

Homework #2

Nathaniel Haulk

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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]
```

Indexing by NA returns NA 5 times. Since you are indexing by an unknown element, you are instructing R to retrieve an element it can not recognize, causing it to print 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