
> x
$a
$a[[1]]
[1] 10

$a[[2]]
[1] 20

$a[[3]]
[1] 20
```

```
$b
[1] 22.0 11.0  2.3

> x[[c(1,3)]]
[1] 20
> x
$a
$a[[1]]
[1] 10

$a[[2]]
[1] 20

$a[[3]]
[1] 20


$b
[1] 22.0 11.0  2.3

> x<-list(a=list(10,20,20),b=c(22,11,2.3))
> x[[c(1,3)]]
[1] 20
> x[[c(1,2)]]
[1] 20
> x[[c(1,1)]]
[1] 10
> x[[[1]][[3]]]
Error: unexpected '[' in "x[[["
> x[[1]][[3]]
[1] 20
> x[[[2]][[3]]]
Error: unexpected '[' in "x[[["
> x[[2]][[3]]
[1] 2.3
> x <- list(aardvark=1:5)
> x
$aardvark
[1] 1 2 3 4 5

> x[["a"]]
NULL
> x[["a",exact=FALSE]]
[1] 1 2 3 4 5
> x[["x",exact=FALSE]]
NULL
> x[["v",exact=FALSE]]
NULL
> x[["aa",exact=FALSE]]
[1] 1 2 3 4 5
> x[["aar",exact=FALSE]]
[1] 1 2 3 4 5
> x[["aar",exact=T]]
NULL
> x[["aar",exact=F]]
[1] 1 2 3 4 5
> class(x)
[1] "list"
> x <- c(1,2,NA,4,NA,5)
> x
[1]  1  2 NA  4 NA  5
> bad <- is.na(x)
> bad
[1] FALSE FALSE  TRUE FALSE  TRUE FALSE
> x[bad]
[1] NA NA
> x[!bad]
```

```
[1] 1 2 4 5
> df = data.frame(one=list("c","b","d",NA,"x"),two=list(1,2,NA,NA,NA,200))
> df
  one..c. one..b. one..d. one.NA one..x. two.1 two.2 two.NA two.NA.1 two.NA.2
1       c       b       d     NA       x     1     2     NA       NA       NA
  two.200
1     200
> df = data.frame(one=list("c","b","d",NA,"x"),two=list(1,2,NA,NA,NA,200))
> df
  one..c. one..b. one..d. one.NA one..x. two.1 two.2 two.NA two.NA.1 two.NA.2 two.200
1       c       b       d     NA       x     1     2     NA       NA       NA     200
> df = data.frame(one=c("c","b","d",NA,"x"),two=c(1,2,NA,NA,NA,200))
Error in data.frame(one = c("c", "b", "d", NA, "x"), two = c(1, 2, NA,  :
  arguments imply differing number of rows: 5, 6
> df = data.frame(one=c("c","b","d",NA,"x"),two=c(1,2,NA,NA,200))
> df
   one two
1    c   1
2    b   2
3    d  NA
4 <NA>  NA
5    x 200
> df = data.frame(one=list("c","b","d",NA,"x"),two=list(1,2,NA,NA,200))
> df
  one..c. one..b. one..d. one.NA one..x. two.1 two.2 two.NA two.NA.1 two.200
1       c       b       d     NA       x     1     2     NA       NA     200
> df = data.frame(one=c("c","b","d",NA,"x"),two=c(1,2,NA,NA,200))
> df
   one two
1    c   1
2    b   2
3    d  NA
4 <NA>  NA
5    x 200
> df
   one two
1    c   1
2    b   2
3    d  NA
4 <NA>  NA
5    x 200
> df = data.frame(one=c("c","b","d","e","x"),two=c(1,2,NA,NA,200))
> df
  one two
1   c   1
2   b   2
3   d  NA
4   e  NA
5   x 200
> df[1]
  one
1   c
2   b
3   d
4   e
5   x
> df[2]
  two
1   1
2   2
3  NA
4  NA
5 200
> bad <- is.na(df[2])
> bad
      two
[1,] FALSE
[2,] FALSE
```

```
[3,]  TRUE
[4,]  TRUE
[5,] FALSE
> df[bad]
[1] "d" "e" NA  NA
> df[2,3]
NULL
> df[2,2]
[1] 2
> df[2,bad]
Error in `[.data.frame`(df, 2, bad) : undefined columns selected
> bad
       two
[1,] FALSE
[2,] FALSE
[3,]  TRUE
[4,]  TRUE
[5,] FALSE
> bad <- is.na(df[[2]])
> bad
[1] FALSE FALSE  TRUE  TRUE FALSE
> df[2,bad]
Error in `[.data.frame`(df, 2, bad) : undefined columns selected
> df[1,bad]
Error in `[.data.frame`(df, 1, bad) : undefined columns selected
> df[bad]
Error in `[.data.frame`(df, bad) : undefined columns selected
> df[[1,2]]
[1] 1
> df[[1,bad]]
Error in .subset2(x, ..2, exact = exact) :
  attempt to select less than one element
> df[[,bad]]
Error in .subset2(x, ..2, exact = exact) :
  attempt to select less than one element
> df[[bad,]]
Error in `[[.data.frame`(df, bad, ) :
  argument "..2" is missing, with no default
> df[bad,]
  one two
3   d  NA
4   e  NA
>  df = data.frame(one=c("c","b","d","e","x"),two=c(1,2,NA,NA,200))
> df
  one two
1   c   1
2   b   2
3   d  NA
4   e  NA
5   x 200
> df[!bad,]
  one two
1   c   1
2   b   2
5   x 200
> x <- c(1,2,NA,4,NA,5)
> y <- c("a","b",NA,"d",NA,"f")
> x
[1]  1  2 NA  4 NA  5
> y
[1] "a" "b" NA  "d" NA  "f"
> good <- complete.cases(x,y)
starting httpd help server ... done
> x[good]
[1] 1 2 4 5
> y[good]
[1] "a" "b" "d" "f"
> y <- c("a","b",NA,"d",NA,NA)
```

```
> good <- complete.cases(x,y)
> good
[1]  TRUE  TRUE FALSE  TRUE FALSE FALSE
> y[good]
[1] "a" "b" "d"
> x[good]
[1] 1 2 4
> x
[1]  1  2 NA  4 NA  5
> y
[1] "a" "b" NA  "d" NA  NA
> airquality[1:6,]
  Ozone Solar.R Wind Temp Month Day
1    41     190  7.4   67     5   1
2    36     118  8.0   72     5   2
3    12     149 12.6   74     5   3
4    18     313 11.5   62     5   4
5    NA      NA 14.3   56     5   5
6    28      NA 14.9   66     5   6
> airquality[1:6,1:2]
  Ozone Solar.R
1    41     190
2    36     118
3    12     149
4    18     313
5    NA      NA
6    28      NA
> airquality[,]
    Ozone Solar.R Wind Temp Month Day
1      41     190  7.4   67     5   1
2      36     118  8.0   72     5   2
3      12     149 12.6   74     5   3
4      18     313 11.5   62     5   4
5      NA      NA 14.3   56     5   5
6      28      NA 14.9   66     5   6
7      23     299  8.6   65     5   7
8      19      99 13.8   59     5   8
9       8      19 20.1   61     5   9
10     NA     194  8.6   69     5  10
11      7      NA  6.9   74     5  11
12     16     256  9.7   69     5  12
13     11     290  9.2   66     5  13
14     14     274 10.9   68     5  14
15     18      65 13.2   58     5  15
16     14     334 11.5   64     5  16
17     34     307 12.0   66     5  17
18      6      78 18.4   57     5  18
19     30     322 11.5   68     5  19
20     11      44  9.7   62     5  20
21      1       8  9.7   59     5  21
22     11     320 16.6   73     5  22
23      4      25  9.7   61     5  23
24     32      92 12.0   61     5  24
25     NA      66 16.6   57     5  25
26     NA     266 14.9   58     5  26
27     NA      NA  8.0   57     5  27
28     23      13 12.0   67     5  28
29     45     252 14.9   81     5  29
30    115     223  5.7   79     5  30
31     37     279  7.4   76     5  31
32     NA     286  8.6   78     6   1
33     NA     287  9.7   74     6   2
34     NA     242 16.1   67     6   3
35     NA     186  9.2   84     6   4
36     NA     220  8.6   85     6   5
37     NA     264 14.3   79     6   6
38     29     127  9.7   82     6   7
39     NA     273  6.9   87     6   8
```

40	71	291	13.8	90	6	9
41	39	323	11.5	87	6	10
42	NA	259	10.9	93	6	11
43	NA	250	9.2	92	6	12
44	23	148	8.0	82	6	13
45	NA	332	13.8	80	6	14
46	NA	322	11.5	79	6	15
47	21	191	14.9	77	6	16
48	37	284	20.7	72	6	17
49	20	37	9.2	65	6	18
50	12	120	11.5	73	6	19
51	13	137	10.3	76	6	20
52	NA	150	6.3	77	6	21
53	NA	59	1.7	76	6	22
54	NA	91	4.6	76	6	23
55	NA	250	6.3	76	6	24
56	NA	135	8.0	75	6	25
57	NA	127	8.0	78	6	26
58	NA	47	10.3	73	6	27
59	NA	98	11.5	80	6	28
60	NA	31	14.9	77	6	29
61	NA	138	8.0	83	6	30
62	135	269	4.1	84	7	1
63	49	248	9.2	85	7	2
64	32	236	9.2	81	7	3
65	NA	101	10.9	84	7	4
66	64	175	4.6	83	7	5
67	40	314	10.9	83	7	6
68	77	276	5.1	88	7	7
69	97	267	6.3	92	7	8
70	97	272	5.7	92	7	9
71	85	175	7.4	89	7	10
72	NA	139	8.6	82	7	11
73	10	264	14.3	73	7	12
74	27	175	14.9	81	7	13
75	NA	291	14.9	91	7	14
76	7	48	14.3	80	7	15
77	48	260	6.9	81	7	16
78	35	274	10.3	82	7	17
79	61	285	6.3	84	7	18
80	79	187	5.1	87	7	19
81	63	220	11.5	85	7	20
82	16	7	6.9	74	7	21
83	NA	258	9.7	81	7	22
84	NA	295	11.5	82	7	23
85	80	294	8.6	86	7	24
86	108	223	8.0	85	7	25
87	20	81	8.6	82	7	26
88	52	82	12.0	86	7	27
89	82	213	7.4	88	7	28
90	50	275	7.4	86	7	29
91	64	253	7.4	83	7	30
92	59	254	9.2	81	7	31
93	39	83	6.9	81	8	1
94	9	24	13.8	81	8	2
95	16	77	7.4	82	8	3
96	78	NA	6.9	86	8	4
97	35	NA	7.4	85	8	5
98	66	NA	4.6	87	8	6
99	122	255	4.0	89	8	7
100	89	229	10.3	90	8	8
101	110	207	8.0	90	8	9
102	NA	222	8.6	92	8	10
103	NA	137	11.5	86	8	11
104	44	192	11.5	86	8	12
105	28	273	11.5	82	8	13
106	65	157	9.7	80	8	14
107	NA	64	11.5	79	8	15

```
108    22      71 10.3   77     8  16
109    59      51  6.3   79     8  17
110    23     115  7.4   76     8  18
111    31     244 10.9   78     8  19
112    44     190 10.3   78     8  20
113    21     259 15.5   77     8  21
114     9      36 14.3   72     8  22
115    NA     255 12.6   75     8  23
116    45     212  9.7   79     8  24
117   168     238  3.4   81     8  25
118    73     215  8.0   86     8  26
119    NA     153  5.7   88     8  27
120    76     203  9.7   97     8  28
121   118     225  2.3   94     8  29
122    84     237  6.3   96     8  30
123    85     188  6.3   94     8  31
124    96     167  6.9   91     9   1
125    78     197  5.1   92     9   2
126    73     183  2.8   93     9   3
127    91     189  4.6   93     9   4
128    47      95  7.4   87     9   5
129    32      92 15.5   84     9   6
130    20     252 10.9   80     9   7
131    23     220 10.3   78     9   8
132    21     230 10.9   75     9   9
133    24     259  9.7   73     9  10
134    44     236 14.9   81     9  11
135    21     259 15.5   76     9  12
136    28     238  6.3   77     9  13
137     9      24 10.9   71     9  14
138    13     112 11.5   71     9  15
139    46     237  6.9   78     9  16
140    18     224 13.8   67     9  17
141    13      27 10.3   76     9  18
142    24     238 10.3   68     9  19
143    16     201  8.0   82     9  20
144    13     238 12.6   64     9  21
145    23      14  9.2   71     9  22
146    36     139 10.3   81     9  23
147     7      49 10.3   69     9  24
148    14      20 16.6   63     9  25
149    30     193  6.9   70     9  26
150    NA     145 13.2   77     9  27
151    14     191 14.3   75     9  28
152    18     131  8.0   76     9  29
153    20     223 11.5   68     9  30
> airquality[1:6,]
  Ozone Solar.R Wind Temp Month Day
1    41     190  7.4   67     5   1
2    36     118  8.0   72     5   2
3    12     149 12.6   74     5   3
4    18     313 11.5   62     5   4
5    NA      NA 14.3   56     5   5
6    28      NA 14.9   66     5   6
> completed <- complete.cases(airquality)
> completed
  [1]  TRUE  TRUE  TRUE  TRUE FALSE FALSE  TRUE  TRUE  TRUE FALSE FALSE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE
 [18]  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE FALSE FALSE FALSE  TRUE  TRUE  TRUE FALSE FALSE FALSE
 [35] FALSE FALSE FALSE  TRUE FALSE  TRUE  TRUE FALSE FALSE  TRUE FALSE FALSE  TRUE  TRUE  TRUE  TRUE  TRUE
 [52] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE  TRUE  TRUE FALSE  TRUE  TRUE  TRUE
 [69]  TRUE  TRUE  TRUE FALSE  TRUE  TRUE FALSE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE FALSE FALSE  TRUE
 [86]  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE FALSE FALSE FALSE  TRUE  TRUE  TRUE FALSE
[103] FALSE  TRUE  TRUE  TRUE FALSE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE FALSE  TRUE  TRUE  TRUE FALSE
[120]  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE
[137]  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE FALSE  TRUE  TRUE  TRUE
> airquality[completed]
Error in `[.data.frame`(airquality, completed) :
  undefined columns selected
```

```
> airquality[completed,]
    Ozone Solar.R Wind Temp Month Day
1      41     190  7.4   67     5   1
2      36     118  8.0   72     5   2
3      12     149 12.6   74     5   3
4      18     313 11.5   62     5   4
7      23     299  8.6   65     5   7
8      19      99 13.8   59     5   8
9       8      19 20.1   61     5   9
12     16     256  9.7   69     5  12
13     11     290  9.2   66     5  13
14     14     274 10.9   68     5  14
15     18      65 13.2   58     5  15
16     14     334 11.5   64     5  16
17     34     307 12.0   66     5  17
18      6      78 18.4   57     5  18
19     30     322 11.5   68     5  19
20     11      44  9.7   62     5  20
21      1       8  9.7   59     5  21
22     11     320 16.6   73     5  22
23      4      25  9.7   61     5  23
24     32      92 12.0   61     5  24
28     23      13 12.0   67     5  28
29     45     252 14.9   81     5  29
30    115     223  5.7   79     5  30
31     37     279  7.4   76     5  31
38     29     127  9.7   82     6   7
40     71     291 13.8   90     6   9
41     39     323 11.5   87     6  10
44     23     148  8.0   82     6  13
47     21     191 14.9   77     6  16
48     37     284 20.7   72     6  17
49     20      37  9.2   65     6  18
50     12     120 11.5   73     6  19
51     13     137 10.3   76     6  20
62    135     269  4.1   84     7   1
63     49     248  9.2   85     7   2
64     32     236  9.2   81     7   3
66     64     175  4.6   83     7   5
67     40     314 10.9   83     7   6
68     77     276  5.1   88     7   7
69     97     267  6.3   92     7   8
70     97     272  5.7   92     7   9
71     85     175  7.4   89     7  10
73     10     264 14.3   73     7  12
74     27     175 14.9   81     7  13
76      7      48 14.3   80     7  15
77     48     260  6.9   81     7  16
78     35     274 10.3   82     7  17
79     61     285  6.3   84     7  18
80     79     187  5.1   87     7  19
81     63     220 11.5   85     7  20
82     16       7  6.9   74     7  21
85     80     294  8.6   86     7  24
86    108     223  8.0   85     7  25
87     20      81  8.6   82     7  26
88     52      82 12.0   86     7  27
89     82     213  7.4   88     7  28
90     50     275  7.4   86     7  29
91     64     253  7.4   83     7  30
92     59     254  9.2   81     7  31
93     39      83  6.9   81     8   1
94      9      24 13.8   81     8   2
95     16      77  7.4   82     8   3
99    122     255  4.0   89     8   7
100    89     229 10.3   90     8   8
101   110     207  8.0   90     8   9
104    44     192 11.5   86     8  12
```

```
105    28     273 11.5   82     8  13
106    65     157  9.7   80     8  14
108    22      71 10.3   77     8  16
109    59      51  6.3   79     8  17
110    23     115  7.4   76     8  18
111    31     244 10.9   78     8  19
112    44     190 10.3   78     8  20
113    21     259 15.5   77     8  21
114     9      36 14.3   72     8  22
116    45     212  9.7   79     8  24
117   168     238  3.4   81     8  25
118    73     215  8.0   86     8  26
120    76     203  9.7   97     8  28
121   118     225  2.3   94     8  29
122    84     237  6.3   96     8  30
123    85     188  6.3   94     8  31
124    96     167  6.9   91     9   1
125    78     197  5.1   92     9   2
126    73     183  2.8   93     9   3
127    91     189  4.6   93     9   4
128    47      95  7.4   87     9   5
129    32      92 15.5   84     9   6
130    20     252 10.9   80     9   7
131    23     220 10.3   78     9   8
132    21     230 10.9   75     9   9
133    24     259  9.7   73     9  10
134    44     236 14.9   81     9  11
135    21     259 15.5   76     9  12
136    28     238  6.3   77     9  13
137     9      24 10.9   71     9  14
138    13     112 11.5   71     9  15
139    46     237  6.9   78     9  16
140    18     224 13.8   67     9  17
141    13      27 10.3   76     9  18
142    24     238 10.3   68     9  19
143    16     201  8.0   82     9  20
144    13     238 12.6   64     9  21
145    23      14  9.2   71     9  22
146    36     139 10.3   81     9  23
147     7      49 10.3   69     9  24
148    14      20 16.6   63     9  25
149    30     193  6.9   70     9  26
151    14     191 14.3   75     9  28
152    18     131  8.0   76     9  29
153    20     223 11.5   68     9  30
> airquality[completed,][1:6,]
  Ozone Solar.R Wind Temp Month Day
1    41     190  7.4   67     5   1
2    36     118  8.0   72     5   2
3    12     149 12.6   74     5   3
4    18     313 11.5   62     5   4
7    23     299  8.6   65     5   7
8    19      99 13.8   59     5   8
> airquality[completed,][1:5,]
  Ozone Solar.R Wind Temp Month Day
1    41     190  7.4   67     5   1
2    36     118  8.0   72     5   2
3    12     149 12.6   74     5   3
4    18     313 11.5   62     5   4
7    23     299  8.6   65     5   7
> airquality[completed,][1:2,]
  Ozone Solar.R Wind Temp Month Day
1    41     190  7.4   67     5   1
2    36     118  8.0   72     5   2
> data <- read.table("foo.txt")
Error in file(file, "rt") : cannot open the connection
In addition: Warning message:
In file(file, "rt") : cannot open file 'foo.txt': No such file or directory
```

```
> pwd
Error: object 'pwd' not found
> getwd
function ()
.Internal(getwd())
<bytecode: 0x10227fae0>
<environment: namespace:base>
> getwd()
[1] "/Users/kiichi/work/r/class/2/week1"
> data <- read.table("foo.txt")
> data
          V1
1 hello,world
2         1,2
3     3.0,4.0
> rnum(data)
Error: could not find function "rnum"
> ncol(data)
[1] 1
> nrow(data)
[1] 3
> data <- read.csv("foot.txt")
Error in file(file, "rt") : cannot open the connection
In addition: Warning message:
In file(file, "rt") :
  cannot open file 'foot.txt': No such file or directory
> data <- read.csv("foo.txt")
> data <- read.csv("foo.txt")
> data
  hello world
1     1     2
2     3     4
> data <- read.table("foo.txt",comment.char="")
> data
          V1
1 hello,world
2         1,2
3     3.0,4.0
>
```