```
from google.colab import files
files.upload()
```

Choose Files No file chosen   Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable.
Saving CARS.csv to CARS (1).csv

```
{'CARS.csv':
b'\xef\xbb\xbfMake,Model,Type,Origin,DriveTrain,MSRP,Invoice,EngineSize,Cylinders,Horsepower,MPG_City,M
Type S 2dr,Sedan,Asia,Front,"$23,820","$21,761",2,4,200,24,31,2778,101,172\nAcura,TSX
4dr,Sedan,Asia,Front,"$26,990","$24,647",2.4,4,200,22,29,3230,105,183\nAcura,TL
4dr,Sedan,Asia,Front,"$33,195","$30,299",3.2,6,270,20,28,3575,108,186\nAcura,3.5 RL
4dr,Sedan,Asia,Front,"$43,755","$39,014",3.5,6,225,18,24,3880,115,197\nAcura,3.5 RL w/Navigation
4dr,Sedan,Asia,Front,"$46,100","$41,100",3.5,6,225,18,24,3893,115,197\nAcura,NSX coupe 2dr manual
S,Sports,Asia,Rear,"$89,765","$79,978",3.2,6,290,17,24,3153,100,174\nAudi,A4 1.8T
4dr,Sedan,Europe,Front,"$25,940","$23,508",1.8,4,170,22,31,3252,104,179\nAudi,A41.8T convertible
2dr,Sedan,Europe,Front,"$35,940","$32,506",1.8,4,170,23,30,3638,105,180\nAudi,A4 3.0
4dr,Sedan,Europe,Front,"$31,840","$28,846",3,6,220,20,28,3462,104,179\nAudi,A4 3.0 Quattro 4dr
manual,Sedan,Europe,All,"$33,430","$30,366",3,6,220,17,26,3583,104,179\nAudi,A4 3.0 Quattro 4dr
auto,Sedan,Europe,All,"$34,480","$31,388",3,6,220,18,25,3627,104,179\nAudi,A6 3.0
4dr,Sedan,Europe,Front,"$36,640","$33,129",3,6,220,20,27,3561,109,192\nAudi,A6 3.0 Quattro
4dr,Sedan,Europe,All,"$39,640","$35,992",3,6,220,18,25,3880,109,192\nAudi,A4 3.0 convertible
2dr,Sedan,Europe,Front,"$42,490","$38,325",3,6,220,20,27,3814,105,180\nAudi,A4 3.0 Quattro convertible
2dr,Sedan,Europe,All,"$44,240","$40,075",3,6,220,18,25,4013,105,180\nAudi,A6 2.7 Turbo Quattro
4dr,Sedan,Europe,All,"$42,840","$38,840",2.7,6,250,18,25,3836,109,192\nAudi,A6 4.2 Quattro
4dr,Sedan,Europe,All,"$49,690","$44,936",4.2,8,300,17,24,4024,109,193\nAudi,A8 L Quattro
4dr,Sedan,Europe,All,"$69,190","$64,740",4.2,8,330,17,24,4399,121,204\nAudi,S4 Quattro
4dr,Sedan,Europe,All,"$48,040","$43,556",4.2,8,340,14,20,3825,104,179\nAudi,RS 6
4dr,Sports,Europe,Front,"$84,600","$76,417",4.2,8,450,15,22,4024,109,191\nAudi,TT 1.8 convertible 2dr
(coupe),Sports,Europe,Front,"$35,940","$32,512",1.8,4,180,20,28,3131,95,159\nAudi,TT 1.8 Quattro 2dr
(convertible),Sports,Europe,All,"$37,390","$33,891",1.8,4,225,20,28,2921,96,159\nAudi,TT 3.2 coupe 2dr
(convertible),Sports,Europe,All,"$40,590","$36,739",3.2,6,250,21,29,3351,96,159\nAudi,A6 3.0 Avant
Quattro,Wagon,Europe,All,"$40,840","$37,060",3,6,220,18,25,4035,109,192\nAudi,S4 Avant
Quattro,Wagon,Europe,All,"$49,090","$44,446",4.2,8,340,15,21,3936,104,179\nBMW,X3
3.0i,SUV,Europe,All,"$37,000","$33,873",3,6,225,16,23,4023,110,180\nBMW,X5
4.4i,SUV,Europe,All,"$52,195","$47,720",4.4,8,325,16,22,4824,111,184\nBMW,325i
4dr,Sedan,Europe,Rear,"$28,495","$26,155",2.5,6,184,20,29,3219,107,176\nBMW,325Ci
2dr,Sedan,Europe,Rear,"$30,795","$28,245",2.5,6,184,20,29,3197,107,177\nBMW,325Ci convertible
2dr,Sedan,Europe,Rear,"$37,995","$34,800",2.5,6,184,19,27,3560,107,177\nBMW,325xi
4dr,Sedan,Europe,All,"$30,245","$27,745",2.5,6,184,19,27,3461,107,176\nBMW,330i
4dr,Sedan,Europe,Rear,"$35,495","$32,525",3,6,225,20,30,3285,107,176\nBMW,330Ci
2dr,Sedan,Europe,Rear,"$36,995","$33,890",3,6,225,20,30,3285,107,176\nBMW,330xi
4dr,Sedan,Europe,All,"$37,245","$34,115",3,6,225,20,29,3483,107,176\nBMW,525i
4dr,Sedan,Europe,Rear,"$39,995","$36,620",2.5,6,184,19,28,3428,114,191\nBMW,330Ci convertible
2dr,Sedan,Europe,Rear,"$44,295","$40,530",3,6,225,19,28,3616,107,177\nBMW,530i
4dr,Sedan,Europe,Rear,"$44,995","$41,170",3,6,225,20,30,3472,114,191\nBMW,545iA
4dr,Sedan,Europe,Rear,"$54,995","$50,270",4.4,8,325,18,26,3814,114,191\nBMW,745i
4dr,Sedan,Europe,Rear,"$69,195","$63,190",4.4,8,325,18,26,4376,118,198\nBMW,745Li
4dr,Sedan,Europe,Rear,"$73,195","$66,830",4.4,8,325,18,26,4464,123,204\nBMW,M3 coupe
2dr,Sports,Europe,Rear,"$48,195","$44,170",3.2,6,333,16,24,3415,108,177\nBMW,M3 convertible
2dr,Sports,Europe,Rear,"$56,595","$51,815",3.2,6,333,16,23,3781,108,177\nBMW,Z4 convertible 2.5i
2dr,Sports,Europe,Rear,"$33,895","$31,065",2.5,6,184,20,28,2932,98,161\nBMW,Z4 convertible 3.0i
2dr,Sports,Europe,Rear,"$41,045","$37,575",3,6,225,21,29,2998,98,161\nBMW,325xi
Sport,Wagon,Europe,All,"$32,845","$30,110",2.5,6,184,19,26,3594,107,176\nBuick,Rainier,SUV,USA,All,"$37
CX,SUV,USA,Front,"$26,545","$24,085",3.4,6,185,19,26,4024,112,187\nBuick,Century Custom
4dr,Sedan,USA,Front,"$22,180","$20,351",3.1,6,175,20,30,3353,109,195\nBuick,LeSabre Custom
4dr,Sedan,USA,Front,"$26,470","$24,282",3.8,6,205,20,29,3567,112,200\nBuick,Regal LS
4dr,Sedan,USA,Front,"$24,895","$22,835",3.8,6,200,20,30,3461,109,196\nBuick,Regal GS
4dr,Sedan,USA,Front,"$28,345","$26,047",3.8,6,240,18,28,3536,109,196\nBuick,LeSabre Limited
4dr,Sedan,USA,Front,"$32,245","$29,566",3.8,6,205,20,29,3591,112,200\nBuick,Park Avenue
4dr,Sedan,USA,Front,"$35,545","$32,244",3.8,6,205,20,29,3778,114,207\nBuick,Park Avenue Ultra
4dr,Sedan,USA,Front,"$40,720","$36,927",3.8,6,240,18,28,3909,114,207\nCadillac,Escalade,SUV,USA,Front,'
V8,SUV,USA,Front,"$46,995","$43,523",4.6,8,320,16,21,4302,116,195\nCadillac,CTS VVT
4dr,Sedan,USA,Rear,"$30,835","$28,575",3.6,6,255,18,25,3694,113,190\nCadillac,Deville
4dr,Sedan,USA,Front,"$45,445","$41,650",4.6,8,275,18,26,3984,115,207\nCadillac,Deville DTS
4dr,Sedan,USA,Front,"$50,595","$46,362",4.6,8,300,18,26,4044,115,207\nCadillac,Seville SLS
4dr,Sedan,USA,Front,"$47,955","$43,841",4.6,8,275,18,26,3992,112,201\nCadillac,XLR convertible
2dr,Sports,USA,Rear,"$76,200","$70,546",4.6,8,320,17,25,3647,106,178\nCadillac,Escalade
EXT,Truck,USA,All,"$52,975","$48,541",6,8,345,13,17,5879,130,221\nChevrolet,Suburban 1500
LT,SUV,USA,Front,"$42,735","$37,422",5.3,8,295,14,18,4947,130,219\nChevrolet,Tahoe
LT,SUV,USA,All,"$41,465","$36,287",5.3,8,295,14,18,5050,116,197\nChevrolet,TrailBlazer
LT,SUV,USA,Front,"$30,295","$27,479",4.2,6,275,16,21,4425,113,192\nChevrolet,Tracker,SUV,USA,Front,"$26
4dr,Sedan,USA,Front,"$11,690","$10,965",1.6,4,103,28,34,2370,98,167\nChevrolet,Aveo LS 4dr
hatch,Sedan,USA,Front,"$12,585","$11,802",1.6,4,103,28,34,2348,98,153\nChevrolet,Cavalier
2dr,Sedan,USA,Front,"$14,610","$13,697",2.2,4,140,26,37,2617,104,183\nChevrolet,Cavalier
4dr,Sedan,USA,Front,"$14,810","$13,884",2.2,4,140,26,37,2676,104,183\nChevrolet,Cavalier LS
2dr,Sedan,USA,Front,"$16,385","$15,357",2.2,4,140,26,37,2617,104,183\nChevrolet,Impala
4dr,Sedan,USA,Front,"$21,900","$20,095",3.4,6,180,21,32,3465,111,200\nChevrolet,Malibu
4dr,Sedan,USA,Front,"$18,995","$17,434",2.2,4,145,24,34,3174,106,188\nChevrolet,Malibu LS
4dr,Sedan,USA,Front,"$20,370","$18,639",3.5,6,200,22,30,3297,106,188\nChevrolet,Monte Carlo LS
2dr,Sedan,USA,Front,"$21,825","$20,026",3.4,6,180,21,32,3340,111,198\nChevrolet,Impala LS
4dr,Sedan,USA,Front,"$25,000","$22,931",3.8,6,200,20,30,3476,111,200\nChevrolet,Impala SS
4dr,Sedan,USA,Front,"$27,995","$25,672",3.8,6,240,18,28,3606,111,200\nChevrolet,Malibu LT
4dr,Sedan,USA,Front,"$23,495","$21,551",3.5,6,200,23,32,3315,106,188\nChevrolet,Monte Carlo SS
2dr,Sedan,USA,Front,"$24,225","$22,222",3.8,6,200,18,28,3434,111,198\nChevrolet,Astro,Sedan,USA,All,"$2
LS,Sedan,USA,Front,"$27,020","$24,518",3.4,6,185,19,26,3699,112,187\nChevrolet,Corvette
2dr,Sports,USA,Rear,"$44,535","$39,068",5.7,8,350,18,25,3246,105,180\nChevrolet,Corvette convertible
2dr,Sports,USA,Rear,"$51,535","$45,193",5.7,8,350,18,25,3248,105,180\nChevrolet,Avalanche
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1500,Truck,USA,All,"$36,100","$31,689",5.3,8,295,14,18,5678,130,222\nChevrolet,Colorado
Z85,Truck,USA,All,"$18,760","$17,070",2.8,4,175,18,23,3623,111,192\nChevrolet,Silverado 1500 Regular
Cab,Truck,USA,Rear,"$20,310","$18,480",4.3,6,200,15,21,4142,119,206\nChevrolet,Silverado
SS,Truck,USA,All,"$40,340","$35,399",6,8,300,13,17,4804,144,238\nChevrolet,SSR,Truck,USA,Rear,"$41,995'
Maxx LS,Wagon,USA,Front,"$22,225","$20,394",3.5,6,200,22,30,3458,112,188\nChrysler,PT Cruiser
4dr,Sedan,USA,Front,"$17,985","$16,919",2.4,4,150,22,29,3101,103,169\nChrysler,PT Cruiser Limited
4dr,Sedan,USA,Front,"$22,000","$20,573",2.4,4,150,22,29,3105,103,169\nChrysler,Sebring
4dr,Sedan,USA,Front,"$19,090","$17,805",2.4,4,150,22,30,3173,108,191\nChrysler,Sebring Touring
4dr,Sedan,USA,Front,"$21,840","$20,284",2.7,6,200,21,28,3222,108,191\nChrysler,300M
4dr,Sedan,USA,Front,"$29,865","$27,797",3.5,6,250,18,27,3581,113,198\nChrysler,Concorde LX
4dr,Sedan,USA,Front,"$24,130","$22,452",2.7,6,200,21,29,3479,113,208\nChrysler,Concorde LXi
4dr,Sedan,USA,Front,"$26,860","$24,909",3.5,6,232,19,27,3548,113,208\nChrysler,PT Cruiser GT
4dr,Sedan,USA,Front,"$25,955","$24,172",2.4,4,220,21,27,3217,103,169\nChrysler,Sebring convertible
2dr,Sedan,USA,Front,"$25,215","$23,451",2.4,4,150,22,30,3357,106,194\nChrysler,300M Special Edition
4dr,Sedan,USA,Front,"$33,295","$30,884",3.5,6,255,18,27,3650,113,198\nChrysler,Sebring Limited
convertible 2dr,Sedan,USA,Front,"$30,950","$28,613",2.7,6,200,21,28,3448,106,194\nChrysler,Town and
Country LX,Sedan,USA,Front,"$27,490","$25,371",3.3,6,180,19,26,4068,119,201\nChrysler,Town and Country
Limited,Sedan,USA,Front,"$38,380","$35,063",3.8,6,215,18,25,4331,119,201\nChrysler,Crossfire
2dr,Sports,USA,Rear,"$34,495","$32,033",3.2,6,215,17,25,3060,95,160\nChrysler,Pacifica,Wagon,USA,Rear,'
SLT,SUV,USA,All,"$32,235","$29,472",4.7,8,230,15,21,4987,119,201\nDodge,Neon SE
4dr,Sedan,USA,Front,"$13,670","$12,849",2,4,132,29,36,2581,105,174\nDodge,Neon SXT
4dr,Sedan,USA,Front,"$15,040","$14,086",2,4,132,29,36,2626,105,174\nDodge,Intrepid SE
4dr,Sedan,USA,Front,"$22,035","$20,502",2.7,6,200,21,29,3469,113,204\nDodge,Stratus SXT
4dr,Sedan,USA,Front,"$18,820","$17,512",2.4,4,150,21,28,3182,108,191\nDodge,Stratus SE
4dr,Sedan,USA,Front,"$20,220","$18,821",2.4,4,150,21,28,3175,108,191\nDodge,Intrepid ES
4dr,Sedan,USA,Front,"$24,885","$23,058",3.5,6,232,18,27,3487,113,204\nDodge,Caravan
SE,Sedan,USA,Front,"$21,795","$20,508",2.4,4,150,20,26,3862,113,189\nDodge,Grand Caravan
SXT,Sedan,USA,All,"$32,660","$29,812",3.8,6,215,18,25,4440,119,201\nDodge,Viper SRT-10 convertible
2dr,Sports,USA,Rear,"$81,795","$74,451",8.3,10,500,12,20,3410,99,176\nDodge,Dakota Regular
Cab,Truck,USA,Rear,"$17,630","$16,264",3.7,6,210,16,22,3714,112,193\nDodge,Dakota Club
Cab,Truck,USA,Rear,"$20,300","$18,670",3.7,6,210,16,22,3829,131,219\nDodge,Ram 1500 Regular Cab
ST,Truck,USA,Rear,"$20,215","$18,076",3.7,6,215,16,21,4542,121,208\nFord,Excursion 6.8
XLT,SUV,USA,All,"$41,475","$36,494",6.8,10,310,10,13,7190,137,227\nFord,Expedition 4.6
XLT,SUV,USA,Front,"$34,560","$30,468",4.6,8,232,15,19,5000,119,206\nFord,Explorer XLT
V6,SUV,USA,All,"$29,670","$26,983",4,6,210,15,20,4463,114,190\nFord,Escape
XLS,SUV,USA,All,"$22,515","$20,907",3,6,201,18,23,3346,103,173\nFord,Focus ZX3 2dr
hatch,Sedan,USA,Front,"$13,270","$12,482",2,4,130,26,33,2612,103,168\nFord,Focus LX
4dr,Sedan,USA,Front,"$13,730","$12,906",2,4,110,27,36,2606,103,168\nFord,Focus SE
4dr,Sedan,USA,Front,"$15,460","$14,496",2,4,130,26,33,2606,103,168\nFord,Focus ZX5
5dr,Sedan,USA,Front,"$15,580","$14,607",2,4,130,26,33,2691,103,168\nFord,Focus SVT
2dr,Sedan,USA,Front,"$19,135","$17,878",2,4,170,21,28,2750,103,168\nFord,Taurus LX
4dr,Sedan,USA,Front,"$20,320","$18,881",3,6,155,20,27,3306,109,198\nFord,Taurus SES Duratec
4dr,Sedan,USA,Front,"$22,735","$20,857",3,6,201,19,26,3313,109,198\nFord,Crown Victoria
4dr,Sedan,USA,Rear,"$24,345","$22,856",4.6,8,224,17,25,4057,115,212\nFord,Crown Victoria LX
4dr,Sedan,USA,Rear,"$27,370","$25,105",4.6,8,224,17,25,4057,115,212\nFord,Crown Victoria LX Sport
4dr,Sedan,USA,Rear,"$30,315","$27,756",4.6,8,239,17,25,4057,115,212\nFord,Freestar
SE,Sedan,USA,Front,"$26,930","$24,498",3.9,6,193,17,23,4275,121,201\nFord,Mustang 2dr
(convertible),Sports,USA,Rear,"$18,345","$16,943",3.8,6,193,20,29,3290,101,183\nFord,Mustang GT
Premium convertible
2dr,Sports,USA,Rear,"$29,380","$26,875",4.6,8,260,17,25,3347,101,183\nFord,Thunderbird Deluxe convert
w/hardtop 2d,Sports,USA,Front,"$37,530","$34,483",3.9,8,280,17,24,3780,107,186\nFord,F-150 Regular Cab
XL,Truck,USA,Rear,"$22,010","$19,490",4.6,8,231,15,19,4788,126,211\nFord,F-150 Supercab
Lariat,Truck,USA,All,"$33,540","$29,405",5.4,8,300,14,18,5464,133,218\nFord,Ranger 2.3 XL Regular
Cab,Truck,USA,Rear,"$14,385","$13,717",2.3,4,143,24,29,3028,111,188\nFord,Focus
ZTW,Wagon,USA,Front,"$17,475","$16,375",2,4,130,26,33,2702,103,178\nFord,Taurus
SE,Wagon,USA,Front,"$22,290","$20,457",3,6,155,19,26,3497,109,198\nGMC,Envoy XUV
SLE,SUV,USA,Front,"$31,890","$28,922",4.2,6,275,15,19,4945,129,208\nGMC,Yukon 1500
SLE,SUV,USA,All,"$35,725","$31,361",4.8,8,285,16,19,5042,116,199\nGMC,Yukon XL 2500
SLT,SUV,USA,All,"$46,265","$40,534",6,8,325,13,17,6133,130,219\nGMC,Safari
SLE,Sedan,USA,Rear,"$25,640","$23,215",4.3,6,190,16,20,4309,111,190\nGMC,Canyon Z85 SL Regular
Cab,Truck,USA,Rear,"$16,530","$14,877",2.8,4,175,18,25,3351,111,192\nGMC,Sierra Extended Cab
1500,Truck,USA,Rear,"$25,717","$22,604",4.8,8,285,17,20,4548,144,230\nGMC,Sierra HD
2500,Truck,USA,All,"$29,322","$25,759",6,8,300,13,18,5440,133,222\nGMC,Sonoma Crew
Cab,Truck,USA,All,"$25,395","$23,043",4.3,6,190,15,19,4083,123,208\nHonda,Civic Hybrid 4dr manual
(gas/electric),Hybrid,Asia,Front,"$20,140","$18,451",1.4,4,93,46,51,2732,103,175\nHonda,Insight 2dr
(gas/electric),Hybrid,Asia,Front,"$19,110","$17,911",2,3,73,60,66,1850,95,155\nHonda,Pilot
LX,SUV,Asia,All,"$27,560","$24,843",3.5,6,240,17,22,4387,106,188\nHonda,CR-V
LX,SUV,Asia,All,"$19,860","$18,419",2.4,4,160,21,25,3258,103,179\nHonda,Element
LX,SUV,Asia,All,"$18,690","$17,334",2.4,4,160,21,24,3468,101,167\nHonda,Civic DX
2dr,Sedan,Asia,Front,"$13,270","$12,175",1.7,4,115,32,38,2432,103,175\nHonda,Civic HX
2dr,Sedan,Asia,Front,"$14,170","$12,996",1.7,4,117,36,44,2500,103,175\nHonda,Civic LX
4dr,Sedan,Asia,Front,"$15,850","$14,531",1.7,4,115,32,38,2513,103,175\nHonda,Accord LX
2dr,Sedan,Asia,Front,"$19,860","$17,924",2.4,4,160,26,34,2994,105,188\nHonda,Accord EX
2dr,Sedan,Asia,Front,"$22,260","$20,080",2.4,4,160,26,34,3047,105,188\nHonda,Civic EX
4dr,Sedan,Asia,Front,"$17,750","$16,265",1.7,4,127,32,37,2601,103,175\nHonda,Civic Si 2dr
hatch,Sedan,Asia,Front,"$19,490","$17,849",2,4,160,26,30,2782,101,166\nHonda,Accord LX V6
4dr,Sedan,Asia,Front,"$23,760","$21,428",3,6,240,21,30,3349,108,190\nHonda,Accord EX V6
2dr,Sedan,Asia,Front,"$26,960","$24,304",3,6,240,21,30,3294,105,188\nHonda,Odyssey
LX,Sedan,Asia,Front,"$24,950","$22,498",3.5,6,240,18,25,4310,118,201\nHonda,Odyssey
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!ls
```

```
'CARS (1).csv'   CARS.csv   sample_data
4dr,Sedan,Asia,Front,"$11,839","$11,116",1.6,4,103,29,33,2290,96,167\nHyundai,Accent GT 2dr
```

```
# Importing the required libraries
import pandas as pd
import numpy as np
import seaborn as sns #visualisation
import matplotlib.pyplot as plt #visualisation
%matplotlib inline
sns.set# Importing the required libraries
import pandas as pd
import numpy as np
import seaborn as sns #visualisation
import matplotlib.pyplot as plt #visualisation
%matplotlib inline
sns.set(color_codes=True)
```

```
# Loading the CSV file into a pandas dataframe.
df = pd.read_csv("CARS.csv")
df.head(5)
```

	Make	Model	Type	Origin	DriveTrain	MSRP	Invoice	EngineSize	Cylinders	Horsepower	MPG_Cit
0	Acura	MDX	SUV	Asia	All	$36,945	$33,337	3.5	6.0	265	1
1	Acura	RSX Type S 2dr	Sedan	Asia	Front	$23,820	$21,761	2.0	4.0	200	2
2	Acura	TSX 4dr	Sedan	Asia	Front	$26,990	$24,647	2.4	4.0	200	2

```
# Removing irrelevant features
df = df.drop(['Model','DriveTrain','Invoice', 'Origin', 'Type'], axis=1)
df.head(5)
```

	Make	MSRP	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway	Weight	Wheelbase	Length
0	Acura	$36,945	3.5	6.0	265	17	23	4451	106	189
1	Acura	$23,820	2.0	4.0	200	24	31	2778	101	172
2	Acura	$26,990	2.4	4.0	200	22	29	3230	105	183
3	Acura	$33,195	3.2	6.0	270	20	28	3575	108	186
4	Acura	$43,755	3.5	6.0	225	18	24	3880	115	197

```
# To identify the type of data
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 428 entries, 0 to 427
Data columns (total 10 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   Make         428 non-null    object
 1   MSRP         428 non-null    object
 2   EngineSize   428 non-null    float64
 3   Cylinders    426 non-null    float64
 4   Horsepower   428 non-null    int64
 5   MPG_City     428 non-null    int64
 6   MPG_Highway  428 non-null    int64
 7   Weight       428 non-null    int64
 8   Wheelbase    428 non-null    int64
 9   Length       428 non-null    int64
dtypes: float64(2), int64(6), object(2)
memory usage: 33.6+ KB
```

```
# Getting the number of instances and features
df.shape
```

```
(428, 10)
```

```
# Getting the dimensions of the data frame
df.ndim
```

```
2
```

```python
df = df.drop_duplicates(subset='MSRP', keep='first')
df.count()
```

```
Make          410
MSRP          410
EngineSize    410
Cylinders     408
Horsepower    410
MPG_City      410
MPG_Highway   410
Weight        410
Wheelbase     410
Length        410
dtype: int64
```

```python
# Finding the null values
print(df.isnull().sum())
```

```
Make          0
MSRP          0
EngineSize    0
Cylinders     2
Horsepower    0
MPG_City      0
MPG_Highway   0
Weight        0
Wheelbase     0
Length        0
dtype: int64
```

```python
df.Horsepower.max()
```

```
500
```

```python
# Printing the null value rows
df[240:242]
```

	Make	MSRP	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway	Weight	W
247	Mazda	$25,700	1.3	NaN	197	18	25	3053	
248	Mazda	$27,200	1.3	NaN	238	18	24	3029	

```python
sns.FacetGrid(df, hue='MSRP', height=5).map(plt.bar, 'EngineSize', 'Horsepower').add_legend()
```

<seaborn.axisgrid.FacetGrid at 0x7f90b9de3250>

MSRP
- 10280
- 10539
- 10760
- 10995
- 11155
- 11290
- 11560
- 11690
- 11839
- 11905
- 11939
- 12269
- 12360
- 12585
- 12740
- 12800
- 12884
- 12965
- 13270
- 13580
- 13670
- 13730
- 13839
- 14085
- 14165
- 14170
- 14300
- 14385
- 14500
- 14610
- 14622
- 14630
- 14740
- 14810
- 14840
- 14850
- 15030
- 15040
- 15295
- 15389
- 15460
- 15495
- 15500
- 15568
- 15580
- 15825
- 15850
- 16040
- 16350
- 16385
- 16495
- 16497
- 16530
- 16695
- 16722
- 16999
- 17045
- 17163
- 17200
- 17232
- 17262
- 17475
- 17495
- 17630
- 17640
- 17735
- 17750
- 17985
- 18345
- 18435
- 18690
- 18715
- 18739
- 18760
- 18820
- 18825
- 18892
- 18995
- 19005
- 19090
- 19110
- 19135
- 19240
- 19270
- 19312
- 19339
- 19479
- 19490
- 19560
- 19635
- 19825
- 19860

- 19800
- 19945
- 19999
- 20130
- 20140
- 20215
- 20220
- 20255
- 20290
- 20300
- 20310
- 20320
- 20339
- 20370
- 20445
- 20449
- 20510
- 20585
- 20615
- 20939
- 21055
- 21087
- 21410
- 21445
- 21589
- 21595
- 21795
- 21825
- 21840
- 21900
- 21965
- 22000
- 22010
- 22035
- 22180
- 22225
- 22260
- 22290
- 22350
- 22388
- 22395
- 22450
- 22515
- 22570
- 22595
- 22735
- 22775
- 23215
- 23290
- 23495
- 23560
- 23675
- 23699
- 23760
- 23785
- 23820
- 23845
- 23895
- 23955
- 24130
- 24225
- 24295
- 24345
- 24520
- 24589
- 24695
- 24780
- 24885
- 24895
- 24950
- 24955
- 25000
- 25045
- 25092
- 25130
- 25135
- 25193
- 25215
- 25395
- 25520
- 25640
- 25645
- 25700
- 25717
- 25920
- 25935
- 25940
- 25955
- 25995
- 26000
- 26060
- 26135
- 26189
- 26395
- 26470
- 26510

Horsepower

EngineSize
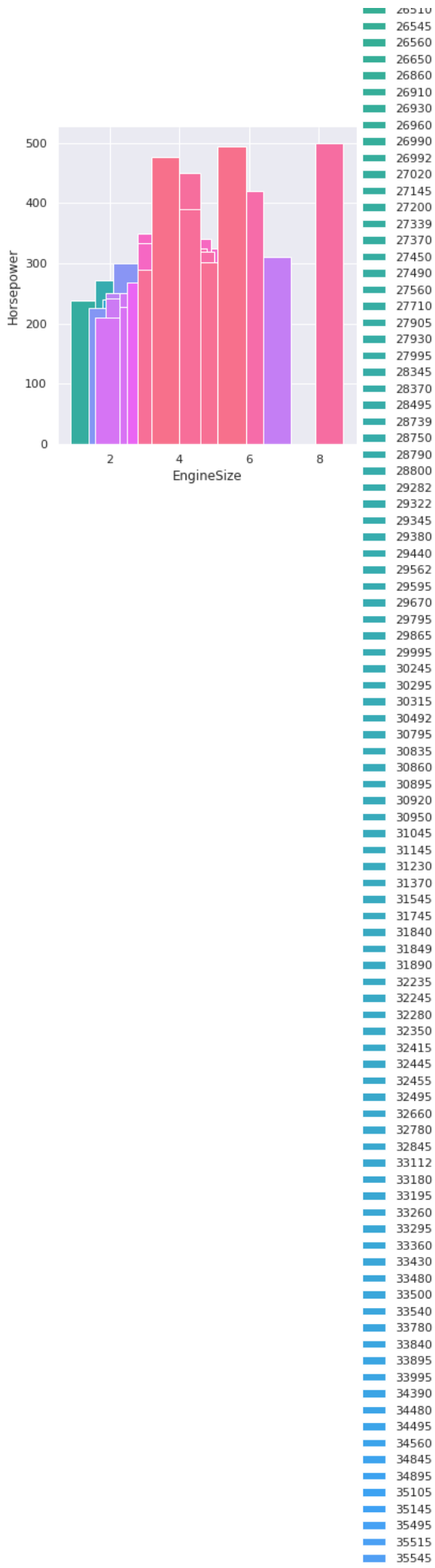
- 35695
- 35725
- 35920
- 35940
- 35995
- 36100
- 36395
- 36640
- 36895
- 36945
- 36995
- 37000
- 37245
- 37390
- 37530
- 37560
- 37630
- 37730
- 37885
- 37895
- 37995
- 38380
- 38830
- 39195
- 39235
- 39250
- 39465
- 39640
- 39995
- 40095
- 40235
- 40320
- 40340
- 40565
- 40590
- 40670
- 40720
- 40840
- 40845
- 41010
- 41045
- 41250
- 41465
- 41475
- 41815
- 41995
- 42490
- 42565
- 42735
- 42840
- 42845
- 42915
- 43175
- 43365
- 43495
- 43755
- 43895
- 44240
- 44295
- 44535
- 44925
- 44995
- 45210
- 45445
- 45700
- 45707
- 46100
- 46265
- 46470
- 46995
- 47955
- 48040
- 48170
- 48195
- 48450
- 49090
- 49690
- 49995
- 50470
- 50595
- 50670
- 51535
- 52120
- 52195
- 52365
- 52545
- 52775
- 52795
- 52800
- 52975
- 54765
- 54995
- 55750
- 56170

```
# Filling the rows with the mean of the column
val = df['Cylinders'].mean()
df['Cylinders'][247] = round(val)
val = df['Cylinders'].mean()
df['Cylinders'][248]= round(val)
```

<ipython-input-19-d9e0250049dd>:5: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-cc
  df['Cylinders'][248]= round(val)

━━ 75000

```
# Removing the formatting
df['MSRP'] = [x.replace('$', '') for x in df['MSRP']]
df['MSRP'] = [x.replace(',', '') for x in df['MSRP']]
df['MSRP']=pd.to_numeric(df['MSRP'],errors='coerce')
```

━━ 84165

```
sns.boxplot(x=df['MSRP'])
```

<matplotlib.axes._subplots.AxesSubplot at 0x7f90de5d4df0>
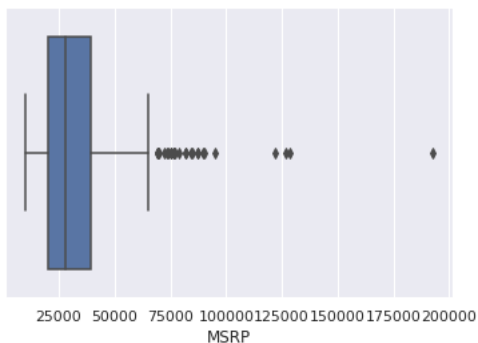

```
Q1 = df.quantile(0.25)
Q3 = df.quantile(0.75)
```

```
IQR = Q3 - Q1
print(IQR)
```

```
MSRP          19086.50
EngineSize        1.55
Cylinders         2.00
Horsepower       85.00
MPG_City          4.00
MPG_Highway       5.00
Weight          872.25
Wheelbase         9.00
Length           16.00
dtype: float64
```

```
sns.boxplot(x=df['MSRP'])
```

<matplotlib.axes._subplots.AxesSubplot at 0x7f90de44ebe0>

```
df.describe()
```
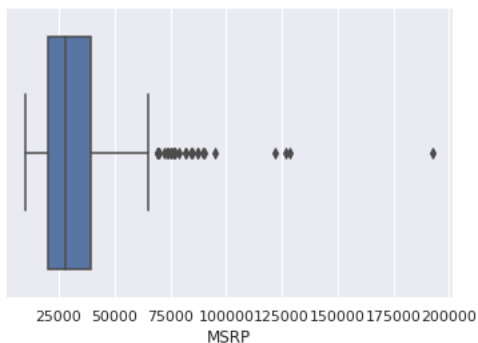
	MSRP	EngineSize	Cylinders	Horsepower	MPG_City	MPG_Highway	Weight	Wheelbas
count	410.000000	410.000000	410.000000	410.000000	410.000000	410.000000	410.000000	410.00000
mean	32919.021951	3.200976	5.824390	216.007317	20.039024	26.792683	3581.221951	108.16829
std	19628.241002	1.115264	1.556873	72.330689	5.280720	5.790004	766.396651	8.36563
min	10280.000000	1.300000	3.000000	73.000000	10.000000	12.000000	1850.000000	89.00000
25%	20324.750000	2.325000	4.000000	165.000000	17.000000	24.000000	3102.000000	103.00000
50%	27807.500000	3.000000	6.000000	210.000000	19.000000	26.000000	3476.000000	107.00000
75%	39411.250000	3.875000	6.000000	250.000000	21.000000	29.000000	3974.250000	112.00000
max	192465.000000	8.300000	12.000000	500.000000	60.000000	66.000000	7190.000000	144.00000

```
# Plotting a heat map
plt.figure(figsize=(10,5))
c= df.corr()
sns.heatmap(c,cmap="BrBG",annot=True)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f90de5d4fa0>
```
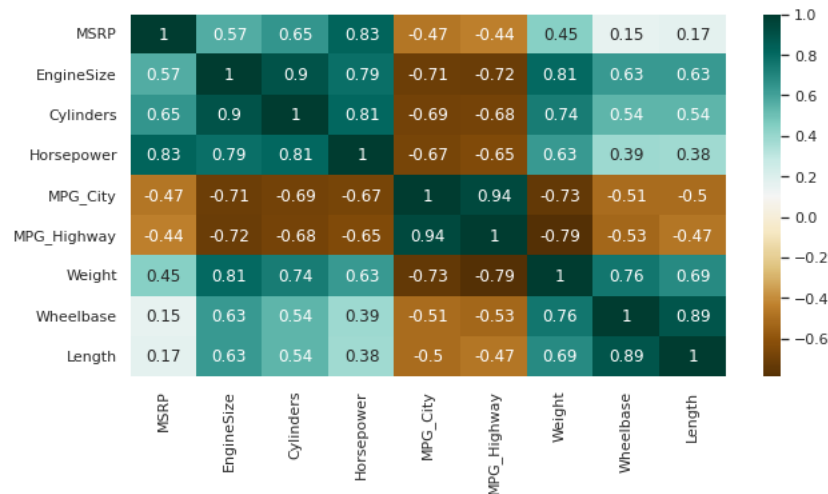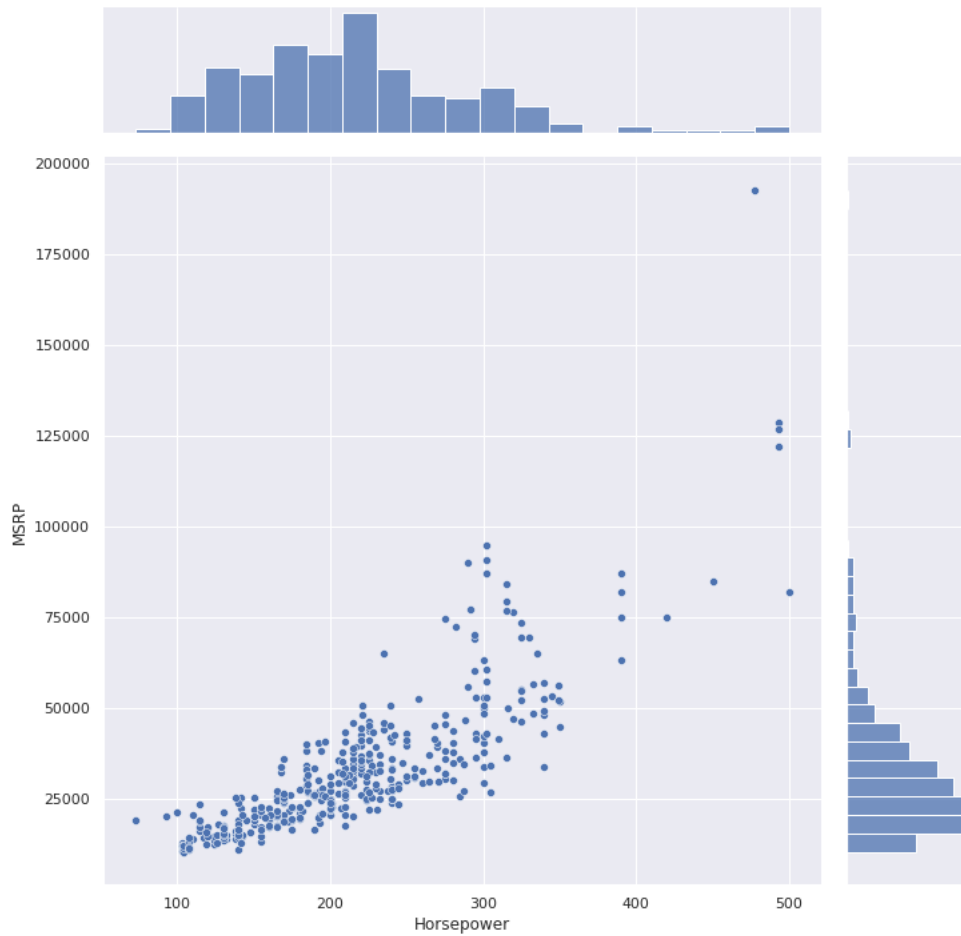


```
# Plotting a scatter plot
fig, ax = plt.subplots(figsize=(5,5))
ax.scatter(df['Horsepower'], df['MSRP'])
plt.title('Scatter plot between MSRP and Horsepower')
ax.set_xlabel('Horsepower')
ax.set_ylabel('MSRP')
plt.show()
```
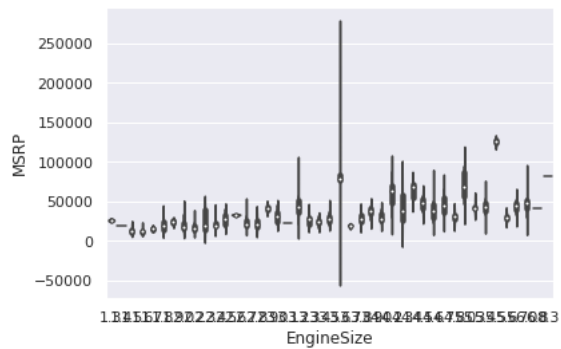


```
sns.jointplot(x='Horsepower', y='MSRP', data=df, height=10)
```

<seaborn.axisgrid.JointGrid at 0x7f90d9b91940>


```
sns.violinplot(x='EngineSize', y='MSRP', data=df, height=6)
```

<matplotlib.axes._subplots.AxesSubplot at 0x7f90d74f41c0>


```
sns.pairplot(df, hue='MSRP', height=2)
```

<seaborn.axisgrid.PairGrid at 0x7f90d69b7d30>


```
df.boxplot(by='MSRP', figsize=(12, 6))
```

array([[<matplotlib.axes._subplots.AxesSubplot object at 0x7f90d6d84670>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x7f90d6257610>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x7f90d63053d0>],
       [<matplotlib.axes._subplots.AxesSubplot object at 0x7f90d7436430>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x7f90d74eb3d0>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x7f90d6107520>],
       [<matplotlib.axes._subplots.AxesSubplot object at 0x7f90d613c490>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x7f90d750e670>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x7f90d62c8730>]],
      dtype=object)

Boxplot grouped by MSRP

Cylinders   EngineSize   Horsepower

6000
4000
2000
0

Length   MPG_City   MPG_Highway

6000
4000
2000
0

Weight   Wheelbase   [MSRP]

6000

✓ 12s   completed at 10:41 PM   ● ✕