Practical Exam in CS 101

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2023-11-14

#1. Load the mtcars.csv dataset into the R environment.

```
data("mtcars")
mtcars
```

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

#2. How many observations does the mtcars have? How about the number of columns? List down the names of the column. Show your answer.

```
length(mtcars)
```

```
## [1] 11
```

```r
length(colnames(mtcars))
```

[1] 11

```r
colnames(mtcars)
```

[1] "mpg" "cyl" "disp" "hp"   "drat" "wt"   "qsec" "vs"   "am"   "gear"
[11] "carb"

#3. Generate a summary of the numerical variables as well as the structure of each variable in the mtcars dataset.

```r
library(tibble)
head(mtcars)
```

mpg cyl disp hp drat   wt qsec vs am gear carb
Mazda RX4   21.0   6 160 110 3.90 2.620 16.46 0 1   4   4
Mazda RX4 Wag   21.0   6 160 110 3.90 2.875 17.02 0 1   4   4
Datsun 710   22.8   4 108 93 3.85 2.320 18.61 1 1   4   1
Hornet 4 Drive   21.4   6 258 110 3.08 3.215 19.44 1 0   3   1
Hornet Sportabout 18.7   8 360 175 3.15 3.440 17.02 0 0   3   2
Valiant   18.1   6 225 105 2.76 3.460 20.22 1 0   3   1

```r
summary(mtcars)
```

mpg   cyl   disp   hp
Min.   :10.40   Min.   :4.000   Min.   : 71.1   Min.   : 52.0
1st Qu.:15.43   1st Qu.:4.000   1st Qu.:120.8   1st Qu.: 96.5
Median :19.20   Median :6.000   Median :196.3   Median :123.0
Mean   :20.09   Mean   :6.188   Mean   :230.7   Mean   :146.7
3rd Qu.:22.80   3rd Qu.:8.000   3rd Qu.:326.0   3rd Qu.:180.0
Max.   :33.90   Max.   :8.000   Max.   :472.0   Max.   :335.0
drat   wt   qsec   vs
Min.   :2.760   Min.   :1.513   Min.   :14.50   Min.   :0.0000
1st Qu.:3.080   1st Qu.:2.581   1st Qu.:16.89   1st Qu.:0.0000
Median :3.695   Median :3.325   Median :17.71   Median :0.0000
Mean   :3.597   Mean   :3.217   Mean   :17.85   Mean   :0.4375
3rd Qu.:3.920   3rd Qu.:3.610   3rd Qu.:18.90   3rd Qu.:1.0000
Max.   :4.930   Max.   :5.424   Max.   :22.90   Max.   :1.0000
am   gear   carb
Min.   :0.0000   Min.   :3.000   Min.   :1.000
1st Qu.:0.0000   1st Qu.:3.000   1st Qu.:2.000
Median :0.0000   Median :4.000   Median :2.000
Mean   :0.4062   Mean   :3.688   Mean   :2.812
3rd Qu.:1.0000   3rd Qu.:4.000   3rd Qu.:4.000
Max.   :1.0000   Max.   :5.000   Max.   :8.000

#4. Create a bar chart to visualize the distribution of transmission types. Show your solution.

#5. Which from the model has the highest mpg? How about the car model with the highest horsepower? Show your solution that will display the name of the model with the highest mpg and the car model with the highest horsepower