Homework 02

Suliat Alli

10/6/2021

Question 1

```
mtcars[mtcars$cyl < 6,]</pre>
```

```
##
                   mpg cyl disp hp drat
                                              wt qsec vs am gear carb
## Datsun 710
                         4 108.0 93 3.85 2.320 18.61
                  22.8
                                                                      1
## Merc 240D
                  24.4
                         4 146.7
                                  62 3.69 3.190 20.00
                                                                      2
## Merc 230
                  22.8
                         4 140.8
                                  95 3.92 3.150 22.90
                                                                      2
                                                        1
## Fiat 128
                  32.4
                            78.7
                                  66 4.08 2.200 19.47
## Honda Civic
                  30.4
                            75.7
                                  52 4.93 1.615 18.52
                                                                      2
## Toyota Corolla 33.9
                            71.1
                                  65 4.22 1.835 19.90
                         4
## Toyota Corona
                  21.5
                         4 120.1
                                  97 3.70 2.465 20.01
                                                                      1
                  27.3
## Fiat X1-9
                            79.0
                                  66 4.08 1.935 18.90
                                                                      1
## Porsche 914-2
                  26.0
                         4 120.3
                                  91 4.43 2.140 16.70
                                                                      2
                                                        0
                  30.4
                            95.1 113 3.77 1.513 16.90
                                                                      2
## Lotus Europa
                                                        1
                                                                      2
## Volvo 142E
                         4 121.0 109 4.11 2.780 18.60
                  21.4
```

```
mtcars[-c(1:3),]
```

```
##
                        mpg cyl disp hp drat
                                                   wt
                                                       qsec vs am gear carb
## Hornet 4 Drive
                       21.4
                              6 258.0 110 3.08 3.215 19.44
                                                                           2
                       18.7
                              8 360.0 175 3.15 3.440 17.02
                                                                      3
## Hornet Sportabout
## Valiant
                       18.1
                              6 225.0 105 2.76 3.460 20.22
                                                                0
                                                                      3
                                                                           1
## Duster 360
                       14.3
                              8 360.0 245 3.21 3.570 15.84
                                                                           4
## Merc 240D
                       24.4
                              4 146.7
                                       62 3.69 3.190 20.00
                                                                           2
## Merc 230
                       22.8
                              4 140.8
                                      95 3.92 3.150 22.90
                                                                      4
                                                                           2
## Merc 280
                       19.2
                              6 167.6 123 3.92 3.440 18.30
                                                                      4
                                                                           4
## Merc 280C
                       17.8
                              6 167.6 123 3.92 3.440 18.90
## Merc 450SE
                       16.4
                              8 275.8 180 3.07 4.070 17.40
                                                                     3
                                                                           3
## Merc 450SL
                       17.3
                              8 275.8 180 3.07 3.730 17.60
                                                                      3
                                                                           3
## Merc 450SLC
                       15.2
                              8 275.8 180 3.07 3.780 18.00
                                                                     3
                                                                           3
## Cadillac Fleetwood 10.4
                              8 472.0 205 2.93 5.250 17.98
                                                                      3
## Lincoln Continental 10.4
                              8 460.0 215 3.00 5.424 17.82
                                                                           4
                              8 440.0 230 3.23 5.345 17.42
## Chrysler Imperial
                       14.7
                                                                           4
## Fiat 128
                       32.4
                              4 78.7
                                        66 4.08 2.200 19.47
                                                                           1
## Honda Civic
                       30.4
                                                                           2
                              4 75.7
                                        52 4.93 1.615 18.52
## Toyota Corolla
                       33.9
                              4 71.1
                                        65 4.22 1.835 19.90
                                                             1
                                                                      4
                                                                           1
## Toyota Corona
                       21.5
                              4 120.1 97 3.70 2.465 20.01
                                                                      3
                                                                           1
## Dodge Challenger
                              8 318.0 150 2.76 3.520 16.87
                       15.5
```

```
15.2
                            8 304.0 150 3.15 3.435 17.30
## AMC Javelin
## Camaro Z28
                      13.3
                            8 350.0 245 3.73 3.840 15.41
                                                         0
                                                                 3
                                                                      4
                                                            0
                     19.2
## Pontiac Firebird
                            8 400.0 175 3.08 3.845 17.05
## Fiat X1-9
                      27.3
                            4 79.0 66 4.08 1.935 18.90
                                                                      1
                                                        1 1
## Porsche 914-2
                      26.0
                           4 120.3 91 4.43 2.140 16.70
                                                                 5
                                                                      2
## Lotus Europa
                      30.4
                           4 95.1 113 3.77 1.513 16.90 1 1
                                                                 5
                                                                      2
## Ford Pantera L
                            8 351.0 264 4.22 3.170 14.50 0 1
                      15.8
                            6 145.0 175 3.62 2.770 15.50 0 1
## Ferrari Dino
                      19.7
                                                                 5
                                                                      6
## Maserati Bora
                      15.0
                            8 301.0 335 3.54 3.570 14.60
                                                         0 1
                                                                 5
                                                                      8
## Volvo 142E
                            4 121.0 109 4.11 2.780 18.60 1 1
                      21.4
```

mtcars[mtcars\$cyl == 8,]

```
##
                       mpg cyl disp hp drat
                                                wt qsec vs am gear carb
                             8 360.0 175 3.15 3.440 17.02
## Hornet Sportabout
                      18.7
                                                          0
                                                             0
                                                                       2
## Duster 360
                      14.3
                             8 360.0 245 3.21 3.570 15.84
                                                                       4
## Merc 450SE
                      16.4
                             8 275.8 180 3.07 4.070 17.40
                                                          Λ
                                                             Ω
                                                                  3
                                                                       3
## Merc 450SL
                      17.3
                             8 275.8 180 3.07 3.730 17.60
                             8 275.8 180 3.07 3.780 18.00 0
## Merc 450SLC
                      15.2
                                                             0
                                                                       3
                             8 472.0 205 2.93 5.250 17.98
## Cadillac Fleetwood 10.4
                                                          0
                                                             Ω
                                                                  3
                                                                       4
                                                                  3
## Lincoln Continental 10.4 8 460.0 215 3.00 5.424 17.82 0
                                                             0
## Chrysler Imperial 14.7
                            8 440.0 230 3.23 5.345 17.42
                                                         0
                                                             0
                                                                  3
                             8 318.0 150 2.76 3.520 16.87
                                                                  3
## Dodge Challenger
                      15.5
                                                          0
                                                             0
## AMC Javelin
                      15.2
                             8 304.0 150 3.15 3.435 17.30 0
                                                             0
                                                                  3
                                                                       2
## Camaro Z28
                             8 350.0 245 3.73 3.840 15.41 0
                                                                  3
                      13.3
                                                            0
## Pontiac Firebird
                      19.2
                             8 400.0 175 3.08 3.845 17.05 0 0
                                                                       2
## Ford Pantera L
                      15.8
                             8 351.0 264 4.22 3.170 14.50 0 1
                                                                  5
                                                                       4
                      15.0
                             8 301.0 335 3.54 3.570 14.60 0 1
## Maserati Bora
```

mtcars[mtcars\$cyl == 4 |mtcars\$cyl == 6,]

```
##
                 mpg cyl disp hp drat
                                          wt qsec vs am gear carb
## Mazda RX4
                 21.0
                      6 160.0 110 3.90 2.620 16.46 0 1
## Mazda RX4 Wag 21.0 6 160.0 110 3.90 2.875 17.02 0 1
## Datsun 710
                 22.8 4 108.0 93 3.85 2.320 18.61
                                                           4
                                                                1
                                                   1 1
## Hornet 4 Drive 21.4 6 258.0 110 3.08 3.215 19.44
                                                                1
## Valiant
                 18.1 6 225.0 105 2.76 3.460 20.22
                                                   1
                                                      Ω
                                                           3
                                                                1
## Merc 240D
                 24.4
                      4 146.7 62 3.69 3.190 20.00
                                                    1
                                                      0
                                                           4
                                                                2
## Merc 230
                 22.8
                      4 140.8 95 3.92 3.150 22.90
                                                      0
                                                                2
                                                    1
                                                           4
## Merc 280
                 19.2
                       6 167.6 123 3.92 3.440 18.30
                                                                4
                17.8 6 167.6 123 3.92 3.440 18.90
## Merc 280C
                                                      Ω
                                                                4
                                                   1
## Fiat 128
                 32.4
                      4 78.7 66 4.08 2.200 19.47
                                                                1
## Honda Civic
                 30.4
                     4 75.7 52 4.93 1.615 18.52
                                                   1 1
                                                                2
## Toyota Corolla 33.9 4 71.1 65 4.22 1.835 19.90
                                                   1 1
                                                                1
                21.5
                      4 120.1 97 3.70 2.465 20.01
## Toyota Corona
                                                   1 0
                                                           3
                                                                1
                 27.3
                      4 79.0 66 4.08 1.935 18.90
## Fiat X1-9
                                                   1 1
                                                           4
                                                                1
                                                                2
## Porsche 914-2 26.0
                     4 120.3 91 4.43 2.140 16.70 0 1
## Lotus Europa
                 30.4 4 95.1 113 3.77 1.513 16.90
                19.7
                     6 145.0 175 3.62 2.770 15.50 0 1
                                                           5
                                                                6
## Ferrari Dino
## Volvo 142E
                21.4
                      4 121.0 109 4.11 2.780 18.60 1 1
```

Question 2

```
x = 1:5 # generate a five space vector
x[NA] # filling the spaces with NA
```

[1] NA NA NA NA NA

Question 3

```
#mtcars[1:15] #specifies just the row, undefined column
mtcars[1:15,] # all columns are specified , doesn't return error
```

```
##
                    mpg cyl disp hp drat
                                             wt qsec vs am gear carb
## Mazda RX4
                    21.0
                         6 160.0 110 3.90 2.620 16.46 0
                    21.0 6 160.0 110 3.90 2.875 17.02 0 1
## Mazda RX4 Wag
## Datsun 710
                    22.8 4 108.0 93 3.85 2.320 18.61 1 1
                                                                  1
## Hornet 4 Drive
                    21.4 6 258.0 110 3.08 3.215 19.44 1 0
## Hornet Sportabout 18.7 8 360.0 175 3.15 3.440 17.02 0 0
                    18.1 6 225.0 105 2.76 3.460 20.22 1 0
## Valiant
## Duster 360
                   14.3 8 360.0 245 3.21 3.570 15.84 0 0
                                                              3
## Merc 240D
                   24.4 4 146.7 62 3.69 3.190 20.00 1 0
## Merc 230
                   22.8 4 140.8 95 3.92 3.150 22.90 1 0
                                                                  2
## Merc 280
                   19.2 6 167.6 123 3.92 3.440 18.30 1 0
## Merc 280C
                   17.8 6 167.6 123 3.92 3.440 18.90 1 0
## Merc 450SE
                    16.4 8 275.8 180 3.07 4.070 17.40 0 0
## Merc 450SL
                    17.3 8 275.8 180 3.07 3.730 17.60 0 0
                                                                  3
## Merc 450SLC
                    15.2 8 275.8 180 3.07 3.780 18.00 0 0
                                                              3
## Cadillac Fleetwood 10.4 8 472.0 205 2.93 5.250 17.98 0 0
```

Question 4

```
x = matrix(c(1:3, NA, 5:7, NA, NA), nrow = 3) # it generates a 3x3 matrix that consists of 1,2,3,NA,5,6
x[is.na(x)] = 0 # it assigns zero to all cells with NA.
```

Question 5

Mazda RX4

```
data("mtcars")
mtcars$mpg_2 <- ifelse(mtcars$mpg <16, 'Low',</pre>
                        ifelse(mtcars$mpg >= 16 & mtcars$mpg < 21, 'Low_intermediate',</pre>
                               ifelse(mtcars$mpg >= 21 & mtcars$mpg < 26, 'Intermediate_high', 'High')))</pre>
mtcars
##
                        mpg cyl disp hp drat
                                                    wt qsec vs am gear carb
                        21.0 6 160.0 110 3.90 2.620 16.46 0 1
```

```
## Mazda RX4 Wag
                        21.0
                               6 160.0 110 3.90 2.875 17.02
## Datsun 710
                        22.8
                               4 108.0 93 3.85 2.320 18.61
                                                                            1
## Hornet 4 Drive
                        21.4
                               6 258.0 110 3.08 3.215 19.44
## Hornet Sportabout
                        18.7
                               8 360.0 175 3.15 3.440 17.02
                                                                      3
                                                                            2
## Valiant
                        18.1
                               6 225.0 105 2.76 3.460 20.22
                                                                       3
                                                                            1
## Duster 360
                               8 360.0 245 3.21 3.570 15.84
                                                                      3
                        14.3
                                                                 0
                                                                            4
## Merc 240D
                               4 146.7 62 3.69 3.190 20.00
                        24.4
## Merc 230
                        22.8
                               4 140.8 95 3.92 3.150 22.90
                                                              1
                                                                 0
                                                                       4
                                                                            2
## Merc 280
                       19.2
                               6 167.6 123 3.92 3.440 18.30
                                                                            4
## Merc 280C
                                                                       4
                                                                            4
                        17.8
                               6 167.6 123 3.92 3.440 18.90
## Merc 450SE
                        16.4
                               8 275.8 180 3.07 4.070 17.40
## Merc 450SL
                        17.3
                               8 275.8 180 3.07 3.730 17.60
                                                                      3
                                                                 0
                                                                            3
                                                                      3
## Merc 450SLC
                        15.2
                               8 275.8 180 3.07 3.780 18.00
                                                              0
                                                                 0
                                                                            3
                               8 472.0 205 2.93 5.250 17.98
                                                                      3
## Cadillac Fleetwood 10.4
                                                                 0
## Lincoln Continental 10.4
                               8 460.0 215 3.00 5.424 17.82
                                                                 0
                                                                      3
                                                              0
## Chrysler Imperial
                       14.7
                               8 440.0 230 3.23 5.345 17.42
                                                                 0
                                                                       3
## Fiat 128
                        32.4
                                  78.7
                                                                       4
                                        66 4.08 2.200 19.47
                                                              1
                                                                            1
                                                                 1
## Honda Civic
                        30.4
                                  75.7
                                        52 4.93 1.615 18.52
                        33.9
                               4 71.1 65 4.22 1.835 19.90
## Toyota Corolla
                                                                            1
                                                                      3
## Toyota Corona
                        21.5
                               4 120.1
                                       97 3.70 2.465 20.01
                                                                            1
## Dodge Challenger
                        15.5
                               8 318.0 150 2.76 3.520 16.87
                                                                 Λ
                                                                      3
                                                                            2
## AMC Javelin
                               8 304.0 150 3.15 3.435 17.30
                        15.2
## Camaro Z28
                               8 350.0 245 3.73 3.840 15.41
                                                                      3
                        13.3
                                                                 0
                                                                            4
## Pontiac Firebird
                        19.2
                               8 400.0 175 3.08 3.845 17.05
                                                                      3
                                                                            2
## Fiat X1-9
                               4 79.0 66 4.08 1.935 18.90
                                                                      4
                        27.3
                                                                            1
## Porsche 914-2
                        26.0
                               4 120.3 91 4.43 2.140 16.70
                                                                            2
## Lotus Europa
                       30.4
                               4 95.1 113 3.77 1.513 16.90
                                                                      5
                                                                            2
                                                              1
                                                                 1
                                                                      5
## Ford Pantera L
                        15.8
                               8 351.0 264 4.22 3.170 14.50
                                                                            4
                                                                      5
## Ferrari Dino
                        19.7
                               6 145.0 175 3.62 2.770 15.50
                                                                            6
                                                                 1
## Maserati Bora
                        15.0
                               8 301.0 335 3.54 3.570 14.60
                                                                      5
                                                                            8
## Volvo 142E
                        21.4
                               4 121.0 109 4.11 2.780 18.60 1 1
                                                                       4
                                                                            2
##
                                    mpg_2
## Mazda RX4
                        Intermediate_high
## Mazda RX4 Wag
                        Intermediate_high
## Datsun 710
                        Intermediate high
## Hornet 4 Drive
                        Intermediate_high
## Hornet Sportabout
                        Low intermediate
## Valiant
                        Low_intermediate
## Duster 360
                                      I.ow
## Merc 240D
                        Intermediate_high
## Merc 230
                        Intermediate high
## Merc 280
                        Low intermediate
## Merc 280C
                        Low intermediate
## Merc 450SE
                        Low_intermediate
## Merc 450SL
                        Low_intermediate
## Merc 450SLC
                                      Low
## Cadillac Fleetwood
                                      Low
## Lincoln Continental
                                      Low
## Chrysler Imperial
                                      Low
## Fiat 128
                                     High
## Honda Civic
                                     High
## Toyota Corolla
## Toyota Corona
                       Intermediate_high
## Dodge Challenger
```

##	AMC Javelin	Low
##	Camaro Z28	Low
##	Pontiac Firebird	Low_intermediate
##	Fiat X1-9	High
##	Porsche 914-2	High
##	Lotus Europa	High
##	Ford Pantera L	Low
##	Ferrari Dino	Low_intermediate
##	Maserati Bora	Low
##	Volvo 142E	${\tt Intermediate_high}$