Data manipulation with R

```
getwd()
```

```
## [1] "/Users/SamShamsan/Desktop/RStudy"
```

```
setwd("/Users/SamShamsan/Desktop/RStudy")
myDataFrame <- read.csv("forestfires.csv", header=TRUE,
stringsAsFactors=FALSE)
head(myDataFrame, 10)
```

```
##    X Y month day FFMC   DMC    DC  ISI temp RH wind rain area
## 1  7 5   mar fri 86.2  26.2  94.3  5.1  8.2 51  6.7  0.0    0
## 2  7 4   oct tue 90.6  35.4 669.1  6.7 18.0 33  0.9  0.0    0
## 3  7 4   oct sat 90.6  43.7 686.9  6.7 14.6 33  1.3  0.0    0
## 4  8 6   mar fri 91.7  33.3  77.5  9.0  8.3 97  4.0  0.2    0
## 5  8 6   mar sun 89.3  51.3 102.2  9.6 11.4 99  1.8  0.0    0
## 6  8 6   aug sun 92.3  85.3 488.0 14.7 22.2 29  5.4  0.0    0
## 7  8 6   aug mon 92.3  88.9 495.6  8.5 24.1 27  3.1  0.0    0
## 8  8 6   aug mon 91.5 145.4 608.2 10.7  8.0 86  2.2  0.0    0
## 9  8 6   sep tue 91.0 129.5 692.6  7.0 13.1 63  5.4  0.0    0
## 10 7 5   sep sat 92.5  88.0 698.6  7.1 22.8 40  4.0  0.0    0
```

```
NROW(myDataFrame)
```

```
## [1] 517
```

```
sum(with(myDataFrame, area>0))
```

```
## [1] 270
```

```
sum(with(myDataFrame, rain>0))
```

```
## [1] 8
```

```
sum(with(myDataFrame, area>0 & rain>0))
```

```
## [1] 2
```

```
# 2 - Show the columns month, day, area of the all the observations.
newdata=(myDataFrame[,c(3,4,13)]);newdata
```

```
##     month day    area
## 1     mar fri    0.00
## 2     oct tue    0.00
## 3     oct sat    0.00
## 4     mar fri    0.00
## 5     mar sun    0.00
## 6     aug sun    0.00
## 7     aug mon    0.00
## 8     aug mon    0.00
## 9     sep tue    0.00
## 10    sep sat    0.00
## 11    sep sat    0.00
## 12    sep sat    0.00
## 13    aug fri    0.00
## 14    sep mon    0.00
## 15    sep wed    0.00
## 16    sep fri    0.00
## 17    mar sat    0.00
## 18    oct mon    0.00
## 19    mar wed    0.00
## 20    apr sat    0.00
## 21    sep tue    0.00
## 22    sep mon    0.00
## 23    jun sun    0.00
## 24    aug sat    0.00
## 25    aug sat    0.00
## 26    aug sun    0.00
## 27    sep fri    0.00
## 28    sep mon    0.00
## 29    sep sat    0.00
## 30    sep sun    0.00
## 31    sep fri    0.00
## 32    sep mon    0.00
## 33    sep fri    0.00
## 34    sep sun    0.00
## 35    sep mon    0.00
## 36    sep tue    0.00
```

```
## 37    oct tue    0.00
## 38    oct fri    0.00
## 39    oct sat    0.00
## 40    mar tue    0.00
## 41    jul tue    0.00
## 42    aug sat    0.00
## 43    aug tue    0.00
## 44    sep sat    0.00
## 45    sep wed    0.00
## 46    sep wed    0.00
## 47    sep mon    0.00
## 48    jul mon    0.00
## 49    mar mon    0.00
## 50    mar mon    0.00
## 51    sep thu    0.00
## 52    aug sun    0.00
## 53    aug wed    0.00
## 54    aug wed    0.00
## 55    aug thu    0.00
## 56    sep thu    0.00
## 57    sep tue    0.00
## 58    oct sun    0.00
## 59    feb mon    0.00
## 60    feb fri    0.00
## 61    mar sun    0.00
## 62    mar sun    0.00
## 63    aug thu    0.00
## 64    aug sun    0.00
## 65    aug mon    0.00
## 66    aug thu    0.00
## 67    sep fri    0.00
## 68    sep fri    0.00
## 69    sep fri    0.00
## 70    mar fri    0.00
## 71    mar fri    0.00
## 72    sep fri    0.00
## 73    mar fri    0.00
```

```
## 74    aug tue    0.00
## 75    sep fri    0.00
## 76    feb thu    0.00
## 77    feb fri    0.00
## 78    mar mon    0.00
## 79    aug fri    0.00
## 80    aug tue    0.00
## 81    aug sun    0.00
## 82    aug sun    0.00
## 83    aug tue    0.00
## 84    aug wed    0.00
## 85    aug thu    0.00
## 86    sep thu    0.00
## 87    sep thu    0.00
## 88    sep thu    0.00
## 89    sep sun    0.00
## 90    mar sat    0.00
## 91    aug sat    0.00
## 92    mar fri    0.00
## 93    aug sun    0.00
## 94    aug sun    0.00
## 95    aug mon    0.00
## 96    sep sun    0.00
## 97    feb sat    0.00
## 98    mar sat    0.00
## 99    aug sun    0.00
## 100   aug sun    0.00
## 101   aug sun    0.00
## 102   aug tue    0.00
## 103   aug tue    0.00
## 104   sep sat    0.00
## 105   jan sat    0.00
## 106   mar fri    0.00
## 107   mar thu    0.00
## 108   aug sun    0.00
## 109   sep sat    0.00
## 110   sep mon    0.00
```

```
## 111   mar fri    0.00
## 112   mar fri    0.00
## 113   sep sun    0.00
## 114   sep mon    0.00
## 115   mar tue    0.00
## 116   mar tue    0.00
## 117   mar sat    0.00
## 118   mar sat    0.00
## 119   mar mon    0.00
## 120   aug thu    0.00
## 121   aug mon    0.00
## 122   aug mon    0.00
## 123   sep sun    0.00
## 124   sep tue    0.00
## 125   sep fri    0.00
## 126   oct sun    0.00
## 127   mar mon    0.00
## 128   sep fri    0.00
## 129   oct wed    0.00
## 130   oct sun    0.00
## 131   feb sat    0.00
## 132   mar mon    0.00
## 133   mar sun    0.00
## 134   sep thu    0.00
## 135   mar tue    0.00
## 136   aug sat    0.00
## 137   sep sun    0.00
## 138   sep mon    0.00
## 139   jul tue    0.36
## 140   sep tue    0.43
## 141   sep mon    0.47
## 142   aug wed    0.55
## 143   aug fri    0.61
## 144   jul sat    0.71
## 145   aug wed    0.77
## 146   aug thu    0.90
## 147   mar mon    0.95
```

```
## 148   sep tue    0.96
## 149   aug tue    1.07
## 150   sep thu    1.12
## 151   jun fri    1.19
## 152   jul sun    1.36
## 153   jul sat    1.43
## 154   sep fri    1.46
## 155   sep sat    1.46
## 156   aug sun    1.56
## 157   sep sat    1.61
## 158   aug wed    1.63
## 159   aug wed    1.64
## 160   sep fri    1.69
## 161   mar mon    1.75
## 162   aug thu    1.90
## 163   mar sat    1.94
## 164   sep sat    1.95
## 165   sep sun    2.01
## 166   mar thu    2.14
## 167   aug wed    2.29
## 168   aug wed    2.51
## 169   mar fri    2.53
## 170   aug thu    2.55
## 171   sep wed    2.57
## 172   aug wed    2.69
## 173   aug sun    2.74
## 174   sep mon    3.07
## 175   aug sat    3.50
## 176   aug sat    4.53
## 177   apr thu    4.61
## 178   aug sun    4.69
## 179   sep wed    4.88
## 180   aug tue    5.23
## 181   sep sun    5.33
## 182   oct mon    5.44
## 183   feb sun    6.38
## 184   oct mon    6.83
```

```
## 185   aug fri    6.96
## 186   sep tue    7.04
## 187   mar sun    7.19
## 188   sep mon    7.30
## 189   mar sat    7.40
## 190   mar sun    8.24
## 191   mar fri    8.31
## 192   aug thu    8.68
## 193   aug tue    8.71
## 194   sep wed    9.41
## 195   aug tue   10.01
## 196   aug fri   10.02
## 197   apr thu   10.93
## 198   sep thu   11.06
## 199   sep tue   11.24
## 200   sep mon   11.32
## 201   sep tue   11.53
## 202   mar sun   12.10
## 203   feb sun   13.05
## 204   oct wed   13.70
## 205   mar sat   13.99
## 206   sep thu   14.57
## 207   aug sat   15.45
## 208   sep tue   17.20
## 209   sep fri   19.23
## 210   sep thu   23.41
## 211   oct sat   24.23
## 212   aug sat   26.00
## 213   sep fri   26.13
## 214   mar mon   27.35
## 215   mar sat   28.66
## 216   mar sat   28.66
## 217   sep sun   29.48
## 218   sep mon   30.32
## 219   sep wed   31.72
## 220   mar mon   31.86
## 221   aug sun   32.07
```

```
## 222   sep fri   35.88
## 223   mar mon   36.85
## 224   jul fri   37.02
## 225   sep wed   37.71
## 226   sep sun   48.55
## 227   oct mon   49.37
## 228   aug sat   58.30
## 229   sep sun   64.10
## 230   aug sat   71.30
## 231   sep wed   88.49
## 232   sep sun   95.18
## 233   sep tue  103.39
## 234   sep tue  105.66
## 235   sep sat  154.88
## 236   aug sun  196.48
## 237   sep sat  200.94
## 238   sep tue  212.88
## 239   sep sat 1090.84
## 240   apr sun    0.00
## 241   apr wed    0.00
## 242   apr fri    0.00
## 243   aug sun   10.13
## 244   aug sun    0.00
## 245   aug sun    2.87
## 246   aug sun    0.76
## 247   aug sun    0.09
## 248   aug wed    0.75
## 249   aug wed    0.00
## 250   aug wed    2.47
## 251   aug wed    0.68
## 252   aug wed    0.24
## 253   aug wed    0.21
## 254   aug thu    1.52
## 255   aug thu   10.34
## 256   aug thu    0.00
## 257   aug sat    8.02
## 258   aug sat    0.68
```

```
## 259   aug sat    0.00
## 260   aug sat    1.38
## 261   aug mon    8.85
## 262   aug fri    3.30
## 263   aug fri    4.25
## 264   aug fri    1.56
## 265   aug fri    6.54
## 266   aug tue    0.79
## 267   aug tue    0.17
## 268   aug tue    0.00
## 269   aug tue    0.00
## 270   aug tue    4.40
## 271   aug tue    0.52
## 272   aug tue    9.27
## 273   aug tue    3.09
## 274   dec sun    8.98
## 275   dec wed   11.19
## 276   dec thu    5.38
## 277   dec mon   17.85
## 278   dec mon   10.73
## 279   dec mon   22.03
## 280   dec mon    9.77
## 281   dec fri    9.27
## 282   dec tue   24.77
## 283   feb sun    0.00
## 284   feb wed    1.10
## 285   feb fri   24.24
## 286   jul sun    0.00
## 287   jul wed    0.00
## 288   jul sat    0.00
## 289   jul sat    0.00
## 290   jul sat    0.00
## 291   jul sat    0.00
## 292   jul sat    8.00
## 293   jul fri    2.64
## 294   jul tue   86.45
## 295   jul tue    6.57
```

```
## 296   jun sun    0.00
## 297   jun sun    0.90
## 298   jun sun    0.00
## 299   jun wed    0.00
## 300   jun sat    0.00
## 301   jun mon    0.00
## 302   jun mon    3.52
## 303   jun fri    0.00
## 304   jun fri    0.00
## 305   may sat    0.00
## 306   sep sun    0.00
## 307   sep sun    0.41
## 308   sep sun    5.18
## 309   sep sun    0.00
## 310   sep sun    0.00
## 311   sep sun    0.00
## 312   sep sun   14.29
## 313   sep sun    0.00
## 314   sep wed    0.00
## 315   sep wed    1.58
## 316   sep wed    0.00
## 317   sep thu    0.00
## 318   sep thu    3.78
## 319   sep thu    0.00
## 320   sep thu    4.41
## 321   sep thu   34.36
## 322   sep thu    7.21
## 323   sep thu    1.01
## 324   sep thu    2.18
## 325   sep thu    4.42
## 326   sep sat    0.00
## 327   sep sat    0.00
## 328   sep sat    0.00
## 329   sep sat    0.00
## 330   sep sat    3.33
## 331   sep sat    6.58
## 332   sep sat   15.64
```

```
## 333   sep sat   11.22
## 334   sep mon    2.13
## 335   sep mon    0.00
## 336   sep mon    0.00
## 337   sep mon    0.00
## 338   sep mon   56.04
## 339   sep mon    7.48
## 340   sep mon    1.47
## 341   sep mon    3.93
## 342   sep mon    0.00
## 343   sep mon    0.00
## 344   sep mon    2.18
## 345   sep mon    6.10
## 346   sep mon    5.83
## 347   sep mon   28.19
## 348   sep fri    0.00
## 349   sep fri    0.00
## 350   sep fri    1.64
## 351   sep fri    3.71
## 352   sep fri    7.31
## 353   sep fri    2.03
## 354   sep fri    1.72
## 355   sep fri    5.97
## 356   sep fri   13.06
## 357   sep fri    1.26
## 358   sep fri    0.00
## 359   sep fri    0.00
## 360   sep fri    8.12
## 361   sep fri    1.09
## 362   sep fri    3.94
## 363   sep fri    0.52
## 364   sep tue    2.93
## 365   sep tue    5.65
## 366   sep tue   20.03
## 367   sep tue    1.75
## 368   sep tue    0.00
## 369   sep sat   12.64
```

```
## 370   sep sun    0.00
## 371   sep sun   11.06
## 372   jul wed    0.00
## 373   aug sun    0.00
## 374   aug thu    0.00
## 375   sep fri   18.30
## 376   sep sat   39.35
## 377   aug mon    0.00
## 378   aug sat  174.63
## 379   mar thu    0.00
## 380   jan sun    0.00
## 381   jul wed    7.73
## 382   aug thu   16.33
## 383   aug wed    5.86
## 384   aug thu   42.87
## 385   aug sat   12.18
## 386   aug sun   16.00
## 387   sep sun   24.59
## 388   mar thu    0.00
## 389   aug fri   28.74
## 390   aug fri    0.00
## 391   feb mon    9.96
## 392   sep fri   30.18
## 393   sep sun   70.76
## 394   mar tue    0.00
## 395   feb mon    0.00
## 396   feb sun   51.78
## 397   sep sun    3.64
## 398   aug sun    3.63
## 399   aug sat    0.00
## 400   jun wed    0.00
## 401   jun wed    8.16
## 402   sep thu    4.95
## 403   aug fri    0.00
## 404   aug thu    0.00
## 405   sep wed    6.04
## 406   aug tue    0.00
```

```
## 407   sep sat    3.95
## 408   feb sat    0.00
## 409   sep fri    7.80
## 410   jul tue    0.00
## 411   feb fri    0.00
## 412   feb fri    4.62
## 413   jul mon    1.63
## 414   aug sat    0.00
## 415   aug sun    0.00
## 416   aug thu  746.28
## 417   jul tue    7.02
## 418   mar wed    0.00
## 419   aug sun    2.44
## 420   aug sun    3.05
## 421   aug wed  185.76
## 422   aug wed    0.00
## 423   jul sun    6.30
## 424   sep sat    0.72
## 425   aug sat    4.96
## 426   aug thu    0.00
## 427   aug thu    0.00
## 428   aug mon    2.35
## 429   aug thu    0.00
## 430   aug sun    3.20
## 431   sep thu    0.00
## 432   aug sat    6.36
## 433   aug thu    0.00
## 434   aug sun   15.34
## 435   aug fri    0.00
## 436   jul sat    0.00
## 437   aug mon    0.54
## 438   aug sat    0.00
## 439   aug sat    6.43
## 440   sep fri    0.33
## 441   sep fri    0.00
## 442   aug mon    1.23
## 443   apr mon    3.35
```

```
## 444   jul fri    0.00
## 445   sep fri    9.96
## 446   aug sun    0.00
## 447   aug sun    0.00
## 448   mar wed    0.00
## 449   sep wed    0.00
## 450   aug sun    0.00
## 451   aug wed    6.43
## 452   aug fri    9.71
## 453   aug mon    0.00
## 454   aug thu    0.00
## 455   aug thu    0.00
## 456   jul mon    0.00
## 457   aug thu    0.00
## 458   aug wed   82.75
## 459   aug sat    3.32
## 460   aug sat    1.94
## 461   aug sat    0.00
## 462   aug sat    0.00
## 463   sep sun    3.71
## 464   feb tue    5.39
## 465   feb tue    2.14
## 466   feb sat    6.84
## 467   mar mon    3.18
## 468   mar wed    5.55
## 469   mar thu    6.61
## 470   apr sun   61.13
## 471   apr sun    0.00
## 472   may fri   38.48
## 473   jun mon    1.94
## 474   jun sat   70.32
## 475   jun thu   10.08
## 476   jun thu    3.19
## 477   jul thu    1.76
## 478   jul sun    7.36
## 479   jul sun    2.21
## 480   jul mon  278.53
```

```
## 481   jul thu    2.75
## 482   jul thu    0.00
## 483   aug sun    1.29
## 484   aug sun    0.00
## 485   aug sun   26.43
## 486   aug mon    2.07
## 487   aug tue    2.00
## 488   aug tue   16.40
## 489   aug tue   46.70
## 490   aug wed    0.00
## 491   aug wed    0.00
## 492   aug thu    0.00
## 493   aug fri    0.00
## 494   aug fri   43.32
## 495   aug sat    8.59
## 496   aug mon    0.00
## 497   aug mon    2.77
## 498   aug tue   14.68
## 499   aug tue   40.54
## 500   aug tue   10.82
## 501   aug tue    0.00
## 502   aug tue    0.00
## 503   aug tue    0.00
## 504   aug wed    1.95
## 505   aug wed   49.59
## 506   aug thu    5.80
## 507   aug fri    0.00
## 508   aug fri    0.00
## 509   aug fri    0.00
## 510   aug fri    2.17
## 511   aug fri    0.43
## 512   aug sun    0.00
## 513   aug sun    6.44
## 514   aug sun   54.29
## 515   aug sun   11.16
## 516   aug sat    0.00
## 517   nov tue    0.00
```

```r
# 3- Show the columns month, day, area of the observations with a fire
withrain=myDataFrame[ which(myDataFrame$rain >0) , ]
newdatawithfire=(withrain[,c(3,4,13)]);newdatawithfire
```

```
##     month day  area
## 4     mar fri  0.00
## 244   aug sun  0.00
## 287   jul wed  0.00
## 500   aug tue 10.82
## 501   aug tue  0.00
## 502   aug tue  0.00
## 503   aug tue  0.00
## 510   aug fri  2.17
```

```r
#How large are the five largest fires (i.e., having largest area)
library(plyr)
head(arrange(myDataFrame,desc(area)), n = 5)
```

```
##   X Y month day FFMC   DMC    DC  ISI temp RH wind rain    area
## 1 6 5   sep sat 92.5 121.1 674.4  8.6 25.1 27  4.0    0 1090.84
## 2 8 6   aug thu 94.8 222.4 698.6 13.9 27.5 27  4.9    0  746.28
## 3 7 4   jul mon 89.2 103.9 431.6  6.4 22.6 57  4.9    0  278.53
## 4 1 2   sep tue 91.0 129.5 692.6  7.0 18.8 40  2.2    0  212.88
## 5 2 2   sep sat 92.5 121.1 674.4  8.6 18.2 46  1.8    0  200.94
```

```r
#A
cor(myDataFrame[,c(2,9,10,11,12,13)])
```

```
##                 Y        temp          RH        wind         rain
## Y     1.00000000 -0.02410308  0.06222073 -0.02034085  0.033234103
## temp -0.02410308  1.00000000 -0.52739034 -0.22711622  0.069490547
## RH    0.06222073 -0.52739034  1.00000000  0.06941007  0.099751223
## wind -0.02034085 -0.22711622  0.06941007  1.00000000  0.061118880
## rain  0.03323410  0.06949055  0.09975122  0.06111888  1.000000000
## area  0.04487323  0.09784411 -0.07551856  0.01231728 -0.007365729
##              area
## Y     0.044873225
## temp  0.097844107
## RH   -0.075518563
## wind  0.012317277
```

```
## rain -0.007365729
## area  1.000000000

myDataFrame$month <- factor(myDataFrame$month,
                            levels=paste(month.abb))
```