Homework #2

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Question 1

mtcars[mtcars$cyl < 6]

Missing a comma, should be:
mtcars[mtcars$cyl < 6,]

mtcars[-1:3,]

Needs to be a list so it knows not to include rows 1 to 3:
mtcars[-c(1:3),]

mtcars[mtcars$cyl = 8,]

Needs a second equals sign:
mtcars[mtcars$cyl == 8,]

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

Needs a list of numbers to run through rather than using '|':
mtcars[mtcars$cyl == c(4,6),]

Question 2

x = 1:5

x[NA]

Logical vectors like the one above tend to reuse the indices for each value, meaning that five values will be outputted instead of just one. When you index by NA, R recycles this value assigning it to all five of the values in X.

Question 3

mtcars[1:15] vs mtcars[1:15,]

mtcars[1:15] doesn't work because you are not specifying what rows or columns to pull from. mtcars[1:15,] works because you are denoting you want the first 15 rows to be printed out with all of the columns associated with those rows.

Question 4

Line 1: x = matrix(c(1:3, NA, 5:7, NA, NA), nrow = 3)

Line 2: x[is.na(x)] = 0

Line 1 Makes a 3 by 3 matrix (x) with values 1, 2, 3, NA, 5, 6, 7, NA, NA. This means that x[1,2], x[2,3], and x[3,3] all contain NA. Line 2 is used to set all NAs in the matrix to a value of 0. "is.na(x)" detects any NA values and sets them as true while also denoting integers as false. "x[is.na(x)]" pulls any value marked as true. By setting "x[is.na(x)] = 0", any value that is NA is now set to 0.

Question 5

```
## Loads dataset mtcars
data("mtcars")

## Creates empty row mpg_2 to record what gas efficiency category the car falls under
mtcars['mpg_2'] = NA

## For loop to run through every row of mtcars
for(i in 1:nrow(mtcars)){

  ## Tests for low category (mpg < 16)
  if(mtcars[i,1] < 16){
    mtcars[i,12] = "Low"
  } # Closes if loop

  ## Tests for Low_intermediate category (16 <= mpg <21)
  else if(mtcars[i,1] < 21){
    mtcars[i,12] = "Low_intermediate"
  } # Closes first else if loop

  ## Tests for Intermediate_high category (21 <= mpg <26)
  else if(mtcars[i,1] < 26){
    mtcars[i,12] = "Intermediate_high"
  } # Closes second else if loop

  ## Sets all other values at high (26 <= mpg)
  else{
    mtcars[i,12] = "High"
  }# Closes else loop
```

```
}# Closes for loop


## Used to print out mtcars so mpg and mpg_2 are columns next to each other.
print(mtcars[c(1,12,2:11)])
```

```
##                     mpg             mpg_2 cyl  disp  hp drat    wt  qsec vs am
## Mazda RX4          21.0 Intermediate_high   6 160.0 110 3.90 2.620 16.46  0  1
## Mazda RX4 Wag      21.0 Intermediate_high   6 160.0 110 3.90 2.875 17.02  0  1
## Datsun 710         22.8 Intermediate_high   4 108.0  93 3.85 2.320 18.61  1  1
## Hornet 4 Drive     21.4 Intermediate_high   6 258.0 110 3.08 3.215 19.44  1  0
## Hornet Sportabout  18.7  Low_intermediate   8 360.0 175 3.15 3.440 17.02  0  0
## Valiant            18.1  Low_intermediate   6 225.0 105 2.76 3.460 20.22  1  0
## Duster 360         14.3               Low   8 360.0 245 3.21 3.570 15.84  0  0
## Merc 240D          24.4 Intermediate_high   4 146.7  62 3.69 3.190 20.00  1  0
## Merc 230           22.8 Intermediate_high   4 140.8  95 3.92 3.150 22.90  1  0
## Merc 280           19.2  Low_intermediate   6 167.6 123 3.92 3.440 18.30  1  0
## Merc 280C          17.8  Low_intermediate   6 167.6 123 3.92 3.440 18.90  1  0
## Merc 450SE         16.4  Low_intermediate   8 275.8 180 3.07 4.070 17.40  0  0
## Merc 450SL         17.3  Low_intermediate   8 275.8 180 3.07 3.730 17.60  0  0
## Merc 450SLC        15.2               Low   8 275.8 180 3.07 3.780 18.00  0  0
## Cadillac Fleetwood 10.4               Low   8 472.0 205 2.93 5.250 17.98  0  0
## Lincoln Continental 10.4              Low   8 460.0 215 3.00 5.424 17.82  0  0
## Chrysler Imperial  14.7               Low   8 440.0 230 3.23 5.345 17.42  0  0
## Fiat 128           32.4              High   4  78.7  66 4.08 2.200 19.47  1  1
## Honda Civic        30.4              High   4  75.7  52 4.93 1.615 18.52  1  1
## Toyota Corolla     33.9              High   4  71.1  65 4.22 1.835 19.90  1  1
## Toyota Corona      21.5 Intermediate_high   4 120.1  97 3.70 2.465 20.01  1  0
## Dodge Challenger   15.5               Low   8 318.0 150 2.76 3.520 16.87  0  0
## AMC Javelin        15.2               Low   8 304.0 150 3.15 3.435 17.30  0  0
## Camaro Z28         13.3               Low   8 350.0 245 3.73 3.840 15.41  0  0
## Pontiac Firebird   19.2  Low_intermediate   8 400.0 175 3.08 3.845 17.05  0  0
## Fiat X1-9          27.3              High   4  79.0  66 4.08 1.935 18.90  1  1
## Porsche 914-2      26.0              High   4 120.3  91 4.43 2.140 16.70  0  1
## Lotus Europa       30.4              High   4  95.1 113 3.77 1.513 16.90  1  1
## Ford Pantera L     15.8               Low   8 351.0 264 4.22 3.170 14.50  0  1
## Ferrari Dino       19.7  Low_intermediate   6 145.0 175 3.62 2.770 15.50  0  1
## Maserati Bora      15.0               Low   8 301.0 335 3.54 3.570 14.60  0  1
## Volvo 142E         21.4 Intermediate_high   4 121.0 109 4.11 2.780 18.60  1  1
##                    gear carb
## Mazda RX4             4    4
## Mazda RX4 Wag         4    4
## Datsun 710            4    1
## Hornet 4 Drive        3    1
## Hornet Sportabout     3    2
## Valiant               3    1
## Duster 360            3    4
## Merc 240D             4    2
## Merc 230              4    2
## Merc 280              4    4
## Merc 280C             4    4
## Merc 450SE            3    3
## Merc 450SL            3    3
```

```
## Merc 450SLC           3    3
## Cadillac Fleetwood    3    4
## Lincoln Continental   3    4
## Chrysler Imperial     3    4
## Fiat 128              4    1
## Honda Civic           4    2
## Toyota Corolla        4    1
## Toyota Corona         3    1
## Dodge Challenger      3    2
## AMC Javelin           3    2
## Camaro Z28            3    4
## Pontiac Firebird      3    2
## Fiat X1-9             4    1
## Porsche 914-2         5    2
## Lotus Europa          5    2
## Ford Pantera L        5    4
## Ferrari Dino          5    6
## Maserati Bora         5    8
## Volvo 142E            4    2
```