

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]
```

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 into 0. “is.na(x)” detects any NA values and sets them as true. All of the integers are considered false. “x[is.na(x)]” pulls any value marked as true. By setting “x[is.na(x)]” to, any value that is NA is now set to 0.

Question 5

```
## 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 |