EDA-Heart

2022-09-24

R Markdown

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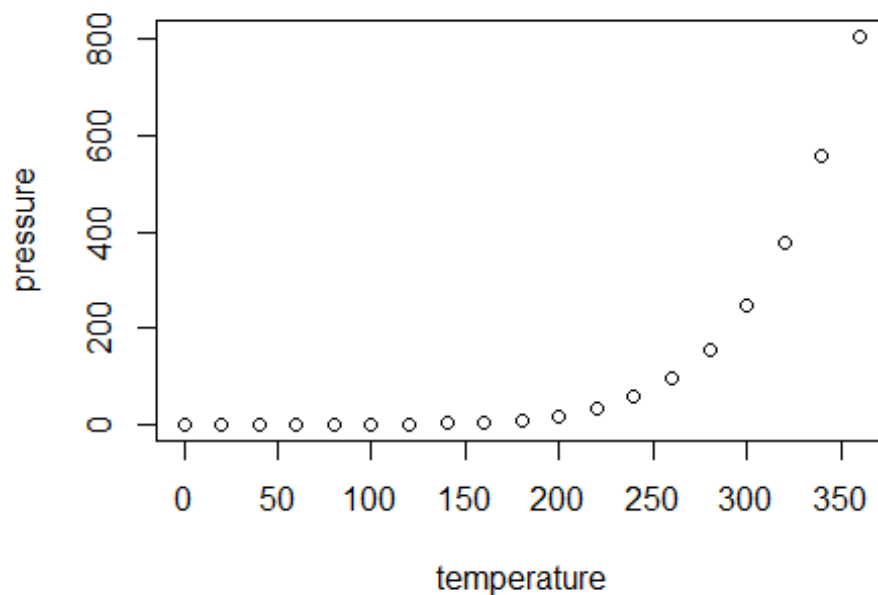
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)

##      speed           dist
##  Min.   : 4.0   Min.   :  2.00
##  1st Qu.:12.0   1st Qu.: 26.00
##  Median :15.0   Median : 36.00
##  Mean   :15.4   Mean   : 42.98
##  3rd Qu.:19.0   3rd Qu.: 56.00
##  Max.   :25.0   Max.   :120.00
```

Including Plots

You can also embed plots, for example:

Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

```
getwd()

## [1] "C:/Users/Dell/Documents"

df=read.csv('heart.csv')

head(df)

##    age sex cp trtbps chol fbs restecg thalachh exng oldpeak slp caa thall
output
## 1  63   1  3    145  233   1       0      150    0     2.3   0   0     1
1
## 2  37   1  2    130  250   0       1      187    0     3.5   0   0     2
1
## 3  41   0  1    130  204   0       0      172    0     1.4   2   0     2
1
## 4  56   1  1    120  236   0       1      178    0     0.8   2   0     2
1
## 5  57   0  0    120  354   0       1      163    1     0.6   2   0     2
1
## 6  57   1  0    140  192   0       1      148    0     0.4   1   0     1
1

tail(df)
```

```
##      age sex cp trtbps chol fbs restecg thalachh exng oldpeak slp caa thall
## 298  59   1  0    164  176   1       0       90    0     1.0   1   2     1
## 299  57   0  0    140  241   0       1      123    1     0.2   1   0     3
## 300  45   1  3    110  264   0       1      132    0     1.2   1   0     3
## 301  68   1  0    144  193   1       1      141    0     3.4   1   2     3
## 302  57   1  0    130  131   0       1      115    1     1.2   1   1     3
## 303  57   0  1    130  236   0       0      174    0     0.0   1   1     2
##      output
## 298       0
## 299       0
## 300       0
## 301       0
## 302       0
## 303       0
```

df[1]

```
##      age
## 1     63
## 2     37
## 3     41
## 4     56
## 5     57
## 6     57
## 7     56
## 8     44
## 9     52
## 10    57
## 11    54
## 12    48
## 13    49
## 14    64
## 15    58
## 16    50
## 17    58
## 18    66
## 19    43
## 20    69
## 21    59
## 22    44
## 23    42
## 24    61
## 25    40
## 26    71
## 27    59
## 28    51
## 29    65
## 30    53
## 31    41
## 32    65
```

```
## 33      44
## 34      54
## 35      51
## 36      46
## 37      54
## 38      54
## 39      65
## 40      65
## 41      51
## 42      48
## 43      45
## 44      53
## 45      39
## 46      52
## 47      44
## 48      47
## 49      53
## 50      53
## 51      51
## 52      66
## 53      62
## 54      44
## 55      63
## 56      52
## 57      48
## 58      45
## 59      34
## 60      57
## 61      71
## 62      54
## 63      52
## 64      41
## 65      58
## 66      35
## 67      51
## 68      45
## 69      44
## 70      62
## 71      54
## 72      51
## 73      29
## 74      51
## 75      43
## 76      55
## 77      51
## 78      59
## 79      52
## 80      58
## 81      41
## 82      45
```

```
## 83    60
## 84    52
## 85    42
## 86    67
## 87    68
## 88    46
## 89    54
## 90    58
## 91    48
## 92    57
## 93    52
## 94    54
## 95    45
## 96    53
## 97    62
## 98    52
## 99    43
## 100   53
## 101   42
## 102   59
## 103   63
## 104   42
## 105   50
## 106   68
## 107   69
## 108   45
## 109   50
## 110   50
## 111   64
## 112   57
## 113   64
## 114   43
## 115   55
## 116   37
## 117   41
## 118   56
## 119   46
## 120   46
## 121   64
## 122   59
## 123   41
## 124   54
## 125   39
## 126   34
## 127   47
## 128   67
## 129   52
## 130   74
## 131   54
## 132   49
```

```
## 133    42
## 134    41
## 135    41
## 136    49
## 137    60
## 138    62
## 139    57
## 140    64
## 141    51
## 142    43
## 143    42
## 144    67
## 145    76
## 146    70
## 147    44
## 148    60
## 149    44
## 150    42
## 151    66
## 152    71
## 153    64
## 154    66
## 155    39
## 156    58
## 157    47
## 158    35
## 159    58
## 160    56
## 161    56
## 162    55
## 163    41
## 164    38
## 165    38
## 166    67
## 167    67
## 168    62
## 169    63
## 170    53
## 171    56
## 172    48
## 173    58
## 174    58
## 175    60
## 176    40
## 177    60
## 178    64
## 179    43
## 180    57
## 181    55
## 182    65
```

```
## 183   61
## 184   58
## 185   50
## 186   44
## 187   60
## 188   54
## 189   50
## 190   41
## 191   51
## 192   58
## 193   54
## 194   60
## 195   60
## 196   59
## 197   46
## 198   67
## 199   62
## 200   65
## 201   44
## 202   60
## 203   58
## 204   68
## 205   62
## 206   52
## 207   59
## 208   60
## 209   49
## 210   59
## 211   57
## 212   61
## 213   39
## 214   61
## 215   56
## 216   43
## 217   62
## 218   63
## 219   65
## 220   48
## 221   63
## 222   55
## 223   65
## 224   56
## 225   54
## 226   70
## 227   62
## 228   35
## 229   59
## 230   64
## 231   47
## 232   57
```

```
## 233   55
## 234   64
## 235   70
## 236   51
## 237   58
## 238   60
## 239   77
## 240   35
## 241   70
## 242   59
## 243   64
## 244   57
## 245   56
## 246   48
## 247   56
## 248   66
## 249   54
## 250   69
## 251   51
## 252   43
## 253   62
## 254   67
## 255   59
## 256   45
## 257   58
## 258   50
## 259   62
## 260   38
## 261   66
## 262   52
## 263   53
## 264   63
## 265   54
## 266   66
## 267   55
## 268   49
## 269   54
## 270   56
## 271   46
## 272   61
## 273   67
## 274   58
## 275   47
## 276   52
## 277   58
## 278   57
## 279   58
## 280   61
## 281   42
## 282   52
```

```
## 283    59
## 284    40
## 285    61
## 286    46
## 287    59
## 288    57
## 289    57
## 290    55
## 291    61
## 292    58
## 293    58
## 294    67
## 295    44
## 296    63
## 297    63
## 298    59
## 299    57
## 300    45
## 301    68
## 302    57
## 303    57
```

df[-1]

```
##      sex cp trtbps chol fbs restecg thalachh exng oldpeak slp caa thall
output
## 1     1  3    145  233   1       0      150    0     2.3   0   0     1
1
## 2     1  2    130  250   0       1      187    0     3.5   0   0     2
1
## 3     0  1    130  204   0       0      172    0     1.4   2   0     2
1
## 4     1  1    120  236   0       1      178    0     0.8   2   0     2
1
## 5     0  0    120  354   0       1      163    1     0.6   2   0     2
1
## 6     1  0    140  192   0       1      148    0     0.4   1   0     1
1
## 7     0  1    140  294   0       0      153    0     1.3   1   0     2
1
## 8     1  1    120  263   0       1      173    0     0.0   2   0     3
1
## 9     1  2    172  199   1       1      162    0     0.5   2   0     3
1
## 10    1  2    150  168   0       1      174    0     1.6   2   0     2
1
## 11    1  0    140  239   0       1      160    0     1.2   2   0     2
1
## 12    0  2    130  275   0       1      139    0     0.2   2   0     2
1
```

```
## 13   1  1  130  266  0  1  171  0  0.6  2  0  2
## 1
## 14   1  3  110  211  0  0  144  1  1.8  1  0  2
## 1
## 15   0  3  150  283  1  0  162  0  1.0  2  0  2
## 1
## 16   0  2  120  219  0  1  158  0  1.6  1  0  2
## 1
## 17   0  2  120  340  0  1  172  0  0.0  2  0  2
## 1
## 18   0  3  150  226  0  1  114  0  2.6  0  0  2
## 1
## 19   1  0  150  247  0  1  171  0  1.5  2  0  2
## 1
## 20   0  3  140  239  0  1  151  0  1.8  2  2  2
## 1
## 21   1  0  135  234  0  1  161  0  0.5  1  0  3
## 1
## 22   1  2  130  233  0  1  179  1  0.4  2  0  2
## 1
## 23   1  0  140  226  0  1  178  0  0.0  2  0  2
## 1
## 24   1  2  150  243  1  1  137  1  1.0  1  0  2
## 1
## 25   1  3  140  199  0  1  178  1  1.4  2  0  3
## 1
## 26   0  1  160  302  0  1  162  0  0.4  2  2  2
## 1
## 27   1  2  150  212  1  1  157  0  1.6  2  0  2
## 1
## 28   1  2  110  175  0  1  123  0  0.6  2  0  2
## 1
## 29   0  2  140  417  1  0  157  0  0.8  2  1  2
## 1
## 30   1  2  130  197  1  0  152  0  1.2  0  0  2
## 1
## 31   0  1  105  198  0  1  168  0  0.0  2  1  2
## 1
## 32   1  0  120  177  0  1  140  0  0.4  2  0  3
## 1
## 33   1  1  130  219  0  0  188  0  0.0  2  0  2
## 1
## 34   1  2  125  273  0  0  152  0  0.5  0  1  2
## 1
## 35   1  3  125  213  0  0  125  1  1.4  2  1  2
## 1
## 36   0  2  142  177  0  0  160  1  1.4  0  0  2
## 1
## 37   0  2  135  304  1  1  170  0  0.0  2  0  2
## 1
```

```
## 38   1 2   150 232   0   0   165   0   1.6   2   0   3
## 1
## 39   0 2   155 269   0   1   148   0   0.8   2   0   2
## 1
## 40   0 2   160 360   0   0   151   0   0.8   2   0   2
## 1
## 41   0 2   140 308   0   0   142   0   1.5   2   1   2
## 1
## 42   1 1   130 245   0   0   180   0   0.2   1   0   2
## 1
## 43   1 0   104 208   0   0   148   1   3.0   1   0   2
## 1
## 44   0 0   130 264   0   0   143   0   0.4   1   0   2
## 1
## 45   1 2   140 321   0   0   182   0   0.0   2   0   2
## 1
## 46   1 1   120 325   0   1   172   0   0.2   2   0   2
## 1
## 47   1 2   140 235   0   0   180   0   0.0   2   0   2
## 1
## 48   1 2   138 257   0   0   156   0   0.0   2   0   2
## 1
## 49   0 2   128 216   0   0   115   0   0.0   2   0   0
## 1
## 50   0 0   138 234   0   0   160   0   0.0   2   0   2
## 1
## 51   0 2   130 256   0   0   149   0   0.5   2   0   2
## 1
## 52   1 0   120 302   0   0   151   0   0.4   1   0   2
## 1
## 53   1 2   130 231   0   1   146   0   1.8   1   3   3
## 1
## 54   0 2   108 141   0   1   175   0   0.6   1   0   2
## 1
## 55   0 2   135 252   0   0   172   0   0.0   2   0   2
## 1
## 56   1 1   134 201   0   1   158   0   0.8   2   1   2
## 1
## 57   1 0   122 222   0   0   186   0   0.0   2   0   2
## 1
## 58   1 0   115 260   0   0   185   0   0.0   2   0   2
## 1
## 59   1 3   118 182   0   0   174   0   0.0   2   0   2
## 1
## 60   0 0   128 303   0   0   159   0   0.0   2   1   2
## 1
## 61   0 2   110 265   1   0   130   0   0.0   2   1   2
## 1
## 62   1 1   108 309   0   1   156   0   0.0   2   0   3
## 1
```

## 63	1	3	118	186	0	0	190	0	0.0	1	0	1	1
## 64	1	1	135	203	0	1	132	0	0.0	1	0	1	1
## 65	1	2	140	211	1	0	165	0	0.0	2	0	2	1
## 66	0	0	138	183	0	1	182	0	1.4	2	0	2	1
## 67	1	2	100	222	0	1	143	1	1.2	1	0	2	1
## 68	0	1	130	234	0	0	175	0	0.6	1	0	2	1
## 69	1	1	120	220	0	1	170	0	0.0	2	0	2	1
## 70	0	0	124	209	0	1	163	0	0.0	2	0	2	1
## 71	1	2	120	258	0	0	147	0	0.4	1	0	3	1
## 72	1	2	94	227	0	1	154	1	0.0	2	1	3	1
## 73	1	1	130	204	0	0	202	0	0.0	2	0	2	1
## 74	1	0	140	261	0	0	186	1	0.0	2	0	2	1
## 75	0	2	122	213	0	1	165	0	0.2	1	0	2	1
## 76	0	1	135	250	0	0	161	0	1.4	1	0	2	1
## 77	1	2	125	245	1	0	166	0	2.4	1	0	2	1
## 78	1	1	140	221	0	1	164	1	0.0	2	0	2	1
## 79	1	1	128	205	1	1	184	0	0.0	2	0	2	1
## 80	1	2	105	240	0	0	154	1	0.6	1	0	3	1
## 81	1	2	112	250	0	1	179	0	0.0	2	0	2	1
## 82	1	1	128	308	0	0	170	0	0.0	2	0	2	1
## 83	0	2	102	318	0	1	160	0	0.0	2	1	2	1
## 84	1	3	152	298	1	1	178	0	1.2	1	0	3	1
## 85	0	0	102	265	0	0	122	0	0.6	1	0	2	1
## 86	0	2	115	564	0	0	160	0	1.6	1	0	3	1
## 87	1	2	118	277	0	1	151	0	1.0	2	1	3	1

```
## 88    1  1  101  197  1    1  156  0  0.0  2  0  3
## 1
## 89    0  2  110  214  0    1  158  0  1.6  1  0  2
## 1
## 90    0  0  100  248  0    0  122  0  1.0  1  0  2
## 1
## 91    1  2  124  255  1    1  175  0  0.0  2  2  2
## 1
## 92    1  0  132  207  0    1  168  1  0.0  2  0  3
## 1
## 93    1  2  138  223  0    1  169  0  0.0  2  4  2
## 1
## 94    0  1  132  288  1    0  159  1  0.0  2  1  2
## 1
## 95    0  1  112  160  0    1  138  0  0.0  1  0  2
## 1
## 96    1  0  142  226  0    0  111  1  0.0  2  0  3
## 1
## 97    0  0  140  394  0    0  157  0  1.2  1  0  2
## 1
## 98    1  0  108  233  1    1  147  0  0.1  2  3  3
## 1
## 99    1  2  130  315  0    1  162  0  1.9  2  1  2
## 1
## 100   1  2  130  246  1    0  173  0  0.0  2  3  2
## 1
## 101   1  3  148  244  0    0  178  0  0.8  2  2  2
## 1
## 102   1  3  178  270  0    0  145  0  4.2  0  0  3
## 1
## 103   0  1  140  195  0    1  179  0  0.0  2  2  2
## 1
## 104   1  2  120  240  1    1  194  0  0.8  0  0  3
## 1
## 105   1  2  129  196  0    1  163  0  0.0  2  0  2
## 1
## 106   0  2  120  211  0    0  115  0  1.5  1  0  2
## 1
## 107   1  3  160  234  1    0  131  0  0.1  1  1  2
## 1
## 108   0  0  138  236  0    0  152  1  0.2  1  0  2
## 1
## 109   0  1  120  244  0    1  162  0  1.1  2  0  2
## 1
## 110   0  0  110  254  0    0  159  0  0.0  2  0  2
## 1
## 111   0  0  180  325  0    1  154  1  0.0  2  0  2
## 1
## 112   1  2  150  126  1    1  173  0  0.2  2  1  3
## 1
```

```
## 113 0 2 140 313 0 1 133 0 0.2 2 0 3
1
## 114 1 0 110 211 0 1 161 0 0.0 2 0 3
1
## 115 1 1 130 262 0 1 155 0 0.0 2 0 2
1
## 116 0 2 120 215 0 1 170 0 0.0 2 0 2
1
## 117 1 2 130 214 0 0 168 0 2.0 1 0 2
1
## 118 1 3 120 193 0 0 162 0 1.9 1 0 3
1
## 119 0 1 105 204 0 1 172 0 0.0 2 0 2
1
## 120 0 0 138 243 0 0 152 1 0.0 1 0 2
1
## 121 0 0 130 303 0 1 122 0 2.0 1 2 2
1
## 122 1 0 138 271 0 0 182 0 0.0 2 0 2
1
## 123 0 2 112 268 0 0 172 1 0.0 2 0 2
1
## 124 0 2 108 267 0 0 167 0 0.0 2 0 2
1
## 125 0 2  94 199 0 1 179 0 0.0 2 0 2
1
## 126 0 1 118 210 0 1 192 0 0.7 2 0 2
1
## 127 1 0 112 204 0 1 143 0 0.1 2 0 2
1
## 128 0 2 152 277 0 1 172 0 0.0 2 1 2
1
## 129 0 2 136 196 0 0 169 0 0.1 1 0 2
1
## 130 0 1 120 269 0 0 121 1 0.2 2 1 2
1
## 131 0 2 160 201 0 1 163 0 0.0 2 1 2
1
## 132 0 1 134 271 0 1 162 0 0.0 1 0 2
1
## 133 1 1 120 295 0 1 162 0 0.0 2 0 2
1
## 134 1 1 110 235 0 1 153 0 0.0 2 0 2
1
## 135 0 1 126 306 0 1 163 0 0.0 2 0 2
1
## 136 0 0 130 269 0 1 163 0 0.0 2 0 2
1
## 137 0 2 120 178 1 1  96 0 0.0 2 0 2
1
```

```
## 138 1 1 128 208 1 0 140 0 0.0 2 0 2
1
## 139 1 0 110 201 0 1 126 1 1.5 1 0 1
1
## 140 1 0 128 263 0 1 105 1 0.2 1 1 3
1
## 141 0 2 120 295 0 0 157 0 0.6 2 0 2
1
## 142 1 0 115 303 0 1 181 0 1.2 1 0 2
1
## 143 0 2 120 209 0 1 173 0 0.0 1 0 2
1
## 144 0 0 106 223 0 1 142 0 0.3 2 2 2
1
## 145 0 2 140 197 0 2 116 0 1.1 1 0 2
1
## 146 1 1 156 245 0 0 143 0 0.0 2 0 2
1
## 147 0 2 118 242 0 1 149 0 0.3 1 1 2
1
## 148 0 3 150 240 0 1 171 0 0.9 2 0 2
1
## 149 1 2 120 226 0 1 169 0 0.0 2 0 2
1
## 150 1 2 130 180 0 1 150 0 0.0 2 0 2
1
## 151 1 0 160 228 0 0 138 0 2.3 2 0 1
1
## 152 0 0 112 149 0 1 125 0 1.6 1 0 2
1
## 153 1 3 170 227 0 0 155 0 0.6 1 0 3
1
## 154 0 2 146 278 0 0 152 0 0.0 1 1 2
1
## 155 0 2 138 220 0 1 152 0 0.0 1 0 2
1
## 156 0 0 130 197 0 1 131 0 0.6 1 0 2
1
## 157 1 2 130 253 0 1 179 0 0.0 2 0 2
1
## 158 1 1 122 192 0 1 174 0 0.0 2 0 2
1
## 159 1 1 125 220 0 1 144 0 0.4 1 4 3
1
## 160 1 1 130 221 0 0 163 0 0.0 2 0 3
1
## 161 1 1 120 240 0 1 169 0 0.0 0 0 2
1
## 162 0 1 132 342 0 1 166 0 1.2 2 0 2
1
```

```
## 163   1  1    120  157  0    1    182  0    0.0  2  0    2
1
## 164   1  2    138  175  0    1    173  0    0.0  2  4    2
1
## 165   1  2    138  175  0    1    173  0    0.0  2  4    2
1
## 166   1  0    160  286  0    0    108  1    1.5  1  3    2
0
## 167   1  0    120  229  0    0    129  1    2.6  1  2    3
0
## 168   0  0    140  268  0    0    160  0    3.6  0  2    2
0
## 169   1  0    130  254  0    0    147  0    1.4  1  1    3
0
## 170   1  0    140  203  1    0    155  1    3.1  0  0    3
0
## 171   1  2    130  256  1    0    142  1    0.6  1  1    1
0
## 172   1  1    110  229  0    1    168  0    1.0  0  0    3
0
## 173   1  1    120  284  0    0    160  0    1.8  1  0    2
0
## 174   1  2    132  224  0    0    173  0    3.2  2  2    3
0
## 175   1  0    130  206  0    0    132  1    2.4  1  2    3
0
## 176   1  0    110  167  0    0    114  1    2.0  1  0    3
0
## 177   1  0    117  230  1    1    160  1    1.4  2  2    3
0
## 178   1  2    140  335  0    1    158  0    0.0  2  0    2
0
## 179   1  0    120  177  0    0    120  1    2.5  1  0    3
0
## 180   1  0    150  276  0    0    112  1    0.6  1  1    1
0
## 181   1  0    132  353  0    1    132  1    1.2  1  1    3
0
## 182   0  0    150  225  0    0    114  0    1.0  1  3    3
0
## 183   0  0    130  330  0    0    169  0    0.0  2  0    2
0
## 184   1  2    112  230  0    0    165  0    2.5  1  1    3
0
## 185   1  0    150  243  0    0    128  0    2.6  1  0    3
0
## 186   1  0    112  290  0    0    153  0    0.0  2  1    2
0
## 187   1  0    130  253  0    1    144  1    1.4  2  1    3
0
```

```
## 188   1   0   124   266   0   0   109   1   2.2   1   1   3
## 0
## 189   1   2   140   233   0   1   163   0   0.6   1   1   3
## 0
## 190   1   0   110   172   0   0   158   0   0.0   2   0   3
## 0
## 191   0   0   130   305   0   1   142   1   1.2   1   0   3
## 0
## 192   1   0   128   216   0   0   131   1   2.2   1   3   3
## 0
## 193   1   0   120   188   0   1   113   0   1.4   1   1   3
## 0
## 194   1   0   145   282   0   0   142   1   2.8   1   2   3
## 0
## 195   1   2   140   185   0   0   155   0   3.0   1   0   2
## 0
## 196   1   0   170   326   0   0   140   1   3.4   0   0   3
## 0
## 197   1   2   150   231   0   1   147   0   3.6   1   0   2
## 0
## 198   1   0   125   254   1   1   163   0   0.2   1   2   3
## 0
## 199   1   0   120   267   0   1    99   1   1.8   1   2   3
## 0
## 200   1   0   110   248   0   0   158   0   0.6   2   2   1
## 0
## 201   1   0   110   197   0   0   177   0   0.0   2   1   2
## 0
## 202   1   0   125   258   0   0   141   1   2.8   1   1   3
## 0
## 203   1   0   150   270   0   0   111   1   0.8   2   0   3
## 0
## 204   1   2   180   274   1   0   150   1   1.6   1   0   3
## 0
## 205   0   0   160   164   0   0   145   0   6.2   0   3   3
## 0
## 206   1   0   128   255   0   1   161   1   0.0   2   1   3
## 0
## 207   1   0   110   239   0   0   142   1   1.2   1   1   3
## 0
## 208   0   0   150   258   0   0   157   0   2.6   1   2   3
## 0
## 209   1   2   120   188   0   1   139   0   2.0   1   3   3
## 0
## 210   1   0   140   177   0   1   162   1   0.0   2   1   3
## 0
## 211   1   2   128   229   0   0   150   0   0.4   1   1   3
## 0
## 212   1   0   120   260   0   1   140   1   3.6   1   1   3
## 0
```

## 213	1	0	118	219	0	1	140	0	1.2	1	0	3	0
## 214	0	0	145	307	0	0	146	1	1.0	1	0	3	0
## 215	1	0	125	249	1	0	144	1	1.2	1	1	2	0
## 216	0	0	132	341	1	0	136	1	3.0	1	0	3	0
## 217	0	2	130	263	0	1	97	0	1.2	1	1	3	0
## 218	1	0	130	330	1	0	132	1	1.8	2	3	3	0
## 219	1	0	135	254	0	0	127	0	2.8	1	1	3	0
## 220	1	0	130	256	1	0	150	1	0.0	2	2	3	0
## 221	0	0	150	407	0	0	154	0	4.0	1	3	3	0
## 222	1	0	140	217	0	1	111	1	5.6	0	0	3	0
## 223	1	3	138	282	1	0	174	0	1.4	1	1	2	0
## 224	0	0	200	288	1	0	133	1	4.0	0	2	3	0
## 225	1	0	110	239	0	1	126	1	2.8	1	1	3	0
## 226	1	0	145	174	0	1	125	1	2.6	0	0	3	0
## 227	1	1	120	281	0	0	103	0	1.4	1	1	3	0
## 228	1	0	120	198	0	1	130	1	1.6	1	0	3	0
## 229	1	3	170	288	0	0	159	0	0.2	1	0	3	0
## 230	1	2	125	309	0	1	131	1	1.8	1	0	3	0
## 231	1	2	108	243	0	1	152	0	0.0	2	0	2	0
## 232	1	0	165	289	1	0	124	0	1.0	1	3	3	0
## 233	1	0	160	289	0	0	145	1	0.8	1	1	3	0
## 234	1	0	120	246	0	0	96	1	2.2	0	1	2	0
## 235	1	0	130	322	0	0	109	0	2.4	1	3	2	0
## 236	1	0	140	299	0	1	173	1	1.6	2	0	3	0
## 237	1	0	125	300	0	0	171	0	0.0	2	2	3	0

```
## 238    1   0   140   293   0   0   170   0   1.2   1   2   3
## 0
## 239    1   0   125   304   0   0   162   1   0.0   2   3   2
## 0
## 240    1   0   126   282   0   0   156   1   0.0   2   0   3
## 0
## 241    1   2   160   269   0   1   112   1   2.9   1   1   3
## 0
## 242    0   0   174   249   0   1   143   1   0.0   1   0   2
## 0
## 243    1   0   145   212   0   0   132   0   2.0   1   2   1
## 0
## 244    1   0   152   274   0   1    88   1   1.2   1   1   3
## 0
## 245    1   0   132   184   0   0   105   1   2.1   1   1   1
## 0
## 246    1   0   124   274   0   0   166   0   0.5   1   0   3
## 0
## 247    0   0   134   409   0   0   150   1   1.9   1   2   3
## 0
## 248    1   1   160   246   0   1   120   1   0.0   1   3   1
## 0
## 249    1   1   192   283   0   0   195   0   0.0   2   1   3
## 0
## 250    1   2   140   254   0   0   146   0   2.0   1   3   3
## 0
## 251    1   0   140   298   0   1   122   1   4.2   1   3   3
## 0
## 252    1   0   132   247   1   0   143   1   0.1   1   4   3
## 0
## 253    0   0   138   294   1   1   106   0   1.9   1   3   2
## 0
## 254    1   0   100   299   0   0   125   1   0.9   1   2   2
## 0
## 255    1   3   160   273   0   0   125   0   0.0   2   0   2
## 0
## 256    1   0   142   309   0   0   147   1   0.0   1   3   3
## 0
## 257    1   0   128   259   0   0   130   1   3.0   1   2   3
## 0
## 258    1   0   144   200   0   0   126   1   0.9   1   0   3
## 0
## 259    0   0   150   244   0   1   154   1   1.4   1   0   2
## 0
## 260    1   3   120   231   0   1   182   1   3.8   1   0   3
## 0
## 261    0   0   178   228   1   1   165   1   1.0   1   2   3
## 0
## 262    1   0   112   230   0   1   160   0   0.0   2   1   2
## 0
```

```
## 263   1   0   123   282   0   1    95   1   2.0   1   2   3
## 0
## 264   0   0   108   269   0   1   169   1   1.8   1   2   2
## 0
## 265   1   0   110   206   0   0   108   1   0.0   1   1   2
## 0
## 266   1   0   112   212   0   0   132   1   0.1   2   1   2
## 0
## 267   0   0   180   327   0   2   117   1   3.4   1   0   2
## 0
## 268   1   2   118   149   0   0   126   0   0.8   2   3   2
## 0
## 269   1   0   122   286   0   0   116   1   3.2   1   2   2
## 0
## 270   1   0   130   283   1   0   103   1   1.6   0   0   3
## 0
## 271   1   0   120   249   0   0   144   0   0.8   2   0   3
## 0
## 272   1   3   134   234   0   1   145   0   2.6   1   2   2
## 0
## 273   1   0   120   237   0   1    71   0   1.0   1   0   2
## 0
## 274   1   0   100   234   0   1   156   0   0.1   2   1   3
## 0
## 275   1   0   110   275   0   0   118   1   1.0   1   1   2
## 0
## 276   1   0   125   212   0   1   168   0   1.0   2   2   3
## 0
## 277   1   0   146   218   0   1   105   0   2.0   1   1   3
## 0
## 278   1   1   124   261   0   1   141   0   0.3   2   0   3
## 0
## 279   0   1   136   319   1   0   152   0   0.0   2   2   2
## 0
## 280   1   0   138   166   0   0   125   1   3.6   1   1   2
## 0
## 281   1   0   136   315   0   1   125   1   1.8   1   0   1
## 0
## 282   1   0   128   204   1   1   156   1   1.0   1   0   0
## 0
## 283   1   2   126   218   1   1   134   0   2.2   1   1   1
## 0
## 284   1   0   152   223   0   1   181   0   0.0   2   0   3
## 0
## 285   1   0   140   207   0   0   138   1   1.9   2   1   3
## 0
## 286   1   0   140   311   0   1   120   1   1.8   1   2   3
## 0
## 287   1   3   134   204   0   1   162   0   0.8   2   2   2
## 0
```

```
## 288   1   1    154  232   0      0       164    0    0.0  2   1   2
0
## 289   1   0    110  335   0      1       143    1    3.0  1   1   3
0
## 290   0   0    128  205   0      2       130    1    2.0  1   1   3
0
## 291   1   0    148  203   0      1       161    0    0.0  2   1   3
0
## 292   1   0    114  318   0      2       140    0    4.4  0   3   1
0
## 293   0   0    170  225   1      0       146    1    2.8  1   2   1
0
## 294   1   2    152  212   0      0       150    0    0.8  1   0   3
0
## 295   1   0    120  169   0      1       144    1    2.8  0   0   1
0
## 296   1   0    140  187   0      0       144    1    4.0  2   2   3
0
## 297   0   0    124  197   0      1       136    1    0.0  1   0   2
0
## 298   1   0    164  176   1      0        90    0    1.0  1   2   1
0
## 299   0   0    140  241   0      1       123    1    0.2  1   0   3
0
## 300   1   3    110  264   0      1       132    0    1.2  1   0   3
0
## 301   1   0    144  193   1      1       141    0    3.4  1   2   3
0
## 302   1   0    130  131   0      1       115    1    1.2  1   1   3
0
## 303   0   1    130  236   0      0       174    0    0.0  1   1   2
0
```

```
df[1:3]
```

```
##      age sex cp
## 1     63   1   3
## 2     37   1   2
## 3     41   0   1
## 4     56   1   1
## 5     57   0   0
## 6     57   1   0
## 7     56   0   1
## 8     44   1   1
## 9     52   1   2
## 10    57   1   2
## 11    54   1   0
## 12    48   0   2
## 13    49   1   1
## 14    64   1   3
```

```
## 15   58   0   3
## 16   50   0   2
## 17   58   0   2
## 18   66   0   3
## 19   43   1   0
## 20   69   0   3
## 21   59   1   0
## 22   44   1   2
## 23   42   1   0
## 24   61   1   2
## 25   40   1   3
## 26   71   0   1
## 27   59   1   2
## 28   51   1   2
## 29   65   0   2
## 30   53   1   2
## 31   41   0   1
## 32   65   1   0
## 33   44   1   1
## 34   54   1   2
## 35   51   1   3
## 36   46   0   2
## 37   54   0   2
## 38   54   1   2
## 39   65   0   2
## 40   65   0   2
## 41   51   0   2
## 42   48   1   1
## 43   45   1   0
## 44   53   0   0
## 45   39   1   2
## 46   52   1   1
## 47   44   1   2
## 48   47   1   2
## 49   53   0   2
## 50   53   0   0
## 51   51   0   2
## 52   66   1   0
## 53   62   1   2
## 54   44   0   2
## 55   63   0   2
## 56   52   1   1
## 57   48   1   0
## 58   45   1   0
## 59   34   1   3
## 60   57   0   0
## 61   71   0   2
## 62   54   1   1
## 63   52   1   3
## 64   41   1   1
```

```
## 65    58    1    2
## 66    35    0    0
## 67    51    1    2
## 68    45    0    1
## 69    44    1    1
## 70    62    0    0
## 71    54    1    2
## 72    51    1    2
## 73    29    1    1
## 74    51    1    0
## 75    43    0    2
## 76    55    0    1
## 77    51    1    2
## 78    59    1    1
## 79    52    1    1
## 80    58    1    2
## 81    41    1    2
## 82    45    1    1
## 83    60    0    2
## 84    52    1    3
## 85    42    0    0
## 86    67    0    2
## 87    68    1    2
## 88    46    1    1
## 89    54    0    2
## 90    58    0    0
## 91    48    1    2
## 92    57    1    0
## 93    52    1    2
## 94    54    0    1
## 95    45    0    1
## 96    53    1    0
## 97    62    0    0
## 98    52    1    0
## 99    43    1    2
## 100   53    1    2
## 101   42    1    3
## 102   59    1    3
## 103   63    0    1
## 104   42    1    2
## 105   50    1    2
## 106   68    0    2
## 107   69    1    3
## 108   45    0    0
## 109   50    0    1
## 110   50    0    0
## 111   64    0    0
## 112   57    1    2
## 113   64    0    2
## 114   43    1    0
```

```
## 115    55    1    1
## 116    37    0    2
## 117    41    1    2
## 118    56    1    3
## 119    46    0    1
## 120    46    0    0
## 121    64    0    0
## 122    59    1    0
## 123    41    0    2
## 124    54    0    2
## 125    39    0    2
## 126    34    0    1
## 127    47    1    0
## 128    67    0    2
## 129    52    0    2
## 130    74    0    1
## 131    54    0    2
## 132    49    0    1
## 133    42    1    1
## 134    41    1    1
## 135    41    0    1
## 136    49    0    0
## 137    60    0    2
## 138    62    1    1
## 139    57    1    0
## 140    64    1    0
## 141    51    0    2
## 142    43    1    0
## 143    42    0    2
## 144    67    0    0
## 145    76    0    2
## 146    70    1    1
## 147    44    0    2
## 148    60    0    3
## 149    44    1    2
## 150    42    1    2
## 151    66    1    0
## 152    71    0    0
## 153    64    1    3
## 154    66    0    2
## 155    39    0    2
## 156    58    0    0
## 157    47    1    2
## 158    35    1    1
## 159    58    1    1
## 160    56    1    1
## 161    56    1    1
## 162    55    0    1
## 163    41    1    1
## 164    38    1    2
```

```
## 165   38   1   2
## 166   67   1   0
## 167   67   1   0
## 168   62   0   0
## 169   63   1   0
## 170   53   1   0
## 171   56   1   2
## 172   48   1   1
## 173   58   1   1
## 174   58   1   2
## 175   60   1   0
## 176   40   1   0
## 177   60   1   0
## 178   64   1   2
## 179   43   1   0
## 180   57   1   0
## 181   55   1   0
## 182   65   0   0
## 183   61   0   0
## 184   58   1   2
## 185   50   1   0
## 186   44   1   0
## 187   60   1   0
## 188   54   1   0
## 189   50   1   2
## 190   41   1   0
## 191   51   0   0
## 192   58   1   0
## 193   54   1   0
## 194   60   1   0
## 195   60   1   2
## 196   59   1   0
## 197   46   1   2
## 198   67   1   0
## 199   62   1   0
## 200   65   1   0
## 201   44   1   0
## 202   60   1   0
## 203   58   1   0
## 204   68   1   2
## 205   62   0   0
## 206   52   1   0
## 207   59   1   0
## 208   60   0   0
## 209   49   1   2
## 210   59   1   0
## 211   57   1   2
## 212   61   1   0
## 213   39   1   0
## 214   61   0   0
```

```
## 215   56   1   0
## 216   43   0   0
## 217   62   0   2
## 218   63   1   0
## 219   65   1   0
## 220   48   1   0
## 221   63   0   0
## 222   55   1   0
## 223   65   1   3
## 224   56   0   0
## 225   54   1   0
## 226   70   1   0
## 227   62   1   1
## 228   35   1   0
## 229   59   1   3
## 230   64   1   2
## 231   47   1   2
## 232   57   1   0
## 233   55   1   0
## 234   64   1   0
## 235   70   1   0
## 236   51   1   0
## 237   58   1   0
## 238   60   1   0
## 239   77   1   0
## 240   35   1   0
## 241   70   1   2
## 242   59   0   0
## 243   64   1   0
## 244   57   1   0
## 245   56   1   0
## 246   48   1   0
## 247   56   0   0
## 248   66   1   1
## 249   54   1   1
## 250   69   1   2
## 251   51   1   0
## 252   43   1   0
## 253   62   0   0
## 254   67   1   0
## 255   59   1   3
## 256   45   1   0
## 257   58   1   0
## 258   50   1   0
## 259   62   0   0
## 260   38   1   3
## 261   66   0   0
## 262   52   1   0
## 263   53   1   0
## 264   63   0   0
```

```
## 265    54    1    0
## 266    66    1    0
## 267    55    0    0
## 268    49    1    2
## 269    54    1    0
## 270    56    1    0
## 271    46    1    0
## 272    61    1    3
## 273    67    1    0
## 274    58    1    0
## 275    47    1    0
## 276    52    1    0
## 277    58    1    0
## 278    57    1    1
## 279    58    0    1
## 280    61    1    0
## 281    42    1    0
## 282    52    1    0
## 283    59    1    2
## 284    40    1    0
## 285    61    1    0
## 286    46    1    0
## 287    59    1    3
## 288    57    1    1
## 289    57    1    0
## 290    55    0    0
## 291    61    1    0
## 292    58    1    0
## 293    58    0    0
## 294    67    1    2
## 295    44    1    0
## 296    63    1    0
## 297    63    0    0
## 298    59    1    0
## 299    57    0    0
## 300    45    1    3
## 301    68    1    0
## 302    57    1    0
## 303    57    0    1
```

df[1:5]

```
##       age sex cp trtbps chol
## 1      63   1  3    145  233
## 2      37   1  2    130  250
## 3      41   0  1    130  204
## 4      56   1  1    120  236
## 5      57   0  0    120  354
## 6      57   1  0    140  192
## 7      56   0  1    140  294
```

```
## 8    44    1    1    120    263
## 9    52    1    2    172    199
## 10   57    1    2    150    168
## 11   54    1    0    140    239
## 12   48    0    2    130    275
## 13   49    1    1    130    266
## 14   64    1    3    110    211
## 15   58    0    3    150    283
## 16   50    0    2    120    219
## 17   58    0    2    120    340
## 18   66    0    3    150    226
## 19   43    1    0    150    247
## 20   69    0    3    140    239
## 21   59    1    0    135    234
## 22   44    1    2    130    233
## 23   42    1    0    140    226
## 24   61    1    2    150    243
## 25   40    1    3    140    199
## 26   71    0    1    160    302
## 27   59    1    2    150    212
## 28   51    1    2    110    175
## 29   65    0    2    140    417
## 30   53    1    2    130    197
## 31   41    0    1    105    198
## 32   65    1    0    120    177
## 33   44    1    1    130    219
## 34   54    1    2    125    273
## 35   51    1    3    125    213
## 36   46    0    2    142    177
## 37   54    0    2    135    304
## 38   54    1    2    150    232
## 39   65    0    2    155    269
## 40   65    0    2    160    360
## 41   51    0    2    140    308
## 42   48    1    1    130    245
## 43   45    1    0    104    208
## 44   53    0    0    130    264
## 45   39    1    2    140    321
## 46   52    1    1    120    325
## 47   44    1    2    140    235
## 48   47    1    2    138    257
## 49   53    0    2    128    216
## 50   53    0    0    138    234
## 51   51    0    2    130    256
## 52   66    1    0    120    302
## 53   62    1    2    130    231
## 54   44    0    2    108    141
## 55   63    0    2    135    252
## 56   52    1    1    134    201
## 57   48    1    0    122    222
```

```
## 58    45   1   0    115   260
## 59    34   1   3    118   182
## 60    57   0   0    128   303
## 61    71   0   2    110   265
## 62    54   1   1    108   309
## 63    52   1   3    118   186
## 64    41   1   1    135   203
## 65    58   1   2    140   211
## 66    35   0   0    138   183
## 67    51   1   2    100   222
## 68    45   0   1    130   234
## 69    44   1   1    120   220
## 70    62   0   0    124   209
## 71    54   1   2    120   258
## 72    51   1   2     94   227
## 73    29   1   1    130   204
## 74    51   1   0    140   261
## 75    43   0   2    122   213
## 76    55   0   1    135   250
## 77    51   1   2    125   245
## 78    59   1   1    140   221
## 79    52   1   1    128   205
## 80    58   1   2    105   240
## 81    41   1   2    112   250
## 82    45   1   1    128   308
## 83    60   0   2    102   318
## 84    52   1   3    152   298
## 85    42   0   0    102   265
## 86    67   0   2    115   564
## 87    68   1   2    118   277
## 88    46   1   1    101   197
## 89    54   0   2    110   214
## 90    58   0   0    100   248
## 91    48   1   2    124   255
## 92    57   1   0    132   207
## 93    52   1   2    138   223
## 94    54   0   1    132   288
## 95    45   0   1    112   160
## 96    53   1   0    142   226
## 97    62   0   0    140   394
## 98    52   1   0    108   233
## 99    43   1   2    130   315
## 100   53   1   2    130   246
## 101   42   1   3    148   244
## 102   59   1   3    178   270
## 103   63   0   1    140   195
## 104   42   1   2    120   240
## 105   50   1   2    129   196
## 106   68   0   2    120   211
## 107   69   1   3    160   234
```

```
## 108   45   0   0    138   236
## 109   50   0   1    120   244
## 110   50   0   0    110   254
## 111   64   0   0    180   325
## 112   57   1   2    150   126
## 113   64   0   2    140   313
## 114   43   1   0    110   211
## 115   55   1   1    130   262
## 116   37   0   2    120   215
## 117   41   1   2    130   214
## 118   56   1   3    120   193
## 119   46   0   1    105   204
## 120   46   0   0    138   243
## 121   64   0   0    130   303
## 122   59   1   0    138   271
## 123   41   0   2    112   268
## 124   54   0   2    108   267
## 125   39   0   2     94   199
## 126   34   0   1    118   210
## 127   47   1   0    112   204
## 128   67   0   2    152   277
## 129   52   0   2    136   196
## 130   74   0   1    120   269
## 131   54   0   2    160   201
## 132   49   0   1    134   271
## 133   42   1   1    120   295
## 134   41   1   1    110   235
## 135   41   0   1    126   306
## 136   49   0   0    130   269
## 137   60   0   2    120   178
## 138   62   1   1    128   208
## 139   57   1   0    110   201
## 140   64   1   0    128   263
## 141   51   0   2    120   295
## 142   43   1   0    115   303
## 143   42   0   2    120   209
## 144   67   0   0    106   223
## 145   76   0   2    140   197
## 146   70   1   1    156   245
## 147   44   0   2    118   242
## 148   60   0   3    150   240
## 149   44   1   2    120   226
## 150   42   1   2    130   180
## 151   66   1   0    160   228
## 152   71   0   0    112   149
## 153   64   1   3    170   227
## 154   66   0   2    146   278
## 155   39   0   2    138   220
## 156   58   0   0    130   197
## 157   47   1   2    130   253
```

```
## 158   35   1   1     122   192
## 159   58   1   1     125   220
## 160   56   1   1     130   221
## 161   56   1   1     120   240
## 162   55   0   1     132   342
## 163   41   1   1     120   157
## 164   38   1   2     138   175
## 165   38   1   2     138   175
## 166   67   1   0     160   286
## 167   67   1   0     120   229
## 168   62   0   0     140   268
## 169   63   1   0     130   254
## 170   53   1   0     140   203
## 171   56   1   2     130   256
## 172   48   1   1     110   229
## 173   58   1   1     120   284
## 174   58   1   2     132   224
## 175   60   1   0     130   206
## 176   40   1   0     110   167
## 177   60   1   0     117   230
## 178   64   1   2     140   335
## 179   43   1   0     120   177
## 180   57   1   0     150   276
## 181   55   1   0     132   353
## 182   65   0   0     150   225
## 183   61   0   0     130   330
## 184   58   1   2     112   230
## 185   50   1   0     150   243
## 186   44   1   0     112   290
## 187   60   1   0     130   253
## 188   54   1   0     124   266
## 189   50   1   2     140   233
## 190   41   1   0     110   172
## 191   51   0   0     130   305
## 192   58   1   0     128   216
## 193   54   1   0     120   188
## 194   60   1   0     145   282
## 195   60   1   2     140   185
## 196   59   1   0     170   326
## 197   46   1   2     150   231
## 198   67   1   0     125   254
## 199   62   1   0     120   267
## 200   65   1   0     110   248
## 201   44   1   0     110   197
## 202   60   1   0     125   258
## 203   58   1   0     150   270
## 204   68   1   2     180   274
## 205   62   0   0     160   164
## 206   52   1   0     128   255
## 207   59   1   0     110   239
```

```
## 208   60   0   0   150   258
## 209   49   1   2   120   188
## 210   59   1   0   140   177
## 211   57   1   2   128   229
## 212   61   1   0   120   260
## 213   39   1   0   118   219
## 214   61   0   0   145   307
## 215   56   1   0   125   249
## 216   43   0   0   132   341
## 217   62   0   2   130   263
## 218   63   1   0   130   330
## 219   65   1   0   135   254
## 220   48   1   0   130   256
## 221   63   0   0   150   407
## 222   55   1   0   140   217
## 223   65   1   3   138   282
## 224   56   0   0   200   288
## 225   54   1   0   110   239
## 226   70   1   0   145   174
## 227   62   1   1   120   281
## 228   35   1   0   120   198
## 229   59   1   3   170   288
## 230   64   1   2   125   309
## 231   47   1   2   108   243
## 232   57   1   0   165   289
## 233   55   1   0   160   289
## 234   64   1   0   120   246
## 235   70   1   0   130   322
## 236   51   1   0   140   299
## 237   58   1   0   125   300
## 238   60   1   0   140   293
## 239   77   1   0   125   304
## 240   35   1   0   126   282
## 241   70   1   2   160   269
## 242   59   0   0   174   249
## 243   64   1   0   145   212
## 244   57   1   0   152   274
## 245   56   1   0   132   184
## 246   48   1   0   124   274
## 247   56   0   0   134   409
## 248   66   1   1   160   246
## 249   54   1   1   192   283
## 250   69   1   2   140   254
## 251   51   1   0   140   298
## 252   43   1   0   132   247
## 253   62   0   0   138   294
## 254   67   1   0   100   299
## 255   59   1   3   160   273
## 256   45   1   0   142   309
## 257   58   1   0   128   259
```

```
## 258   50   1   0      144   200
## 259   62   0   0      150   244
## 260   38   1   3      120   231
## 261   66   0   0      178   228
## 262   52   1   0      112   230
## 263   53   1   0      123   282
## 264   63   0   0      108   269
## 265   54   1   0      110   206
## 266   66   1   0      112   212
## 267   55   0   0      180   327
## 268   49   1   2      118   149
## 269   54   1   0      122   286
## 270   56   1   0      130   283
## 271   46   1   0      120   249
## 272   61   1   3      134   234
## 273   67   1   0      120   237
## 274   58   1   0      100   234
## 275   47   1   0      110   275
## 276   52   1   0      125   212
## 277   58   1   0      146   218
## 278   57   1   1      124   261
## 279   58   0   1      136   319
## 280   61   1   0      138   166
## 281   42   1   0      136   315
## 282   52   1   0      128   204
## 283   59   1   2      126   218
## 284   40   1   0      152   223
## 285   61   1   0      140   207
## 286   46   1   0      140   311
## 287   59   1   3      134   204
## 288   57   1   1      154   232
## 289   57   1   0      110   335
## 290   55   0   0      128   205
## 291   61   1   0      148   203
## 292   58   1   0      114   318
## 293   58   0   0      170   225
## 294   67   1   2      152   212
## 295   44   1   0      120   169
## 296   63   1   0      140   187
## 297   63   0   0      124   197
## 298   59   1   0      164   176
## 299   57   0   0      140   241
## 300   45   1   3      110   264
## 301   68   1   0      144   193
## 302   57   1   0      130   131
## 303   57   0   1      130   236

df[c(1, 3, 4, 8)]
```

```
##      age cp trtbps thalachh
## 1    63  3    145      150
## 2    37  2    130      187
## 3    41  1    130      172
## 4    56  1    120      178
## 5    57  0    120      163
## 6    57  0    140      148
## 7    56  1    140      153
## 8    44  1    120      173
## 9    52  2    172      162
## 10   57  2    150      174
## 11   54  0    140      160
## 12   48  2    130      139
## 13   49  1    130      171
## 14   64  3    110      144
## 15   58  3    150      162
## 16   50  2    120      158
## 17   58  2    120      172
## 18   66  3    150      114
## 19   43  0    150      171
## 20   69  3    140      151
## 21   59  0    135      161
## 22   44  2    130      179
## 23   42  0    140      178
## 24   61  2    150      137
## 25   40  3    140      178
## 26   71  1    160      162
## 27   59  2    150      157
## 28   51  2    110      123
## 29   65  2    140      157
## 30   53  2    130      152
## 31   41  1    105      168
## 32   65  0    120      140
## 33   44  1    130      188
## 34   54  2    125      152
## 35   51  3    125      125
## 36   46  2    142      160
## 37   54  2    135      170
## 38   54  2    150      165
## 39   65  2    155      148
## 40   65  2    160      151
## 41   51  2    140      142
## 42   48  1    130      180
## 43   45  0    104      148
## 44   53  0    130      143
## 45   39  2    140      182
## 46   52  1    120      172
## 47   44  2    140      180
## 48   47  2    138      156
## 49   53  2    128      115
```

```
## 50   53   0   138   160
## 51   51   2   130   149
## 52   66   0   120   151
## 53   62   2   130   146
## 54   44   2   108   175
## 55   63   2   135   172
## 56   52   1   134   158
## 57   48   0   122   186
## 58   45   0   115   185
## 59   34   3   118   174
## 60   57   0   128   159
## 61   71   2   110   130
## 62   54   1   108   156
## 63   52   3   118   190
## 64   41   1   135   132
## 65   58   2   140   165
## 66   35   0   138   182
## 67   51   2   100   143
## 68   45   1   130   175
## 69   44   1   120   170
## 70   62   0   124   163
## 71   54   2   120   147
## 72   51   2    94   154
## 73   29   1   130   202
## 74   51   0   140   186
## 75   43   2   122   165
## 76   55   1   135   161
## 77   51   2   125   166
## 78   59   1   140   164
## 79   52   1   128   184
## 80   58   2   105   154
## 81   41   2   112   179
## 82   45   1   128   170
## 83   60   2   102   160
## 84   52   3   152   178
## 85   42   0   102   122
## 86   67   2   115   160
## 87   68   2   118   151
## 88   46   1   101   156
## 89   54   2   110   158
## 90   58   0   100   122
## 91   48   2   124   175
## 92   57   0   132   168
## 93   52   2   138   169
## 94   54   1   132   159
## 95   45   1   112   138
## 96   53   0   142   111
## 97   62   0   140   157
## 98   52   0   108   147
## 99   43   2   130   162
```

```
## 100   53   2       130        173
## 101   42   3       148        178
## 102   59   3       178        145
## 103   63   1       140        179
## 104   42   2       120        194
## 105   50   2       129        163
## 106   68   2       120        115
## 107   69   3       160        131
## 108   45   0       138        152
## 109   50   1       120        162
## 110   50   0       110        159
## 111   64   0       180        154
## 112   57   2       150        173
## 113   64   2       140        133
## 114   43   0       110        161
## 115   55   1       130        155
## 116   37   2       120        170
## 117   41   2       130        168
## 118   56   3       120        162
## 119   46   1       105        172
## 120   46   0       138        152
## 121   64   0       130        122
## 122   59   0       138        182
## 123   41   2       112        172
## 124   54   2       108        167
## 125   39   2        94        179
## 126   34   1       118        192
## 127   47   0       112        143
## 128   67   2       152        172
## 129   52   2       136        169
## 130   74   1       120        121
## 131   54   2       160        163
## 132   49   1       134        162
## 133   42   1       120        162
## 134   41   1       110        153
## 135   41   1       126        163
## 136   49   0       130        163
## 137   60   2       120         96
## 138   62   1       128        140
## 139   57   0       110        126
## 140   64   0       128        105
## 141   51   2       120        157
## 142   43   0       115        181
## 143   42   2       120        173
## 144   67   0       106        142
## 145   76   2       140        116
## 146   70   1       156        143
## 147   44   2       118        149
## 148   60   3       150        171
## 149   44   2       120        169
```

```
## 150   42   2     130        150
## 151   66   0     160        138
## 152   71   0     112        125
## 153   64   3     170        155
## 154   66   2     146        152
## 155   39   2     138        152
## 156   58   0     130        131
## 157   47   2     130        179
## 158   35   1     122        174
## 159   58   1     125        144
## 160   56   1     130        163
## 161   56   1     120        169
## 162   55   1     132        166
## 163   41   1     120        182
## 164   38   2     138        173
## 165   38   2     138        173
## 166   67   0     160        108
## 167   67   0     120        129
## 168   62   0     140        160
## 169   63   0     130        147
## 170   53   0     140        155
## 171   56   2     130        142
## 172   48   1     110        168
## 173   58   1     120        160
## 174   58   2     132        173
## 175   60   0     130        132
## 176   40   0     110        114
## 177   60   0     117        160
## 178   64   2     140        158
## 179   43   0     120        120
## 180   57   0     150        112
## 181   55   0     132        132
## 182   65   0     150        114
## 183   61   0     130        169
## 184   58   2     112        165
## 185   50   0     150        128
## 186   44   0     112        153
## 187   60   0     130        144
## 188   54   0     124        109
## 189   50   2     140        163
## 190   41   0     110        158
## 191   51   0     130        142
## 192   58   0     128        131
## 193   54   0     120        113
## 194   60   0     145        142
## 195   60   2     140        155
## 196   59   0     170        140
## 197   46   2     150        147
## 198   67   0     125        163
## 199   62   0     120         99
```

```
## 200   65   0    110      158
## 201   44   0    110      177
## 202   60   0    125      141
## 203   58   0    150      111
## 204   68   2    180      150
## 205   62   0    160      145
## 206   52   0    128      161
## 207   59   0    110      142
## 208   60   0    150      157
## 209   49   2    120      139
## 210   59   0    140      162
## 211   57   2    128      150
## 212   61   0    120      140
## 213   39   0    118      140
## 214   61   0    145      146
## 215   56   0    125      144
## 216   43   0    132      136
## 217   62   2    130       97
## 218   63   0    130      132
## 219   65   0    135      127
## 220   48   0    130      150
## 221   63   0    150      154
## 222   55   0    140      111
## 223   65   3    138      174
## 224   56   0    200      133
## 225   54   0    110      126
## 226   70   0    145      125
## 227   62   1    120      103
## 228   35   0    120      130
## 229   59   3    170      159
## 230   64   2    125      131
## 231   47   2    108      152
## 232   57   0    165      124
## 233   55   0    160      145
## 234   64   0    120       96
## 235   70   0    130      109
## 236   51   0    140      173
## 237   58   0    125      171
## 238   60   0    140      170
## 239   77   0    125      162
## 240   35   0    126      156
## 241   70   2    160      112
## 242   59   0    174      143
## 243   64   0    145      132
## 244   57   0    152       88
## 245   56   0    132      105
## 246   48   0    124      166
## 247   56   0    134      150
## 248   66   1    160      120
## 249   54   1    192      195
```

```
## 250    69    2    140    146
## 251    51    0    140    122
## 252    43    0    132    143
## 253    62    0    138    106
## 254    67    0    100    125
## 255    59    3    160    125
## 256    45    0    142    147
## 257    58    0    128    130
## 258    50    0    144    126
## 259    62    0    150    154
## 260    38    3    120    182
## 261    66    0    178    165
## 262    52    0    112    160
## 263    53    0    123     95
## 264    63    0    108    169
## 265    54    0    110    108
## 266    66    0    112    132
## 267    55    0    180    117
## 268    49    2    118    126
## 269    54    0    122    116
## 270    56    0    130    103
## 271    46    0    120    144
## 272    61    3    134    145
## 273    67    0    120     71
## 274    58    0    100    156
## 275    47    0    110    118
## 276    52    0    125    168
## 277    58    0    146    105
## 278    57    1    124    141
## 279    58    1    136    152
## 280    61    0    138    125
## 281    42    0    136    125
## 282    52    0    128    156
## 283    59    2    126    134
## 284    40    0    152    181
## 285    61    0    140    138
## 286    46    0    140    120
## 287    59    3    134    162
## 288    57    1    154    164
## 289    57    0    110    143
## 290    55    0    128    130
## 291    61    0    148    161
## 292    58    0    114    140
## 293    58    0    170    146
## 294    67    2    152    150
## 295    44    0    120    144
## 296    63    0    140    144
## 297    63    0    124    136
## 298    59    0    164     90
## 299    57    0    140    123
```

```
## 300   45   3     110       132
## 301   68   0     144       141
## 302   57   0     130       115
## 303   57   1     130       174
```

```
class(df)
```

```
## [1] "data.frame"
```

```
str(df)
```

```
## 'data.frame':    303 obs. of  14 variables:
##  $ age     : int  63 37 41 56 57 57 56 44 52 57 ...
##  $ sex     : int  1 1 0 1 0 1 0 1 1 1 ...
##  $ cp      : int  3 2 1 1 0 0 1 1 2 2 ...
##  $ trtbps  : int  145 130 130 120 120 140 140 120 172 150 ...
##  $ chol    : int  233 250 204 236 354 192 294 263 199 168 ...
##  $ fbs     : int  1 0 0 0 0 0 0 0 1 0 ...
##  $ restecg : int  0 1 0 1 1 1 0 1 1 1 ...
##  $ thalachh: int  150 187 172 178 163 148 153 173 162 174 ...
##  $ exng    : int  0 0 0 0 1 0 0 0 0 0 ...
##  $ oldpeak : num  2.3 3.5 1.4 0.8 0.6 0.4 1.3 0 0.5 1.6 ...
##  $ slp     : int  0 0 2 2 2 1 1 2 2 2 ...
##  $ caa     : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ thall   : int  1 2 2 2 2 1 2 3 3 2 ...
##  $ output  : int  1 1 1 1 1 1 1 1 1 1 ...
```

```
df[2,]
```

```
##   age sex cp trtbps chol fbs restecg thalachh exng oldpeak slp caa thall
output
## 2  37   1  2    130  250   0       1      187    0     3.5   0   0     2
1
```

```
df[,3]
```

```
##   [1] 3 2 1 1 0 0 1 1 2 2 0 2 1 3 3 2 2 3 0 3 0 2 0 2 3 1 2 2 2 2 1 0 1 2
3 2 2
##  [38] 2 2 2 2 1 0 0 2 1 2 2 2 0 2 0 2 2 2 1 0 0 3 0 2 1 3 1 2 0 2 1 1 0 2
2 1 0
##  [75] 2 1 2 1 1 2 2 1 2 3 0 2 2 1 2 0 2 0 2 1 1 0 0 0 2 2 3 3 1 2 2 2 3 0
1 0 0
## [112] 2 2 0 1 2 2 3 1 0 0 0 2 2 2 1 0 2 2 1 2 1 1 1 1 0 2 1 0 0 2 0 2 0 2
1 2 3
## [149] 2 2 0 0 3 2 2 0 2 1 1 1 1 1 1 1 2 2 0 0 0 0 0 2 1 1 2 0 0 0 2 0 0 0 0
0 2 0
## [186] 0 0 0 2 0 0 0 0 0 2 0 2 0 0 0 0 0 0 2 0 0 0 2 0 2 0 0 0 0 0 2 0 0
0 0 0
## [223] 3 0 0 0 1 0 3 2 2 0 0 0 0 0 0 0 0 0 2 0 0 0 0 0 1 1 2 0 0 0 0 3 0
0 0 0
## [260] 3 0 0 0 0 0 0 0 2 0 0 0 3 0 0 0 0 0 1 1 0 0 0 2 0 0 0 3 1 0 0 0 0 0
```

```
2 0 0
## [297] 0 0 0 3 0 0 1

df[3,1]

## [1] 41

summary(df)

##       age             sex              cp              trtbps
##  Min.   :29.00   Min.   :0.0000   Min.   :0.000   Min.   : 94.0
##  1st Qu.:47.50   1st Qu.:0.0000   1st Qu.:0.000   1st Qu.:120.0
##  Median :55.00   Median :1.0000   Median :1.000   Median :130.0
##  Mean   :54.37   Mean   :0.6832   Mean   :0.967   Mean   :131.6
##  3rd Qu.:61.00   3rd Qu.:1.0000   3rd Qu.:2.000   3rd Qu.:140.0
##  Max.   :77.00   Max.   :1.0000   Max.   :3.000   Max.   :200.0
##      chol            fbs            restecg          thalachh
##  Min.   :126.0   Min.   :0.0000   Min.   :0.0000   Min.   : 71.0
##  1st Qu.:211.0   1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:133.5
##  Median :240.0   Median :0.0000   Median :1.0000   Median :153.0
##  Mean   :246.3   Mean   :0.1485   Mean   :0.5281   Mean   :149.6
##  3rd Qu.:274.5   3rd Qu.:0.0000   3rd Qu.:1.0000   3rd Qu.:166.0
##  Max.   :564.0   Max.   :1.0000   Max.   :2.0000   Max.   :202.0
##      exng            oldpeak          slp              caa
##  Min.   :0.0000   Min.   :0.00    Min.   :0.000   Min.   :0.0000
##  1st Qu.:0.0000   1st Qu.:0.00    1st Qu.:1.000   1st Qu.:0.0000
##  Median :0.0000   Median :0.80    Median :1.000   Median :0.0000
##  Mean   :0.3267   Mean   :1.04    Mean   :1.399   Mean   :0.7294
##  3rd Qu.:1.0000   3rd Qu.:1.60    3rd Qu.:2.000   3rd Qu.:1.0000
##  Max.   :1.0000   Max.   :6.20    Max.   :2.000   Max.   :4.0000
##      thall           output
##  Min.   :0.000   Min.   :0.0000
##  1st Qu.:2.000   1st Qu.:0.0000
##  Median :2.000   Median :1.0000
##  Mean   :2.314   Mean   :0.5446
##  3rd Qu.:3.000   3rd Qu.:1.0000
##  Max.   :3.000   Max.   :1.0000

names(df)

##  [1] "age"      "sex"      "cp"       "trtbps"   "chol"     "fbs"
##  [7] "restecg"  "thalachh" "exng"     "oldpeak"  "slp"      "caa"
## [13] "thall"    "output"

row.names(df)

##   [1] "1"    "2"    "3"    "4"    "5"    "6"    "7"    "8"    "9"    "10"   "11"
"12"
##  [13] "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] "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] "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] "85"  "86"  "87"  "88"  "89"  "90"  "91"  "92"  "93"  "94"  "95"
## "96"
##   [97] "97"  "98"  "99"  "100" "101" "102" "103" "104" "105" "106" "107"
## "108"
## [109] "109" "110" "111" "112" "113" "114" "115" "116" "117" "118" "119"
## "120"
## [121] "121" "122" "123" "124" "125" "126" "127" "128" "129" "130" "131"
## "132"
## [133] "133" "134" "135" "136" "137" "138" "139" "140" "141" "142" "143"
## "144"
## [145] "145" "146" "147" "148" "149" "150" "151" "152" "153" "154" "155"
## "156"
## [157] "157" "158" "159" "160" "161" "162" "163" "164" "165" "166" "167"
## "168"
## [169] "169" "170" "171" "172" "173" "174" "175" "176" "177" "178" "179"
## "180"
## [181] "181" "182" "183" "184" "185" "186" "187" "188" "189" "190" "191"
## "192"
## [193] "193" "194" "195" "196" "197" "198" "199" "200" "201" "202" "203"
## "204"
## [205] "205" "206" "207" "208" "209" "210" "211" "212" "213" "214" "215"
## "216"
## [217] "217" "218" "219" "220" "221" "222" "223" "224" "225" "226" "227"
## "228"
## [229] "229" "230" "231" "232" "233" "234" "235" "236" "237" "238" "239"
## "240"
## [241] "241" "242" "243" "244" "245" "246" "247" "248" "249" "250" "251"
## "252"
## [253] "253" "254" "255" "256" "257" "258" "259" "260" "261" "262" "263"
## "264"
## [265] "265" "266" "267" "268" "269" "270" "271" "272" "273" "274" "275"
## "276"
## [277] "277" "278" "279" "280" "281" "282" "283" "284" "285" "286" "287"
## "288"
## [289] "289" "290" "291" "292" "293" "294" "295" "296" "297" "298" "299"
## "300"
## [301] "301" "302" "303"

colnames(df)
```

```
##  [1] "age"      "sex"      "cp"       "trtbps"   "chol"     "fbs"
##  [7] "restecg"  "thalachh" "exng"     "oldpeak"  "slp"      "caa"
## [13] "thall"    "output"

dimnames(df)

## [[1]]
##   [1] "1"   "2"   "3"   "4"   "5"   "6"   "7"   "8"   "9"   "10"  "11"
"12"
##  [13] "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] "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] "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] "85"  "86"  "87"  "88"  "89"  "90"  "91"  "92"  "93"  "94"  "95"
"96"
##  [97] "97"  "98"  "99"  "100" "101" "102" "103" "104" "105" "106" "107"
"108"
## [109] "109" "110" "111" "112" "113" "114" "115" "116" "117" "118" "119"
"120"
## [121] "121" "122" "123" "124" "125" "126" "127" "128" "129" "130" "131"
"132"
## [133] "133" "134" "135" "136" "137" "138" "139" "140" "141" "142" "143"
"144"
## [145] "145" "146" "147" "148" "149" "150" "151" "152" "153" "154" "155"
"156"
## [157] "157" "158" "159" "160" "161" "162" "163" "164" "165" "166" "167"
"168"
## [169] "169" "170" "171" "172" "173" "174" "175" "176" "177" "178" "179"
"180"
## [181] "181" "182" "183" "184" "185" "186" "187" "188" "189" "190" "191"
"192"
## [193] "193" "194" "195" "196" "197" "198" "199" "200" "201" "202" "203"
"204"
## [205] "205" "206" "207" "208" "209" "210" "211" "212" "213" "214" "215"
"216"
## [217] "217" "218" "219" "220" "221" "222" "223" "224" "225" "226" "227"
"228"
## [229] "229" "230" "231" "232" "233" "234" "235" "236" "237" "238" "239"
"240"
## [241] "241" "242" "243" "244" "245" "246" "247" "248" "249" "250" "251"
"252"
## [253] "253" "254" "255" "256" "257" "258" "259" "260" "261" "262" "263"
```

```
"264"
## [265] "265" "266" "267" "268" "269" "270" "271" "272" "273" "274" "275"
"276"
## [277] "277" "278" "279" "280" "281" "282" "283" "284" "285" "286" "287"
"288"
## [289] "289" "290" "291" "292" "293" "294" "295" "296" "297" "298" "299"
"300"
## [301] "301" "302" "303"
##
## [[2]]
##  [1] "age"      "sex"      "cp"       "trtbps"  "chol"     "fbs"
##  [7] "restecg"  "thalachh" "exng"     "oldpeak"  "slp"      "caa"
## [13] "thall"    "output"
```

```
df[df$age >= 50 &
+ df$cp == 3 &
+ df$chol >= 250,]
```

```
##      age sex cp trtbps chol fbs restecg thalachh exng oldpeak slp caa thall
## 15    58   0  3    150  283   1       0      162    0     1.0   2   0     2
## 84    52   1  3    152  298   1       1      178    0     1.2   1   0     3
## 102   59   1  3    178  270   0       0      145    0     4.2   0   0     3
## 223   65   1  3    138  282   1       0      174    0     1.4   1   1     2
## 229   59   1  3    170  288   0       0      159    0     0.2   1   0     3
## 255   59   1  3    160  273   0       0      125    0     0.0   2   0     2
##      output
## 15        1
## 84        1
## 102       1
## 223       0
## 229       0
## 255       0
```

```
df[df$age >= 50 &
+ df$cp <= 1 &
+ df$chol >= 250,]
```

```
##      age sex cp trtbps chol fbs restecg thalachh exng oldpeak slp caa thall
## 5     57   0  0    120  354   0       1      163    1     0.6   2   0     2
## 7     56   0  1    140  294   0       0      153    0     1.3   1   0     2
## 26    71   0  1    160  302   0       1      162    0     0.4   2   2     2
## 44    53   0  0    130  264   0       0      143    0     0.4   1   0     2
## 46    52   1  1    120  325   0       1      172    0     0.2   2   0     2
## 52    66   1  0    120  302   0       0      151    0     0.4   1   0     2
## 60    57   0  0    128  303   0       0      159    0     0.0   2   1     2
## 62    54   1  1    108  309   0       1      156    0     0.0   2   0     3
## 74    51   1  0    140  261   0       0      186    1     0.0   2   0     2
## 76    55   0  1    135  250   0       0      161    0     1.4   1   0     2
## 94    54   0  1    132  288   1       0      159    1     0.0   2   1     2
## 97    62   0  0    140  394   0       0      157    0     1.2   1   0     2
## 110   50   0  0    110  254   0       0      159    0     0.0   2   0     2
```

```
## 111   64   0   0   180   325   0   1   154   1   0.0   2   0   2
## 115   55   1   1   130   262   0   1   155   0   0.0   2   0   2
## 121   64   0   0   130   303   0   1   122   0   2.0   1   2   2
## 122   59   1   0   138   271   0   0   182   0   0.0   2   0   2
## 130   74   0   1   120   269   0   0   121   1   0.2   2   1   2
## 140   64   1   0   128   263   0   1   105   1   0.2   1   1   3
## 162   55   0   1   132   342   0   1   166   0   1.2   2   0   2
## 166   67   1   0   160   286   0   0   108   1   1.5   1   3   2
## 168   62   0   0   140   268   0   0   160   0   3.6   0   2   2
## 169   63   1   0   130   254   0   0   147   0   1.4   1   1   3
## 173   58   1   1   120   284   0   0   160   0   1.8   1   0   2
## 180   57   1   0   150   276   0   0   112   1   0.6   1   1   1
## 181   55   1   0   132   353   0   1   132   1   1.2   1   1   3
## 183   61   0   0   130   330   0   0   169   0   0.0   2   0   2
## 187   60   1   0   130   253   0   1   144   1   1.4   2   1   3
## 188   54   1   0   124   266   0   0   109   1   2.2   1   1   3
## 191   51   0   0   130   305   0   1   142   1   1.2   1   0   3
## 194   60   1   0   145   282   0   0   142   1   2.8   1   2   3
## 196   59   1   0   170   326   0   0   140   1   3.4   0   0   3
## 198   67   1   0   125   254   1   1   163   0   0.2   1   2   3
## 199   62   1   0   120   267   0   1    99   1   1.8   1   2   3
## 202   60   1   0   125   258   0   0   141   1   2.8   1   1   3
## 203   58   1   0   150   270   0   0   111   1   0.8   2   0   3
## 206   52   1   0   128   255   0   1   161   1   0.0   2   1   3
## 208   60   0   0   150   258   0   0   157   0   2.6   1   2   3
## 212   61   1   0   120   260   0   1   140   1   3.6   1   1   3
## 214   61   0   0   145   307   0   0   146   1   1.0   1   0   3
## 218   63   1   0   130   330   1   0   132   1   1.8   2   3   3
## 219   65   1   0   135   254   0   0   127   0   2.8   1   1   3
## 221   63   0   0   150   407   0   0   154   0   4.0   1   3   3
## 224   56   0   0   200   288   1   0   133   1   4.0   0   2   3
## 227   62   1   1   120   281   0   0   103   0   1.4   1   1   3
## 232   57   1   0   165   289   1   0   124   0   1.0   1   3   3
## 233   55   1   0   160   289   0   0   145   1   0.8   1   1   3
## 235   70   1   0   130   322   0   0   109   0   2.4   1   3   2
## 236   51   1   0   140   299   0   1   173   1   1.6   2   0   3
## 237   58   1   0   125   300   0   0   171   0   0.0   2   2   3
## 238   60   1   0   140   293   0   0   170   0   1.2   1   2   3
## 239   77   1   0   125   304   0   0   162   1   0.0   2   3   2
## 244   57   1   0   152   274   0   1    88   1   1.2   1   1   3
## 247   56   0   0   134   409   0   0   150   1   1.9   1   2   3
## 249   54   1   1   192   283   0   0   195   0   0.0   2   1   3
## 251   51   1   0   140   298   0   1   122   1   4.2   1   3   3
## 253   62   0   0   138   294   1   1   106   0   1.9   1   3   2
## 254   67   1   0   100   299   0   0   125   1   0.9   1   2   2
## 257   58   1   0   128   259   0   0   130   1   3.0   1   2   3
## 263   53   1   0   123   282   0   1    95   1   2.0   1   2   3
## 264   63   0   0   108   269   0   1   169   1   1.8   1   2   2
## 267   55   0   0   180   327   0   2   117   1   3.4   1   0   2
## 269   54   1   0   122   286   0   0   116   1   3.2   1   2   2
```

```
## 270   56   1   0    130   283   1    0     103   1    1.6   0   0    3
## 278   57   1   1    124   261   0    1     141   0    0.3   2   0    3
## 279   58   0   1    136   319   1    0     152   0    0.0   2   2    2
## 289   57   1   0    110   335   0    1     143   1    3.0   1   1    3
## 292   58   1   0    114   318   0    2     140   0    4.4   0   3    1
##      output
## 5         1
## 7         1
## 26        1
## 44        1
## 46        1
## 52        1
## 60        1
## 62        1
## 74        1
## 76        1
## 94        1
## 97        1
## 110       1
## 111       1
## 115       1
## 121       1
## 122       1
## 130       1
## 140       1
## 162       1
## 166       0
## 168       0
## 169       0
## 173       0
## 180       0
## 181       0
## 183       0
## 187       0
## 188       0
## 191       0
## 194       0
## 196       0
## 198       0
## 199       0
## 202       0
## 203       0
## 206       0
## 208       0
## 212       0
## 214       0
## 218       0
## 219       0
## 221       0
## 224       0
```

```
## 227       0
## 232       0
## 233       0
## 235       0
## 236       0
## 237       0
## 238       0
## 239       0
## 244       0
## 247       0
## 249       0
## 251       0
## 253       0
## 254       0
## 257       0
## 263       0
## 264       0
## 267       0
## 269       0
## 270       0
## 278       0
## 279       0
## 289       0
## 292       0
```

```
df[df$age >= 50 &
+ df$cp <= 1 &
+ df$chol >= 300,]
```

```
##       age sex cp trtbps chol fbs restecg thalachh exng oldpeak slp caa thall
## 5      57   0  0    120  354   0       1      163    1     0.6   2   0     2
## 26     71   0  1    160  302   0       1      162    0     0.4   2   2     2
## 46     52   1  1    120  325   0       1      172    0     0.2   2   0     2
## 52     66   1  0    120  302   0       0      151    0     0.4   1   0     2
## 60     57   0  0    128  303   0       0      159    0     0.0   2   1     2
## 62     54   1  1    108  309   0       1      156    0     0.0   2   0     3
## 97     62   0  0    140  394   0       0      157    0     1.2   1   0     2
## 111    64   0  0    180  325   0       1      154    1     0.0   2   0     2
## 121    64   0  0    130  303   0       1      122    0     2.0   1   2     2
## 162    55   0  1    132  342   0       1      166    0     1.2   2   0     2
## 181    55   1  0    132  353   0       1      132    1     1.2   1   1     3
## 183    61   0  0    130  330   0       0      169    0     0.0   2   0     2
## 191    51   0  0    130  305   0       1      142    1     1.2   1   0     3
## 196    59   1  0    170  326   0       0      140    1     3.4   0   0     3
## 214    61   0  0    145  307   0       0      146    1     1.0   1   0     3
## 218    63   1  0    130  330   1       0      132    1     1.8   2   3     3
## 221    63   0  0    150  407   0       0      154    0     4.0   1   3     3
## 235    70   1  0    130  322   0       0      109    0     2.4   1   3     2
## 237    58   1  0    125  300   0       0      171    0     0.0   2   2     3
## 239    77   1  0    125  304   0       0      162    1     0.0   2   3     2
```

```
## 247   56    0   0    134   409    0      0    150    1    1.9    1    2    3
## 267   55    0   0    180   327    0      2    117    1    3.4    1    0    2
## 279   58    0   1    136   319    1      0    152    0    0.0    2    2    2
## 289   57    1   0    110   335    0      1    143    1    3.0    1    1    3
## 292   58    1   0    114   318    0      2    140    0    4.4    0    3    1
##      output
## 5          1
## 26         1
## 46         1
## 52         1
## 60         1
## 62         1
## 97         1
## 111        1
## 121        1
## 162        1
## 181        0
## 183        0
## 191        0
## 196        0
## 214        0
## 218        0
## 221        0
## 235        0
## 237        0
## 239        0
## 247        0
## 267        0
## 279        0
## 289        0
## 292        0
```