

Quiz answers

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September 17, 2017

What are the column names of the data frame?

```
## [1] "Ozone" "Solar.R" "Wind" "Temp" "Month" "Day"
```

What are the row names of the data frame?

```
print(rownames(dataset))
```

```
## [1] "1" "2" "3" "4" "5" "6" "7" "8" "9" "10" "11"
## [12] "12" "13" "14" "15" "16" "17" "18" "19" "20" "21" "22"
## [23] "23" "24" "25" "26" "27" "28" "29" "30" "31" "32" "33"
## [34] "34" "35" "36" "37" "38" "39" "40" "41" "42" "43" "44"
## [45] "45" "46" "47" "48" "49" "50" "51" "52" "53" "54" "55"
## [56] "56" "57" "58" "59" "60" "61" "62" "63" "64" "65" "66"
## [67] "67" "68" "69" "70" "71" "72" "73" "74" "75" "76" "77"
## [78] "78" "79" "80" "81" "82" "83" "84" "85" "86" "87" "88"
## [89] "89" "90" "91" "92" "93" "94" "95" "96" "97" "98" "99"
## [100] "100" "101" "102" "103" "104" "105" "106" "107" "108" "109" "110"
## [111] "111" "112" "113" "114" "115" "116" "117" "118" "119" "120" "121"
## [122] "122" "123" "124" "125" "126" "127" "128" "129" "130" "131" "132"
## [133] "133" "134" "135" "136" "137" "138" "139" "140" "141" "142" "143"
## [144] "144" "145" "146" "147" "148" "149" "150" "151" "152" "153"
```

Extract the first 6 rows of the data frame and print them to the console

```
print(dataset[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
```

How many observations (i.e. rows) are in this data frame?

```
print(nrow(dataset))
```

```
## [1] 153
```

Extract the last 6 rows of the data frame and print them to the console

```
print(tail(dataset, 6))
```

```
##      Ozone Solar.R Wind Temp Month Day
## 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
```

How many missing values are in the “Ozone” column of this data frame?

```
sum(is.na(dataset$Ozone))
```

```
## [1] 37
```

What is the mean of the “Ozone” column in this dataset? Exclude missing values (coded as NA) from this calculation.

```
mean(dataset$Ozone[!(is.na(dataset$Ozone))])
```

```
## [1] 42.12931
```

Extract the subset of rows of the data frame where Ozone values are above 31 and Temp values are above 90.

```
dataset[which(dataset$Ozone > 31 & dataset$Temp > 90),]
```

```
##      Ozone Solar.R Wind Temp Month Day
## 69      97     267  6.3   92     7   8
## 70      97     272  5.7   92     7   9
## 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
```

Use a for loop to create a vector of length 6 containing the mean of each column in the data frame (excluding all missing values).

```
for (number in 1:6){
  print(mean(dataset[!(is.na(dataset[, number])), number]))
}
```

```
## [1] 42.12931
## [1] 185.9315
## [1] 9.957516
## [1] 77.88235
## [1] 6.993464
## [1] 15.80392
```

Use the apply function to calculate the standard deviation of each column in the data frame (excluding all missing values).

```
apply(X = dataset, MARGIN = 2, FUN = function(number) print(sd(number[!is.na(number)])))
```

```
## [1] 32.98788
## [1] 90.05842
## [1] 3.523001
## [1] 9.46527
## [1] 1.416522
## [1] 8.86452
```

```
##      Ozone  Solar.R    Wind    Temp    Month    Day
## 32.987885 90.058422  3.523001  9.465270  1.416522  8.864520
```

Calculate the mean of “Ozone” for each Month in the data frame and create a vector containing the monthly means (exclude all missing values).

```
vec = vector(length = 5)
for(month in 5:9){
  vec[month-4] = mean(dataset[which(dataset$Month == month & (!( is.na(dataset$Ozone )))), 1])
}
```

Draw a random sample of 5 rows from the data frame

```
print(dataset[sample(1:153, 5),])
```

```
##      Ozone  Solar.R  Wind  Temp  Month  Day
## 36      NA      220   8.6   85     6    5
## 130     20      252  10.9   80     9    7
## 9        8       19  20.1   61     5    9
## 141     13       27  10.3   76     9   18
## 28     23       13  12.0   67     5   28
```