

Practical Exam in CS 101

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Importing a dataset #The mtcars dataset contains information about various car models, including variables such as mpg(miles per gallon), cyl(number of cylinders), disp(displacement in cu.in.), hp(horsepower),drat(rear axle ratio), wt(weight in 1000 lbs), qsec(1/4 mile time), vs(engine where 0 = V-shaped, 1=straight), am(transmission where 0=automatic,1=manual), gear(number of forward gears)

##1. Load the mtcars.csv dataset into the R environment. Show your answer.

```
save(mtcars, file = "mtcars.csv")
load("mtcars.csv")
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
```

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

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

```
colnames(mtcars)
```

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

##Renaming the rownames by using tibble package.

```
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
```

```
mtcars<- rownames_to_column(mtcars,var = "models")
```

```
head(mtcars)
```

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

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

```
summary(mtcars)
```

```
##           models           mpg           cyl           disp
## Length:32      Min.   :10.40      Min.   :4.000      Min.   : 71.1
## Class :character 1st Qu.:15.43      1st Qu.:4.000      1st Qu.:120.8
## Mode  :character Median :19.20      Median :6.000      Median :196.3
##              Mean  :20.09      Mean  :6.188      Mean  :230.7
##              3rd Qu.:22.80      3rd Qu.:8.000      3rd Qu.:326.0
##              Max.   :33.90      Max.   :8.000      Max.   :472.0
##           hp           drat           wt           qsec
## Min.   : 52.0      Min.   :2.760      Min.   :1.513      Min.   :14.50
## 1st Qu.: 96.5      1st Qu.:3.080      1st Qu.:2.581      1st Qu.:16.89
## Median :123.0      Median :3.695      Median :3.325      Median :17.71
## Mean   :146.7      Mean   :3.597      Mean   :3.217      Mean   :17.85
## 3rd Qu.:180.0      3rd Qu.:3.920      3rd Qu.:3.610      3rd Qu.:18.90
## Max.   :335.0      Max.   :4.930      Max.   :5.424      Max.   :22.90
##           vs           am           gear           carb
```

```
## Min.      :0.0000   Min.      :0.0000   Min.      :3.000   Min.      :1.000
## 1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:3.000   1st Qu.:2.000
## Median :0.0000   Median :0.0000   Median :4.000   Median :2.000
## Mean    :0.4375   Mean    :0.4062   Mean    :3.688   Mean    :2.812
## 3rd Qu.:1.0000   3rd Qu.:1.0000   3rd Qu.:4.000   3rd Qu.:4.000
## Max.    :1.0000   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.

```
max(mtcars$model)
```

```
## [1] "Volvo 142E"
```

```
max(mtcars$mpg)
```

```
## [1] 33.9
```

##6. Which from the car models having 8 cylinders? Save this as newCar.csv file. Display the 1st two rows of this dataset. Show your solution.

##7. Calculate the mean mpg of the car models with 6 cylinders. Show your solution.

##8. Visualize the relationship between the miles per gallon and the horsepower? Show your solution and describe the generated scatter plot.

##9. From the newCar dataset, create a boxplot for the number of cylinders(x axis) and the horsepower(y axis). Show your solution and describe the generated box plot.

##10. Create a pie chart to represent the portion of the car models with different numbers of cylinders. Show your solution.

##11. Generate a bar chart for the different number of cylinders. How many cars have 6 cylinders? How about those cars that have 4 cylinders? Show you solution. ##Note: Make sure that the generated graphs will have color,title,and legends.