

# Assignment 1 Group 5

title: "Assignment 1" author: "Group 5" output: pdf\_document: default —

## Load dataset

```
Car.Sales.1 <- read.csv("~/R/AutomobileSales.csv")
```

## Introduction

We have a car sales dataset which we have found from Kaggle.com. We will be studying and performing analysis using the R programming. Our analysis will consist of all the requirements mentioned in the assignment.

## List Variables

```
ls(Car.Sales.1)
```

```
## [1] "Curb_weight"      "Engine_size"      "Fuel_capacity"
## [4] "Fuel_efficiency"  "Horsepower"       "Latest_Launch"
## [7] "Length"           "Manufacturer"     "Model"
## [10] "Power_perf_factor" "Price_in_thousands" "Sales_in_thousands"
## [13] "Vehicle_type"     "Wheelbase"        "Width"
## [16] "X__year_resale_value"
```

## Print Structure

```
str(Car.Sales.1)
```

```
## 'data.frame': 157 obs. of 16 variables:
## $ Manufacturer : chr "Acura" "Acura" "Acura" "Acura" ...
## $ Model : chr "Integra" "TL" "CL" "RL" ...
## $ Sales_in_thousands : num 16.92 39.38 14.11 8.59 20.4 ...
## $ X__year_resale_value: num 16.4 19.9 18.2 29.7 22.3 ...
## $ Vehicle_type : chr "Passenger" "Passenger" "Passenger" "Passenger" ...
## $ Price_in_thousands : num 21.5 28.4 0 42 24 ...
## $ Engine_size : num 1.8 3.2 3.2 3.5 1.8 2.8 4.2 2.5 2.8 2.8 ...
## $ Horsepower : int 140 225 225 210 150 200 310 170 193 193 ...
## $ Wheelbase : num 101 108 107 115 103 ...
## $ Width : num 67.3 70.3 70.6 71.4 68.2 76.1 74 68.4 68.5 70.9 ...
```

```
## $ Length          : num  172 193 192 197 178 ...
## $ Curb_weight      : num   2.64 3.52 3.47 3.85 3 ...
## $ Fuel_capacity    : num  13.2 17.2 17.2 18 16.4 18.5 23.7 16.6 16.6 18.5 ...
## $ Fuel_efficiency  : int   28 25 26 22 27 22 21 26 24 25 ...
## $ Latest_Launch    : chr   "02-02-12" "06-03-11" "01-04-12" "03-10-11" ...
## $ Power_perf_factor : num   58.3 91.4 NA 91.4 62.8 ...
```

## Print the top 15 rows

```
head(Car.Sales.1, 15)
```

```
##      Manufacturer      Model Sales_in_thousands X_year_resale_value
## 1      Acura      Integra          16.919          16.360
## 2      Acura      TL              39.384          19.875
## 3      Acura      CL              14.114          18.225
## 4      Acura      RL              8.588          29.725
## 5      Audi       A4              20.397          22.255
## 6      Audi       A6              18.780          23.555
## 7      Audi       A8              1.380          39.000
## 8      BMW        323i           19.747           NA
## 9      BMW        328i           9.231          28.675
## 10     BMW        528i          17.527          36.125
## 11     Buick      Century         91.561          12.475
## 12     Buick      Regal          39.350          13.740
## 13     Buick      Park Avenue     27.851          20.190
## 14     Buick      LeSabre        83.257          13.360
## 15     Cadillac   DeVille        63.729          22.525
##      Vehicle_type Price_in_thousands Engine_size Horsepower Wheelbase Width
## 1      Passenger          21.500          1.8          140      101.2    67.3
## 2      Passenger          28.400          3.2          225      108.1    70.3
## 3      Passenger           0.000          3.2          225      106.9    70.6
## 4      Passenger          42.000          3.5          210      114.6    71.4
## 5      Passenger          23.990          1.8          150      102.6    68.2
## 6      Passenger          33.950          2.8          200      108.7    76.1
## 7      Passenger          62.000          4.2          310      113.0    74.0
## 8      Passenger          26.990          2.5          170      107.3    68.4
## 9      Passenger          33.400          2.8          193      107.3    68.5
## 10     Passenger          38.900          2.8          193      111.4    70.9
## 11     Passenger          21.975          3.1          175      109.0    72.7
## 12     Passenger          25.300          3.8          240      109.0    72.7
## 13     Passenger          31.965          3.8          205      113.8    74.7
## 14     Passenger          27.885          3.8          205      112.2    73.5
## 15     Passenger          39.895          4.6          275      115.3    74.5
##      Length Curb_weight Fuel_capacity Fuel_efficiency Latest_Launch
## 1      172.4      2.639          13.2              28      02-02-12
## 2      192.9      3.517          17.2              25      06-03-11
## 3      192.0      3.470          17.2              26      01-04-12
## 4      196.6      3.850          18.0              22      03-10-11
## 5      178.0      2.998          16.4              27      10-08-11
## 6      192.0      3.561          18.5              22      08-09-11
## 7      198.2      3.902          23.7              21      2/27/2012
## 8      176.0      3.179          16.6              26      6/28/2011
```

```
## 9 176.0 3.197 16.6 24 1/29/2012
## 10 188.0 3.472 18.5 25 04-04-11
## 11 194.6 3.368 17.5 25 11-02-11
## 12 196.2 3.543 17.5 23 09-03-11
## 13 206.8 3.778 18.5 24 3/23/2012
## 14 200.0 3.591 17.5 25 7/23/2011
## 15 207.2 3.978 18.5 22 2/23/2012
## Power_perf_factor
## 1 58.28015
## 2 91.37078
## 3 NA
## 4 91.38978
## 5 62.77764
## 6 84.56511
## 7 134.65686
## 8 71.19121
## 9 81.87707
## 10 83.99872
## 11 71.18145
## 12 95.63670
## 13 85.82841
## 14 84.25453
## 15 113.85460
```

Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

## User defined function

```
Car.Sales.1$Fuel_capacitynew = Car.Sales.1$Fuel_capacity * 3
##creating a new field Fuel_capacitynew which gets value by multiplying field Fuel_capacity by 3
```

## Data manipulation techniques and filter rows

```
Car.Sales.1%>% filter(Sales_in_thousands > 39)
```

```
## Manufacturer Model Sales_in_thousands X__year_resale_value
## 1 Acura TL 39.384 19.875
## 2 Buick Century 91.561 12.475
## 3 Buick Regal 39.350 13.740
## 4 Buick LeSabre 83.257 13.360
## 5 Cadillac DeVille 63.729 22.525
## 6 Chevrolet Cavalier 145.519 9.250
## 7 Chevrolet Malibu 135.126 11.225
## 8 Chevrolet Monte Carlo 42.593 11.525
## 9 Chevrolet Impala 107.995 NA
## 10 Chrysler Town & Country 53.480 19.540
## 11 Dodge Neon 76.034 7.750
## 12 Dodge Stratus 71.186 10.185
```

## 13	Dodge	Intrepid	88.028	12.275
## 14	Dodge	Ram Pickup	227.061	15.060
## 15	Dodge	Dakota	111.313	11.260
## 16	Dodge	Durango	101.323	NA
## 17	Dodge	Caravan	181.749	12.025
## 18	Ford	Escort	70.227	7.425
## 19	Ford	Mustang	113.369	12.760
## 20	Ford	Taurus	245.815	10.055
## 21	Ford	Focus	175.670	NA
## 22	Ford	Crown Victoria	63.403	14.210
## 23	Ford	Explorer	276.747	16.640
## 24	Ford	Windstar	155.787	13.175
## 25	Ford	Expedition	125.338	23.575
## 26	Ford	Ranger	220.650	7.850
## 27	Ford	F-Series	540.561	15.075
## 28	Honda	Civic	199.685	9.850
## 29	Honda	Accord	230.902	13.210
## 30	Honda	CR-V	73.203	17.710
## 31	Honda	Odyssey	76.029	19.490
## 32	Hyundai	Accent	41.184	5.860
## 33	Hyundai	Elantra	66.692	7.825
## 34	Jeep	Wrangler	55.557	13.475
## 35	Jeep	Cherokee	80.556	13.775
## 36	Jeep	Grand Cherokee	157.040	18.810
## 37	Lexus	RX300	51.238	NA
## 38	Lincoln	Town car	48.911	21.725
## 39	Mitsubishi	Eclipse	42.541	10.395
## 40	Mitsubishi	Galant	55.616	10.595
## 41	Mitsubishi	Montero Sport	39.348	13.880
## 42	Mercury	Sable	67.956	11.030
## 43	Mercury	Grand Marquis	81.174	14.875
## 44	Nissan	Sentra	42.643	8.450
## 45	Nissan	Altima	88.094	11.295
## 46	Nissan	Maxima	79.853	15.125
## 47	Nissan	Pathfinder	42.574	17.810
## 48	Nissan	Xterra	54.158	NA
## 49	Nissan	Frontier	65.005	NA
## 50	Oldsmobile	Alero	80.255	NA
## 51	Pontiac	Sunfire	51.645	13.790
## 52	Pontiac	Grand Am	131.097	10.290
## 53	Pontiac	Grand Prix	92.364	14.010
## 54	Pontiac	Montana	39.572	NA
## 55	Saturn	SL	80.620	9.200
## 56	Saturn	LS	49.989	NA
## 57	Subaru	Outback	47.107	NA
## 58	Toyota	Corolla	142.535	10.025
## 59	Toyota	Camry	247.994	13.245
## 60	Toyota	Avalon	63.849	18.140
## 61	Toyota	Tacoma	84.087	9.575
## 62	Toyota	Sienna	65.119	NA
## 63	Toyota	4Runner	68.411	19.425
## 64	Volkswagen	Jetta	83.721	13.240
## 65	Volkswagen	Passat	51.102	16.725
## 66	Volkswagen	Beetle	49.463	NA

##	Vehicle_type	Price_in_thousands	Engine_size	Horsepower	Wheelbase	Width
## 1	Passenger	28.400	3.2	225	108.1	70.3
## 2	Passenger	21.975	3.1	175	109.0	72.7
## 3	Passenger	25.300	3.8	240	109.0	72.7
## 4	Passenger	27.885	3.8	205	112.2	73.5
## 5	Passenger	39.895	4.6	275	115.3	74.5
## 6	Passenger	13.260	2.2	115	104.1	67.9
## 7	Passenger	16.535	3.1	170	107.0	69.4
## 8	Passenger	19.390	3.4	180	110.5	72.7
## 9	Passenger	18.890	3.4	180	110.5	73.0
## 10	Car	0.000	NA	NA	NA	NA
## 11	Passenger	12.640	2.0	132	105.0	74.4
## 12	Passenger	20.230	2.5	168	108.0	71.0
## 13	Passenger	22.505	2.7	202	113.0	74.7
## 14	Car	19.460	5.2	230	138.7	79.3
## 15	Car	16.980	2.5	120	131.0	71.5
## 16	Car	26.310	5.2	230	115.7	71.7
## 17	Car	19.565	2.4	150	113.3	76.8
## 18	Passenger	12.070	2.0	110	98.4	67.0
## 19	Passenger	21.560	3.8	190	101.3	73.1
## 20	Passenger	17.885	3.0	155	108.5	73.0
## 21	Passenger	12.315	2.0	107	103.0	66.9
## 22	Passenger	22.195	4.6	200	114.7	78.2
## 23	Car	31.930	4.0	210	111.6	70.2
## 24	Car	21.410	3.0	150	120.7	76.6
## 25	Car	36.135	4.6	240	119.0	78.7
## 26	Car	12.050	2.5	119	117.5	69.4
## 27	Car	26.935	4.6	220	138.5	79.1
## 28	Passenger	12.885	1.6	106	103.2	67.1
## 29	Passenger	15.350	2.3	135	106.9	70.3
## 30	Car	20.550	2.0	146	103.2	68.9
## 31	Car	26.000	3.5	210	118.1	75.6
## 32	Passenger	9.699	1.5	92	96.1	65.7
## 33	Passenger	11.799	2.0	140	100.4	66.9
## 34	Car	14.460	2.5	120	93.4	66.7
## 35	Car	21.620	4.0	190	101.4	69.4
## 36	Car	26.895	4.0	195	105.9	72.3
## 37	Car	34.605	3.0	220	103.0	71.5
## 38	Passenger	43.330	4.6	215	117.7	78.2
## 39	Passenger	19.047	2.4	154	100.8	68.9
## 40	Passenger	17.357	2.4	145	103.7	68.5
## 41	Car	22.527	3.0	173	107.3	66.7
## 42	Passenger	19.035	3.0	153	108.5	73.0
## 43	Passenger	22.605	4.6	200	114.7	78.2
## 44	Passenger	13.499	1.8	126	99.8	67.3
## 45	Passenger	20.390	2.4	155	103.1	69.1
## 46	Passenger	26.249	3.0	222	108.3	70.3
## 47	Car	29.299	3.3	170	106.3	71.7
## 48	Car	22.799	3.3	170	104.3	70.4
## 49	Car	17.890	3.3	170	116.1	66.5
## 50	Passenger	18.270	2.4	150	107.0	70.1
## 51	Passenger	21.610	2.4	150	104.1	68.4
## 52	Passenger	19.720	3.4	175	107.0	70.4
## 53	Passenger	21.665	3.8	195	110.5	72.7

## 54	Car	25.635	3.4	185	120.0	72.7
## 55	Passenger	10.685	1.9	100	102.4	66.4
## 56	Passenger	15.010	2.2	137	106.5	69.0
## 57	Passenger	22.695	2.5	165	103.5	67.5
## 58	Passenger	13.108	1.8	120	97.0	66.7
## 59	Passenger	17.518	2.2	133	105.2	70.1
## 60	Passenger	25.545	3.0	210	107.1	71.7
## 61	Car	11.528	2.4	142	103.3	66.5
## 62	Car	22.368	3.0	194	114.2	73.4
## 63	Car	22.288	2.7	150	105.3	66.5
## 64	Passenger	16.700	2.0	115	98.9	68.3
## 65	Passenger	21.200	1.8	150	106.4	68.5
## 66	Passenger	15.900	2.0	115	98.9	67.9
##	Length	Curb_weight	Fuel_capacity	Fuel_efficiency	Latest_Launch	
## 1	192.9	3.517	17.2	25	06-03-11	
## 2	194.6	3.368	17.5	25	11-02-11	
## 3	196.2	3.543	17.5	23	09-03-11	
## 4	200.0	3.591	17.5	25	7/23/2011	
## 5	207.2	3.978	18.5	22	2/23/2012	
## 6	180.9	2.676	14.3	27	8/17/2011	
## 7	190.4	3.051	15.0	25	3/19/2012	
## 8	197.9	3.340	17.0	27	12/22/2011	
## 9	200.0	3.389	17.0	27	6/18/2011	
## 10	NA	NA	NA	NA	7/13/2011	
## 11	174.4	2.567	12.5	29	12-12-11	
## 12	186.0	3.058	16.0	24	10/31/2011	
## 13	203.7	3.489	17.0	NA	06-02-12	
## 14	224.2	4.470	26.0	17	03-06-12	
## 15	215.0	3.557	22.0	19	11/25/2011	
## 16	193.5	4.394	25.0	17	6/27/2012	
## 17	186.3	3.533	20.0	24	09-01-11	
## 18	174.7	2.468	12.7	30	3/31/2012	
## 19	183.2	3.203	15.7	24	1/31/2012	
## 20	197.6	3.368	16.0	24	12/20/2011	
## 21	174.8	2.564	13.2	30	7/22/2012	
## 22	212.0	3.908	19.0	21	9/26/2011	
## 23	190.7	3.876	21.0	19	4/25/2012	
## 24	200.9	3.761	26.0	21	2/25/2012	
## 25	204.6	4.808	26.0	16	9/14/2012	
## 26	200.7	3.086	20.0	23	1/14/2012	
## 27	224.5	4.241	25.1	18	8/16/2012	
## 28	175.1	2.339	11.9	32	10/21/2011	
## 29	188.8	2.932	17.1	27	5/20/2012	
## 30	177.6	3.219	15.3	24	3/21/2012	
## 31	201.2	4.288	20.0	23	02-08-12	
## 32	166.7	2.240	11.9	31	09-10-12	
## 33	174.0	2.626	14.5	27	11/15/2011	
## 34	152.0	3.045	19.0	17	03-04-12	
## 35	167.5	3.194	20.0	20	10-05-12	
## 36	181.5	3.880	20.5	19	12-10-11	
## 37	180.1	3.900	17.2	21	01-04-12	
## 38	215.3	4.121	19.0	21	06-04-12	
## 39	175.4	2.910	15.9	24	11/24/2012	
## 40	187.8	2.945	16.3	25	1/29/2012	

## 41	178.3	3.510	19.5	20	5/18/2012
## 42	199.7	3.379	16.0	24	9/22/2012
## 43	212.0	3.958	19.0	21	7/24/2012
## 44	177.5	2.593	13.2	30	8/31/2011
## 45	183.5	3.012	15.9	25	08-02-11
## 46	190.5	3.294	18.5	25	05-06-11
## 47	182.6	3.947	21.0	19	9/25/2011
## 48	178.0	3.821	19.4	18	1/24/2011
## 49	196.1	3.217	19.4	18	8/27/2011
## 50	186.7	2.958	15.0	27	10/20/2009
## 51	181.9	2.906	15.0	27	1/25/2012
## 52	186.3	3.091	15.2	25	11/26/2012
## 53	196.5	3.396	18.0	25	10/15/2012
## 54	201.3	3.942	25.0	23	7/22/2012
## 55	176.9	2.332	12.1	33	8/16/2012
## 56	190.4	2.910	13.1	28	12-04-12
## 57	185.8	3.415	16.9	25	07-07-11
## 58	174.0	2.420	13.2	33	04-11-11
## 59	188.5	2.998	18.5	27	02-10-11
## 60	191.9	3.417	18.5	26	8/31/2011
## 61	178.7	2.580	15.1	23	08-01-11
## 62	193.5	3.759	20.9	22	10-05-12
## 63	183.3	3.440	18.5	23	03-07-11
## 64	172.3	2.853	14.5	26	8/27/2011
## 65	184.1	3.043	16.4	27	10/30/2012
## 66	161.1	2.769	14.5	26	10/20/2011
##	Power_perf_factor	Fuel_capacitynew			
## 1	91.37078	51.6			
## 2	71.18145	52.5			
## 3	95.63670	52.5			
## 4	84.25453	52.5			
## 5	113.85460	55.5			
## 6	46.36335	42.9			
## 7	67.31446	45.0			
## 8	72.03092	51.0			
## 9	71.83804	51.0			
## 10	NA	NA			
## 11	52.08490	37.5			
## 12	67.87611	48.0			
## 13	80.83147	51.0			
## 14	90.21170	78.0			
## 15	49.64500	66.0			
## 16	92.85413	75.0			
## 17	61.22700	60.0			
## 18	44.08371	38.1			
## 19	76.50918	47.1			
## 20	62.50374	48.0			
## 21	43.11713	39.6			
## 22	80.49954	57.0			
## 23	87.63550	63.0			
## 24	62.09505	78.0			
## 25	100.02480	78.0			
## 26	47.38953	60.0			
## 27	89.40193	75.3			

## 28	42.87910	35.7
## 29	54.26955	51.3
## 30	60.08797	45.9
## 31	85.21769	60.0
## 32	36.67228	35.7
## 33	54.59005	43.5
## 34	48.67290	57.0
## 35	76.58444	60.0
## 36	80.38778	61.5
## 37	91.94380	51.6
## 38	93.95792	57.0
## 39	62.44196	47.7
## 40	58.60677	48.9
## 41	70.66094	58.5
## 42	62.23997	48.0
## 43	80.65770	57.0
## 44	50.24198	39.6
## 45	63.31373	47.7
## 46	89.42782	55.5
## 47	72.29036	63.0
## 48	69.78294	58.2
## 49	67.88927	58.2
## 50	60.72745	45.0
## 51	62.01587	45.0
## 52	70.38974	45.6
## 53	78.31817	54.0
## 54	76.20844	75.0
## 55	39.98642	36.3
## 56	54.81973	39.3
## 57	67.76591	50.7
## 58	47.96897	39.6
## 59	54.37242	55.5
## 60	84.91190	55.5
## 61	55.29712	45.3
## 62	78.02722	62.7
## 63	62.35558	55.5
## 64	47.63824	43.5
## 65	61.70138	49.2
## 66	47.32963	43.5

## Dependent & independent variables and use reshaping techniques

```
totalcardim1 = cbind(Car.Sales.1$Length, Car.Sales.1$Width, Car.Sales.1$Wheelbase)

totalcardim1 = as.data.frame(totalcardim1)

names(totalcardim1)[2] = "width1"

names(totalcardim1)[3] = "wheelbase1"

names(totalcardim1)[1] = "length1"
View(totalcardim1)
```



```
## totalcardim1 is dependent variable and length, width, wheelbase are independent variable
```

## Remove missing values

```
na.omit(Car.Sales.1)
```

##	Manufacturer	Model	Sales_in_thousands	X__year_resale_value
## 1	Acura	Integra	16.919	16.360
## 2	Acura	TL	39.384	19.875
## 4	Acura	RL	8.588	29.725
## 5	Audi	A4	20.397	22.255
## 6	Audi	A6	18.780	23.555
## 7	Audi	A8	1.380	39.000
## 9	BMW	328i	9.231	28.675
## 10	BMW	528i	17.527	36.125
## 11	Buick	Century	91.561	12.475
## 12	Buick	Regal	39.350	13.740
## 13	Buick	Park Avenue	27.851	20.190
## 14	Buick	LeSabre	83.257	13.360
## 15	Cadillac	DeVille	63.729	22.525
## 17	Cadillac	Eldorado	6.536	25.725
## 18	Cadillac	Catera	11.185	18.225
## 20	Chevrolet	Cavalier	145.519	9.250
## 21	Chevrolet	Malibu	135.126	11.225
## 22	Chevrolet	Lumina	24.629	10.310
## 23	Chevrolet	Monte Carlo	42.593	11.525
## 24	Chevrolet	Camaro	26.402	13.025
## 25	Chevrolet	Corvette	17.947	36.225
## 26	Chevrolet	Prizm	32.299	9.125
## 27	Chevrolet	Metro	21.855	5.160
## 29	Chrysler	Sebring Coupe	7.854	12.360
## 30	Chrysler	Sebring Conv.	32.775	14.180
## 31	Chrysler	Concorde	31.148	13.725
## 32	Chrysler	Cirrus	32.306	12.640
## 33	Chrysler	LHS	13.462	17.325
## 36	Dodge	Neon	76.034	7.750
## 37	Dodge	Avenger	4.734	12.545
## 38	Dodge	Stratus	71.186	10.185
## 40	Dodge	Viper	0.916	58.470
## 41	Dodge	Ram Pickup	227.061	15.060
## 42	Dodge	Ram Wagon	16.767	15.510
## 43	Dodge	Ram Van	31.038	13.425
## 44	Dodge	Dakota	111.313	11.260
## 46	Dodge	Caravan	181.749	12.025
## 47	Ford	Escort	70.227	7.425
## 48	Ford	Mustang	113.369	12.760
## 49	Ford	Contour	35.068	8.835
## 50	Ford	Taurus	245.815	10.055
## 52	Ford Crown	Victoria	63.403	14.210
## 53	Ford	Explorer	276.747	16.640
## 54	Ford	Windstar	155.787	13.175

## 55	Ford	Expedition	125.338	23.575
## 56	Ford	Ranger	220.650	7.850
## 57	Ford	F-Series	540.561	15.075
## 58	Honda	Civic	199.685	9.850
## 59	Honda	Accord	230.902	13.210
## 60	Honda	CR-V	73.203	17.710
## 61	Honda	Passport	12.855	17.525
## 62	Honda	Odyssey	76.029	19.490
## 63	Hyundai	Accent	41.184	5.860
## 64	Hyundai	Elantra	66.692	7.825
## 65	Hyundai	Sonata	29.450	8.910
## 66	Infiniti	I30	23.713	19.690
## 68	Jeep	Wrangler	55.557	13.475
## 69	Jeep	Cherokee	80.556	13.775
## 70	Jeep	Grand Cherokee	157.040	18.810
## 71	Lexus	ES300	24.072	26.975
## 72	Lexus	GS300	12.698	32.075
## 74	Lexus	LS400	6.375	40.375
## 77	Lincoln	Continental	13.798	20.525
## 78	Lincoln	Town car	48.911	21.725
## 80	Mitsubishi	Mirage	26.232	8.325
## 81	Mitsubishi	Eclipse	42.541	10.395
## 82	Mitsubishi	Galant	55.616	10.595
## 83	Mitsubishi	Diamante	5.711	16.575
## 84	Mitsubishi	3000GT	0.110	20.940
## 85	Mitsubishi	Montero	11.337	19.125
## 86	Mitsubishi	Montero Sport	39.348	13.880
## 87	Mercury	Mystique	14.351	8.800
## 88	Mercury	Cougar	26.529	13.890
## 89	Mercury	Sable	67.956	11.030
## 90	Mercury	Grand Marquis	81.174	14.875
## 91	Mercury	Mountaineer	27.609	20.430
## 92	Mercury	Villager	20.380	14.795
## 93	Mercedes-B	C-Class	18.392	26.050
## 94	Mercedes-B	E-Class	27.602	41.450
## 95	Mercedes-B	S-Class	16.774	50.375
## 96	Mercedes-B	SL-Class	3.311	58.600
## 102	Nissan	Sentra	42.643	8.450
## 103	Nissan	Altima	88.094	11.295
## 104	Nissan	Maxima	79.853	15.125
## 105	Nissan	Quest	27.308	15.380
## 106	Nissan	Pathfinder	42.574	17.810
## 109	Oldsmobile	Cutlass	1.112	11.240
## 112	Oldsmobile	Aurora	14.690	19.890
## 113	Oldsmobile	Bravada	20.017	19.925
## 114	Oldsmobile	Silhouette	24.361	15.240
## 115	Plymouth	Neon	32.734	7.750
## 116	Plymouth	Breeze	5.240	9.800
## 117	Plymouth	Voyager	24.155	12.025
## 119	Pontiac	Sunfire	51.645	13.790
## 120	Pontiac	Grand Am	131.097	10.290
## 121	Pontiac	Firebird	19.911	17.805
## 122	Pontiac	Grand Prix	92.364	14.010
## 123	Pontiac	Bonneville	35.945	13.225

## 125	Porsche	Boxter	8.982	41.250		
## 126	Porsche	Carrera Coupe	1.280	60.625		
## 127	Porsche	Carrera Cabrio	1.866	67.550		
## 130	Saturn	SL	80.620	9.200		
## 131	Saturn	SC	24.546	10.590		
## 132	Saturn	SW	5.223	10.790		
## 137	Toyota	Corolla	142.535	10.025		
## 138	Toyota	Camry	247.994	13.245		
## 139	Toyota	Avalon	63.849	18.140		
## 140	Toyota	Celica	33.269	15.445		
## 141	Toyota	Tacoma	84.087	9.575		
## 143	Toyota	RAV4	25.106	13.325		
## 144	Toyota	4Runner	68.411	19.425		
## 145	Toyota	Land Cruiser	9.835	34.080		
## 146	Volkswagen	Golf	9.761	11.425		
## 147	Volkswagen	Jetta	83.721	13.240		
## 148	Volkswagen	Passat	51.102	16.725		
## 149	Volkswagen	Cabrio	9.569	16.575		
## 150	Volkswagen	GTI	5.596	13.760		
##	Vehicle_type	Price_in_thousands	Engine_size	Horsepower	Wheelbase	Width
## 1	Passenger	21.500	1.8	140	101.2	67.3
## 2	Passenger	28.400	3.2	225	108.1	70.3
## 4	Passenger	42.000	3.5	210	114.6	71.4
## 5	Passenger	23.990	1.8	150	102.6	68.2
## 6	Passenger	33.950	2.8	200	108.7	76.1
## 7	Passenger	62.000	4.2	310	113.0	74.0
## 9	Passenger	33.400	2.8	193	107.3	68.5
## 10	Passenger	38.900	2.8	193	111.4	70.9
## 11	Passenger	21.975	3.1	175	109.0	72.7
## 12	Passenger	25.300	3.8	240	109.0	72.7
## 13	Passenger	31.965	3.8	205	113.8	74.7
## 14	Passenger	27.885	3.8	205	112.2	73.5
## 15	Passenger	39.895	4.6	275	115.3	74.5
## 17	Passenger	39.665	4.6	275	108.0	75.5
## 18	Passenger	31.010	3.0	200	107.4	70.3
## 20	Passenger	13.260	2.2	115	104.1	67.9
## 21	Passenger	16.535	3.1	170	107.0	69.4
## 22	Passenger	18.890	3.1	175	107.5	72.5
## 23	Passenger	19.390	3.4	180	110.5	72.7
## 24	Passenger	24.340	3.8	200	101.1	74.1
## 25	Passenger	45.705	5.7	345	104.5	73.6
## 26	Passenger	13.960	1.8	120	97.1	66.7
## 27	Passenger	9.235	1.0	55	93.1	62.6
## 29	Passenger	19.840	2.5	163	103.7	69.7
## 30	Passenger	24.495	2.5	168	106.0	69.2
## 31	Passenger	22.245	2.7	200	113.0	74.4
## 32	Passenger	16.480	2.0	132	108.0	71.0
## 33	Passenger	28.340	3.5	253	113.0	74.4
## 36	Passenger	12.640	2.0	132	105.0	74.4
## 37	Passenger	19.045	2.5	163	103.7	69.1
## 38	Passenger	20.230	2.5	168	108.0	71.0
## 40	Passenger	69.725	8.0	450	96.2	75.7
## 41	Car	19.460	5.2	230	138.7	79.3
## 42	Car	21.315	3.9	175	109.6	78.8

## 43	Car	18.575	3.9	175	127.2	78.8
## 44	Car	16.980	2.5	120	131.0	71.5
## 46	Car	19.565	2.4	150	113.3	76.8
## 47	Passenger	12.070	2.0	110	98.4	67.0
## 48	Passenger	21.560	3.8	190	101.3	73.1
## 49	Passenger	17.035	2.5	170	106.5	69.1
## 50	Passenger	17.885	3.0	155	108.5	73.0
## 52	Passenger	22.195	4.6	200	114.7	78.2
## 53	Car	31.930	4.0	210	111.6	70.2
## 54	Car	21.410	3.0	150	120.7	76.6
## 55	Car	36.135	4.6	240	119.0	78.7
## 56	Car	12.050	2.5	119	117.5	69.4
## 57	Car	26.935	4.6	220	138.5	79.1
## 58	Passenger	12.885	1.6	106	103.2	67.1
## 59	Passenger	15.350	2.3	135	106.9	70.3
## 60	Car	20.550	2.0	146	103.2	68.9
## 61	Car	26.600	3.2	205	106.4	70.4
## 62	Car	26.000	3.5	210	118.1	75.6
## 63	Passenger	9.699	1.5	92	96.1	65.7
## 64	Passenger	11.799	2.0	140	100.4	66.9
## 65	Passenger	14.999	2.4	148	106.3	71.6
## 66	Passenger	29.465	3.0	227	108.3	70.2
## 68	Car	14.460	2.5	120	93.4	66.7
## 69	Car	21.620	4.0	190	101.4	69.4
## 70	Car	26.895	4.0	195	105.9	72.3
## 71	Passenger	31.505	3.0	210	105.1	70.5
## 72	Passenger	37.805	3.0	225	110.2	70.9
## 74	Passenger	54.005	4.0	290	112.2	72.0
## 77	Passenger	39.080	4.6	275	109.0	73.6
## 78	Passenger	43.330	4.6	215	117.7	78.2
## 80	Passenger	13.987	1.8	113	98.4	66.5
## 81	Passenger	19.047	2.4	154	100.8	68.9
## 82	Passenger	17.357	2.4	145	103.7	68.5
## 83	Passenger	24.997	3.5	210	107.1	70.3
## 84	Passenger	25.450	3.0	161	97.2	72.4
## 85	Car	31.807	3.5	200	107.3	69.9
## 86	Car	22.527	3.0	173	107.3	66.7
## 87	Passenger	16.240	2.0	125	106.5	69.1
## 88	Passenger	16.540	2.0	125	106.4	69.6
## 89	Passenger	19.035	3.0	153	108.5	73.0
## 90	Passenger	22.605	4.6	200	114.7	78.2
## 91	Car	27.560	4.0	210	111.6	70.2
## 92	Car	22.510	3.3	170	112.2	74.9
## 93	Passenger	31.750	2.3	185	105.9	67.7
## 94	Passenger	49.900	3.2	221	111.5	70.8
## 95	Passenger	69.700	4.3	275	121.5	73.1
## 96	Passenger	82.600	5.0	302	99.0	71.3
## 102	Passenger	13.499	1.8	126	99.8	67.3
## 103	Passenger	20.390	2.4	155	103.1	69.1
## 104	Passenger	26.249	3.0	222	108.3	70.3
## 105	Car	26.399	3.3	170	112.2	74.9
## 106	Car	29.299	3.3	170	106.3	71.7
## 109	Passenger	18.145	3.1	150	107.0	69.4
## 112	Passenger	36.229	4.0	250	113.8	74.4

## 113	Car	31.598	4.3	190	107.0	67.8
## 114	Car	25.345	3.4	185	120.0	72.2
## 115	Passenger	12.640	2.0	132	105.0	74.4
## 116	Passenger	16.080	2.0	132	108.0	71.0
## 117	Car	18.850	2.4	150	113.3	76.8
## 119	Passenger	21.610	2.4	150	104.1	68.4
## 120	Passenger	19.720	3.4	175	107.0	70.4
## 121	Passenger	25.310	3.8	200	101.1	74.5
## 122	Passenger	21.665	3.8	195	110.5	72.7
## 123	Passenger	23.755	3.8	205	112.2	72.6
## 125	Passenger	41.430	2.7	217	95.2	70.1
## 126	Passenger	71.020	3.4	300	92.6	69.5
## 127	Passenger	74.970	3.4	300	92.6	69.5
## 130	Passenger	10.685	1.9	100	102.4	66.4
## 131	Passenger	12.535	1.9	100	102.4	66.4
## 132	Passenger	14.290	1.9	124	102.4	66.4
## 137	Passenger	13.108	1.8	120	97.0	66.7
## 138	Passenger	17.518	2.2	133	105.2	70.1
## 139	Passenger	25.545	3.0	210	107.1	71.7
## 140	Passenger	16.875	1.8	140	102.4	68.3
## 141	Car	11.528	2.4	142	103.3	66.5
## 143	Car	16.888	2.0	127	94.9	66.7
## 144	Car	22.288	2.7	150	105.3	66.5
## 145	Car	51.728	4.7	230	112.2	76.4
## 146	Passenger	14.900	2.0	115	98.9	68.3
## 147	Passenger	16.700	2.0	115	98.9	68.3
## 148	Passenger	21.200	1.8	150	106.4	68.5
## 149	Passenger	19.990	2.0	115	97.4	66.7
## 150	Passenger	17.500	2.0	115	98.9	68.3
##	Length	Curb_weight	Fuel_capacity	Fuel_efficiency	Latest_Launch	
## 1	172.4	2.639	13.2	28	02-02-12	
## 2	192.9	3.517	17.2	25	06-03-11	
## 4	196.6	3.850	18.0	22	03-10-11	
## 5	178.0	2.998	16.4	27	10-08-11	
## 6	192.0	3.561	18.5	22	08-09-11	
## 7	198.2	3.902	23.7	21	2/27/2012	
## 9	176.0	3.197	16.6	24	1/29/2012	
## 10	188.0	3.472	18.5	25	04-04-11	
## 11	194.6	3.368	17.5	25	11-02-11	
## 12	196.2	3.543	17.5	23	09-03-11	
## 13	206.8	3.778	18.5	24	3/23/2012	
## 14	200.0	3.591	17.5	25	7/23/2011	
## 15	207.2	3.978	18.5	22	2/23/2012	
## 17	200.6	3.843	19.0	22	11/27/2011	
## 18	194.8	3.770	18.0	22	9/28/2011	
## 20	180.9	2.676	14.3	27	8/17/2011	
## 21	190.4	3.051	15.0	25	3/19/2012	
## 22	200.9	3.330	16.6	25	5/24/2011	
## 23	197.9	3.340	17.0	27	12/22/2011	
## 24	193.2	3.500	16.8	25	10/23/2011	
## 25	179.7	3.210	19.1	22	05-12-12	
## 26	174.3	2.398	13.2	33	09-11-11	
## 27	149.4	1.895	10.3	45	4/13/2012	
## 29	190.9	2.967	15.9	24	1/16/2012	

## 30	193.0	3.332	16.0	24	11/17/2011
## 31	209.1	3.452	17.0	26	06-06-12
## 32	186.0	2.911	16.0	27	10-06-11
## 33	207.7	3.564	17.0	23	05-08-12
## 36	174.4	2.567	12.5	29	12-12-11
## 37	190.2	2.879	15.9	24	07-01-12
## 38	186.0	3.058	16.0	24	10/31/2011
## 40	176.7	3.375	19.0	16	08-07-11
## 41	224.2	4.470	26.0	17	03-06-12
## 42	192.6	4.245	32.0	15	01-06-12
## 43	208.5	4.298	32.0	16	7/26/2012
## 44	215.0	3.557	22.0	19	11/25/2011
## 46	186.3	3.533	20.0	24	09-01-11
## 47	174.7	2.468	12.7	30	3/31/2012
## 48	183.2	3.203	15.7	24	1/31/2012
## 49	184.6	2.769	15.0	25	8/20/2012
## 50	197.6	3.368	16.0	24	12/20/2011
## 52	212.0	3.908	19.0	21	9/26/2011
## 53	190.7	3.876	21.0	19	4/25/2012
## 54	200.9	3.761	26.0	21	2/25/2012
## 55	204.6	4.808	26.0	16	9/14/2012
## 56	200.7	3.086	20.0	23	1/14/2012
## 57	224.5	4.241	25.1	18	8/16/2012
## 58	175.1	2.339	11.9	32	10/21/2011
## 59	188.8	2.932	17.1	27	5/20/2012
## 60	177.6	3.219	15.3	24	3/21/2012
## 61	178.2	3.857	21.1	19	10-09-12
## 62	201.2	4.288	20.0	23	02-08-12
## 63	166.7	2.240	11.9	31	09-10-12
## 64	174.0	2.626	14.5	27	11/15/2011
## 65	185.4	3.072	17.2	25	6/14/2012
## 66	193.7	3.342	18.5	25	4/15/2012
## 68	152.0	3.045	19.0	17	03-04-12
## 69	167.5	3.194	20.0	20	10-05-12
## 70	181.5	3.880	20.5	19	12-10-11
## 71	190.2	3.373	18.5	23	07-09-12
## 72	189.2	3.638	19.8	23	05-10-12
## 74	196.7	3.890	22.5	22	3/29/2012
## 77	208.5	3.868	20.0	22	08-03-12
## 78	215.3	4.121	19.0	21	06-04-12
## 80	173.6	2.250	13.2	30	4/23/2012
## 81	175.4	2.910	15.9	24	11/24/2012
## 82	187.8	2.945	16.3	25	1/29/2012
## 83	194.1	3.443	19.0	22	8/28/2012
## 84	180.3	3.131	19.8	21	6/29/2012
## 85	186.6	4.520	24.3	18	1/17/2012
## 86	178.3	3.510	19.5	20	5/18/2012
## 87	184.8	2.769	15.0	28	12/19/2012
## 88	185.0	2.892	16.0	30	2/23/2012
## 89	199.7	3.379	16.0	24	9/22/2012
## 90	212.0	3.958	19.0	21	7/24/2012
## 91	190.1	3.876	21.0	18	2/13/2008
## 92	194.7	3.944	20.0	21	10/20/2009
## 93	177.4	3.250	16.4	26	4/24/2011

## 94	189.4	3.823	21.1	25	07-12-11
## 95	203.1	4.133	23.2	21	6/13/2011
## 96	177.1	4.125	21.1	20	3/17/2011
## 102	177.5	2.593	13.2	30	8/31/2011
## 103	183.5	3.012	15.9	25	08-02-11
## 104	190.5	3.294	18.5	25	05-06-11
## 105	194.8	3.991	20.0	21	03-07-11
## 106	182.6	3.947	21.0	19	9/25/2011
## 109	192.0	3.102	15.2	25	5/31/2011
## 112	205.4	3.967	18.5	22	2/18/2011
## 113	181.2	4.068	17.5	19	9/21/2011
## 114	201.4	3.948	25.0	22	6/25/2011
## 115	174.4	2.559	12.5	29	4/26/2011
## 116	186.3	2.942	16.0	27	11/14/2011
## 117	186.3	3.528	20.0	24	4/24/2011
## 119	181.9	2.906	15.0	27	1/25/2012
## 120	186.3	3.091	15.2	25	11/26/2012
## 121	193.4	3.492	16.8	25	6/16/2012
## 122	196.5	3.396	18.0	25	10/15/2012
## 123	202.5	3.590	17.5	24	5/18/2011
## 125	171.0	2.778	17.0	22	2/19/2012
## 126	174.5	3.032	17.0	21	12/21/2012
## 127	174.5	3.075	17.0	23	07-11-11
## 130	176.9	2.332	12.1	33	8/16/2012
## 131	180.0	2.367	12.1	33	3/16/2011
## 132	176.9	2.452	12.1	31	1/15/2011
## 137	174.0	2.420	13.2	33	04-11-11
## 138	188.5	2.998	18.5	27	02-10-11
## 139	191.9	3.417	18.5	26	8/31/2011
## 140	170.5	2.425	14.5	31	12/29/2012
## 141	178.7	2.580	15.1	23	08-01-11
## 143	163.8	2.668	15.3	27	05-06-11
## 144	183.3	3.440	18.5	23	03-07-11
## 145	192.5	5.115	25.4	15	9/25/2011
## 146	163.3	2.767	14.5	26	1/24/2011
## 147	172.3	2.853	14.5	26	8/27/2011
## 148	184.1	3.043	16.4	27	10/30/2012
## 149	160.4	3.079	13.7	26	5/31/2011
## 150	163.3	2.762	14.6	26	04-01-11
##	Power_perf_factor Fuel_capacitynew				
## 1	58.28015	39.6			
## 2	91.37078	51.6			
## 4	91.38978	54.0			
## 5	62.77764	49.2			
## 6	84.56511	55.5			
## 7	134.65686	71.1			
## 9	81.87707	49.8			
## 10	83.99872	55.5			
## 11	71.18145	52.5			
## 12	95.63670	52.5			
## 13	85.82841	55.5			
## 14	84.25453	52.5			
## 15	113.85460	55.5			
## 17	113.76587	57.0			

## 18	83.48309	54.0
## 20	46.36335	42.9
## 21	67.31446	45.0
## 22	69.99140	49.8
## 23	72.03092	51.0
## 24	81.11854	50.4
## 25	141.14115	57.3
## 26	48.29764	39.6
## 27	23.27627	30.9
## 29	65.95718	47.7
## 30	69.52136	48.0
## 31	80.02378	51.0
## 32	53.56620	48.0
## 33	101.32928	51.0
## 36	52.08490	37.5
## 37	65.65051	47.7
## 38	67.87611	48.0
## 40	188.14432	57.0
## 41	90.21170	78.0
## 42	71.13529	96.0
## 43	70.07832	96.0
## 44	49.64500	66.0
## 46	61.22700	60.0
## 47	44.08371	38.1
## 48	76.50918	47.1
## 49	67.35101	45.0
## 50	62.50374	48.0
## 52	80.49954	57.0
## 53	87.63550	63.0
## 54	62.09505	78.0
## 55	100.02480	78.0
## 56	47.38953	60.0
## 57	89.40193	75.3
## 58	42.87910	35.7
## 59	54.26955	51.3
## 60	60.08797	45.9
## 61	83.60250	63.3
## 62	85.21769	60.0
## 63	36.67228	35.7
## 64	54.59005	43.5
## 65	58.75825	51.6
## 66	92.43689	55.5
## 68	48.67290	57.0
## 69	76.58444	60.0
## 70	80.38778	61.5
## 71	87.21100	55.5
## 72	94.94670	59.4
## 74	124.44672	67.5
## 77	113.54021	60.0
## 78	93.95792	57.0
## 80	45.83218	39.6
## 81	62.44196	47.7
## 82	58.60677	48.9
## 83	84.83078	57.0



## 84	67.54415	59.4
## 85	83.92082	72.9
## 86	70.66094	58.5
## 87	50.99775	45.0
## 88	51.11347	48.0
## 89	62.23997	48.0
## 90	80.65770	57.0
## 91	85.94974	63.0
## 92	69.67146	60.0
## 93	78.28073	49.2
## 94	98.24974	63.3
## 95	125.27388	69.6
## 96	139.98229	63.3
## 102	50.24198	39.6
## 103	63.31373	47.7
## 104	89.42782	55.5
## 105	71.17166	60.0
## 106	72.29036	63.0
## 109	60.86161	45.6
## 112	103.44169	55.5
## 113	80.51167	52.5
## 114	76.09657	75.0
## 115	52.08490	37.5
## 116	53.41190	48.0
## 117	60.95119	60.0
## 119	62.01587	45.0
## 120	70.38974	45.6
## 121	81.49273	50.4
## 122	78.31817	54.0
## 123	82.66136	52.5
## 125	93.43733	51.0
## 126	134.39098	51.0
## 127	135.91471	51.0
## 130	39.98642	36.3
## 131	40.70007	36.3
## 132	49.86577	36.3
## 137	47.96897	39.6
## 138	54.37242	55.5
## 139	84.91190	55.5
## 140	56.49603	43.5
## 141	55.29712	45.3
## 143	51.95511	45.9
## 144	62.35558	55.5
## 145	102.52898	76.2
## 146	46.94388	43.5
## 147	47.63824	43.5
## 148	61.70138	49.2
## 149	48.90737	41.1
## 150	47.94684	43.8

## Remove duplicated data

```
duplicated(Car.Sales.1)
```

```
## [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [13] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [25] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [37] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
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## [97] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [109] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [121] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [133] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [145] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [157] FALSE
```

## Reorder multiple rows

```
Car.Sales.1%>%arrange(desc(Curb_weight))
```

##	Manufacturer	Model	Sales_in_thousands	X__year_resale_value
## 1	Cadillac	Escalade	14.785	NA
## 2	Lexus	LX470	9.126	NA
## 3	Lincoln	Navigator	22.925	NA
## 4	Toyota	Land Cruiser	9.835	34.080
## 5	Ford	Expedition	125.338	23.575
## 6	Mitsubishi	Montero	11.337	19.125
## 7	Dodge	Ram Pickup	227.061	15.060
## 8	Dodge	Durango	101.323	NA
## 9	Mercedes-B	M-Class	28.976	NA
## 10	Dodge	Ram Van	31.038	13.425
## 11	Honda	Odyssey	76.029	19.490
## 12	Dodge	Ram Wagon	16.767	15.510
## 13	Ford	F-Series	540.561	15.075
## 14	Mercedes-B	S-Class	16.774	50.375
## 15	Mercedes-B	SL-Class	3.311	58.600
## 16	Lincoln	Town car	48.911	21.725
## 17	Mercedes-B	CL500	0.954	NA
## 18	Oldsmobile	Bravada	20.017	19.925
## 19	Nissan	Quest	27.308	15.380
## 20	Cadillac	DeVille	63.729	22.525
## 21	Oldsmobile	Aurora	14.690	19.890
## 22	Mercury	Grand Marquis	81.174	14.875
## 23	Oldsmobile	Silhouette	24.361	15.240
## 24	Nissan	Pathfinder	42.574	17.810
## 25	Mercury	Villager	20.380	14.795
## 26	Pontiac	Montana	39.572	NA

## 27	Ford Crown Victoria	63.403	14.210
## 28	Audi A8	1.380	39.000
## 29	Lexus RX300	51.238	NA
## 30	Lexus LS400	6.375	40.375
## 31	Jeep Grand Cherokee	157.040	18.810
## 32	Ford Explorer	276.747	16.640
## 33	Mercury Mountaineer	27.609	20.430
## 34	Lincoln Continental	13.798	20.525
## 35	Honda Passport	12.855	17.525
## 36	Acura RL	8.588	29.725
## 37	Cadillac Eldorado	6.536	25.725
## 38	Mercedes-B E-Class	27.602	41.450
## 39	Nissan Xterra	54.158	NA
## 40	Buick Park Avenue	27.851	20.190
## 41	Cadillac Catera	11.185	18.225
## 42	Ford Windstar	155.787	13.175
## 43	Toyota Sienna	65.119	NA
## 44	Lexus GS400	3.334	NA
## 45	Jaguar S-Type	15.467	NA
## 46	Lexus GS300	12.698	32.075
## 47	Volvo C70	3.493	NA
## 48	Volvo S80	18.969	NA
## 49	Buick LeSabre	83.257	13.360
## 50	Pontiac Bonneville	35.945	13.225
## 51	Chrysler 300M	30.696	NA
## 52	Chrysler LHS	13.462	17.325
## 53	Audi A6	18.780	23.555
## 54	Dodge Dakota	111.313	11.260
## 55	Buick Regal	39.350	13.740
## 56	Dodge Caravan	181.749	12.025
## 57	Plymouth Voyager	24.155	12.025
## 58	Acura TL	39.384	19.875
## 59	Mitsubishi Montero Sport	39.348	13.880
## 60	Chevrolet Camaro	26.402	13.025
## 61	Pontiac Firebird	19.911	17.805
## 62	Dodge Intrepid	88.028	12.275
## 63	BMW 528i	17.527	36.125
## 64	Acura CL	14.114	18.225
## 65	Oldsmobile Intrigue	38.554	NA
## 66	Chrysler Concorde	31.148	13.725
## 67	Mitsubishi Diamante	5.711	16.575
## 68	Toyota 4Runner	68.411	19.425
## 69	Toyota Avalon	63.849	18.140
## 70	Subaru Outback	47.107	NA
## 71	Pontiac Grand Prix	92.364	14.010
## 72	Chevrolet Impala	107.995	NA
## 73	Mercury Sable	67.956	11.030
## 74	Dodge Viper	0.916	58.470
## 75	Lexus ES300	24.072	26.975
## 76	Buick Century	91.561	12.475
## 77	Ford Taurus	245.815	10.055
## 78	Infiniti I30	23.713	19.690
## 79	Chevrolet Monte Carlo	42.593	11.525
## 80	Chrysler Sebring Conv.	32.775	14.180

## 81	Chevrolet	Lumina	24.629	10.310
## 82	Nissan	Maxima	79.853	15.125
## 83	Saab	05-Sep	9.191	NA
## 84	Volvo	V70	17.531	NA
## 85	Mercedes-B	C-Class	18.392	26.050
## 86	Honda	CR-V	73.203	17.710
## 87	Nissan	Frontier	65.005	NA
## 88	Mercedes-B	CLK Coupe	11.592	NA
## 89	Chevrolet	Corvette	17.947	36.225
## 90	Volvo	S70	15.245	NA
## 91	Ford	Mustang	113.369	12.760
## 92	BMW	328i	9.231	28.675
## 93	Jeep	Cherokee	80.556	13.775
## 94	BMW	323i	19.747	NA
## 95	Mitsubishi	3000GT	0.110	20.940
## 96	Subaru	Forester	33.028	NA
## 97	Oldsmobile	Cutlass	1.112	11.240
## 98	Pontiac	Grand Am	131.097	10.290
## 99	Ford	Ranger	220.650	7.850
## 100	Volkswagen	Cabrio	9.569	16.575
## 101	Porsche	Carrera Cabrio	1.866	67.550
## 102	Saturn	LW	8.472	NA
## 103	Hyundai	Sonata	29.450	8.910
## 104	Dodge	Stratus	71.186	10.185
## 105	Mercedes-B	SLK	7.998	NA
## 106	Chevrolet	Malibu	135.126	11.225
## 107	Jeep	Wrangler	55.557	13.475
## 108	Volkswagen	Passat	51.102	16.725
## 109	Volvo	V40	3.545	NA
## 110	Porsche	Carrera Coupe	1.280	60.625
## 111	Nissan	Altima	88.094	11.295
## 112	Audi	A4	20.397	22.255
## 113	Toyota	Camry	247.994	13.245
## 114	Volvo	S40	16.957	NA
## 115	Saab	03-Sep	12.115	NA
## 116	Mercedes-B	SLK230	1.526	NA
## 117	Chrysler	Sebring Coupe	7.854	12.360
## 118	Oldsmobile	Alero	80.255	NA
## 119	Mitsubishi	Galant	55.616	10.595
## 120	Plymouth	Breeze	5.240	9.800
## 121	Honda	Accord	230.902	13.210
## 122	Chrysler	Cirrus	32.306	12.640
## 123	Mitsubishi	Eclipse	42.541	10.395
## 124	Saturn	LS	49.989	NA
## 125	Pontiac	Sunfire	51.645	13.790
## 126	Mercury	Cougar	26.529	13.890
## 127	Dodge	Avenger	4.734	12.545
## 128	Volkswagen	Jetta	83.721	13.240
## 129	Plymouth	Prowler	1.872	NA
## 130	Porsche	Boxter	8.982	41.250
## 131	Ford	Contour	35.068	8.835
## 132	Mercury	Mystique	14.351	8.800
## 133	Volkswagen	Beetle	49.463	NA
## 134	Volkswagen	Golf	9.761	11.425

## 135	Volkswagen	GTI	5.596	13.760		
## 136	Chevrolet	Cavalier	145.519	9.250		
## 137	Toyota	RAV4	25.106	13.325		
## 138	Acura	Integra	16.919	16.360		
## 139	Hyundai	Elantra	66.692	7.825		
## 140	Nissan	Sentra	42.643	8.450		
## 141	Toyota	Tacoma	84.087	9.575		
## 142	Dodge	Neon	76.034	7.750		
## 143	Ford	Focus	175.670	NA		
## 144	Plymouth	Neon	32.734	7.750		
## 145	Ford	Escort	70.227	7.425		
## 146	Saturn	SW	5.223	10.790		
## 147	Toyota	Celica	33.269	15.445		
## 148	Toyota	Corolla	142.535	10.025		
## 149	Chevrolet	Prizm	32.299	9.125		
## 150	Saturn	SC	24.546	10.590		
## 151	Honda	Civic	199.685	9.850		
## 152	Saturn	SL	80.620	9.200		
## 153	Mitsubishi	Mirage	26.232	8.325		
## 154	Hyundai	Accent	41.184	5.860		
## 155	Chevrolet	Metro	21.855	5.160		
## 156	Cadillac	Seville	15.943	27.100		
## 157	Chrysler	Town & Country	53.480	19.540		
##	Vehicle_type	Price_in_thousands	Engine_size	Horsepower	Wheelbase	Width
## 1	Car	46.225	5.7	255	117.5	77.0
## 2	Car	60.105	4.7	230	112.2	76.4
## 3	Car	42.660	5.4	300	119.0	79.9
## 4	Car	51.728	4.7	230	112.2	76.4
## 5	Car	36.135	4.6	240	119.0	78.7
## 6	Car	31.807	3.5	200	107.3	69.9
## 7	Car	19.460	5.2	230	138.7	79.3
## 8	Car	26.310	5.2	230	115.7	71.7
## 9	Car	35.300	3.2	215	111.0	72.2
## 10	Car	18.575	3.9	175	127.2	78.8
## 11	Car	26.000	3.5	210	118.1	75.6
## 12	Car	21.315	3.9	175	109.6	78.8
## 13	Car	26.935	4.6	220	138.5	79.1
## 14	Passenger	69.700	4.3	275	121.5	73.1
## 15	Passenger	82.600	5.0	302	99.0	71.3
## 16	Passenger	43.330	4.6	215	117.7	78.2
## 17	Passenger	85.500	5.0	302	113.6	73.1
## 18	Car	31.598	4.3	190	107.0	67.8
## 19	Car	26.399	3.3	170	112.2	74.9
## 20	Passenger	39.895	4.6	275	115.3	74.5
## 21	Passenger	36.229	4.0	250	113.8	74.4
## 22	Passenger	22.605	4.6	200	114.7	78.2
## 23	Car	25.345	3.4	185	120.0	72.2
## 24	Car	29.299	3.3	170	106.3	71.7
## 25	Car	22.510	3.3	170	112.2	74.9
## 26	Car	25.635	3.4	185	120.0	72.7
## 27	Passenger	22.195	4.6	200	114.7	78.2
## 28	Passenger	62.000	4.2	310	113.0	74.0
## 29	Car	34.605	3.0	220	103.0	71.5
## 30	Passenger	54.005	4.0	290	112.2	72.0

## 31	Car	26.895	4.0	195	105.9	72.3
## 32	Car	31.930	4.0	210	111.6	70.2
## 33	Car	27.560	4.0	210	111.6	70.2
## 34	Passenger	39.080	4.6	275	109.0	73.6
## 35	Car	26.600	3.2	205	106.4	70.4
## 36	Passenger	42.000	3.5	210	114.6	71.4
## 37	Passenger	39.665	4.6	275	108.0	75.5
## 38	Passenger	49.900	3.2	221	111.5	70.8
## 39	Car	22.799	3.3	170	104.3	70.4
## 40	Passenger	31.965	3.8	205	113.8	74.7
## 41	Passenger	31.010	3.0	200	107.4	70.3
## 42	Car	21.410	3.0	150	120.7	76.6
## 43	Car	22.368	3.0	194	114.2	73.4
## 44	Passenger	46.305	4.0	300	110.2	70.9
## 45	Passenger	42.800	3.0	240	114.5	71.6
## 46	Passenger	37.805	3.0	225	110.2	70.9
## 47	Passenger	45.500	2.3	236	104.9	71.5
## 48	Passenger	36.000	2.9	201	109.9	72.1
## 49	Passenger	27.885	3.8	205	112.2	73.5
## 50	Passenger	23.755	3.8	205	112.2	72.6
## 51	Passenger	29.185	3.5	253	113.0	74.4
## 52	Passenger	28.340	3.5	253	113.0	74.4
## 53	Passenger	33.950	2.8	200	108.7	76.1
## 54	Car	16.980	2.5	120	131.0	71.5
## 55	Passenger	25.300	3.8	240	109.0	72.7
## 56	Car	19.565	2.4	150	113.3	76.8
## 57	Car	18.850	2.4	150	113.3	76.8
## 58	Passenger	28.400	3.2	225	108.1	70.3
## 59	Car	22.527	3.0	173	107.3	66.7
## 60	Passenger	24.340	3.8	200	101.1	74.1
## 61	Passenger	25.310	3.8	200	101.1	74.5
## 62	Passenger	22.505	2.7	202	113.0	74.7
## 63	Passenger	38.900	2.8	193	111.4	70.9
## 64	Passenger	0.000	3.2	225	106.9	70.6
## 65	Passenger	24.150	3.5	215	109.0	73.6
## 66	Passenger	22.245	2.7	200	113.0	74.4
## 67	Passenger	24.997	3.5	210	107.1	70.3
## 68	Car	22.288	2.7	150	105.3	66.5
## 69	Passenger	25.545	3.0	210	107.1	71.7
## 70	Passenger	22.695	2.5	165	103.5	67.5
## 71	Passenger	21.665	3.8	195	110.5	72.7
## 72	Passenger	18.890	3.4	180	110.5	73.0
## 73	Passenger	19.035	3.0	153	108.5	73.0
## 74	Passenger	69.725	8.0	450	96.2	75.7
## 75	Passenger	31.505	3.0	210	105.1	70.5
## 76	Passenger	21.975	3.1	175	109.0	72.7
## 77	Passenger	17.885	3.0	155	108.5	73.0
## 78	Passenger	29.465	3.0	227	108.3	70.2
## 79	Passenger	19.390	3.4	180	110.5	72.7
## 80	Passenger	24.495	2.5	168	106.0	69.2
## 81	Passenger	18.890	3.1	175	107.5	72.5
## 82	Passenger	26.249	3.0	222	108.3	70.3
## 83	Passenger	33.120	2.3	170	106.4	70.6
## 84	Passenger	28.800	2.4	168	104.9	69.3

## 85	Passenger	31.750	2.3	185	105.9	67.7
## 86	Car	20.550	2.0	146	103.2	68.9
## 87	Car	17.890	3.3	170	116.1	66.5
## 88	Passenger	41.600	3.2	215	105.9	67.8
## 89	Passenger	45.705	5.7	345	104.5	73.6
## 90	Passenger	27.500	2.4	168	104.9	69.3
## 91	Passenger	21.560	3.8	190	101.3	73.1
## 92	Passenger	33.400	2.8	193	107.3	68.5
## 93	Car	21.620	4.0	190	101.4	69.4
## 94	Passenger	26.990	2.5	170	107.3	68.4
## 95	Passenger	25.450	3.0	161	97.2	72.4
## 96	Car	20.095	2.5	165	99.4	68.3
## 97	Passenger	18.145	3.1	150	107.0	69.4
## 98	Passenger	19.720	3.4	175	107.0	70.4
## 99	Car	12.050	2.5	119	117.5	69.4
## 100	Passenger	19.990	2.0	115	97.4	66.7
## 101	Passenger	74.970	3.4	300	92.6	69.5
## 102	Passenger	18.835	2.2	137	106.5	69.0
## 103	Passenger	14.999	2.4	148	106.3	71.6
## 104	Passenger	20.230	2.5	168	108.0	71.0
## 105	Passenger	38.900	2.3	190	94.5	67.5
## 106	Passenger	16.535	3.1	170	107.0	69.4
## 107	Car	14.460	2.5	120	93.4	66.7
## 108	Passenger	21.200	1.8	150	106.4	68.5
## 109	Passenger	24.400	1.9	160	100.5	67.6
## 110	Passenger	71.020	3.4	300	92.6	69.5
## 111	Passenger	20.390	2.4	155	103.1	69.1
## 112	Passenger	23.990	1.8	150	102.6	68.2
## 113	Passenger	17.518	2.2	133	105.2	70.1
## 114	Passenger	23.400	1.9	160	100.5	67.6
## 115	Passenger	26.100	2.0	185	102.6	67.4
## 116	Passenger	41.000	2.3	185	94.5	67.5
## 117	Passenger	19.840	2.5	163	103.7	69.7
## 118	Passenger	18.270	2.4	150	107.0	70.1
## 119	Passenger	17.357	2.4	145	103.7	68.5
## 120	Passenger	16.080	2.0	132	108.0	71.0
## 121	Passenger	15.350	2.3	135	106.9	70.3
## 122	Passenger	16.480	2.0	132	108.0	71.0
## 123	Passenger	19.047	2.4	154	100.8	68.9
## 124	Passenger	15.010	2.2	137	106.5	69.0
## 125	Passenger	21.610	2.4	150	104.1	68.4
## 126	Passenger	16.540	2.0	125	106.4	69.6
## 127	Passenger	19.045	2.5	163	103.7	69.1
## 128	Passenger	16.700	2.0	115	98.9	68.3
## 129	Passenger	43.000	3.5	253	113.3	76.3
## 130	Passenger	41.430	2.7	217	95.2	70.1
## 131	Passenger	17.035	2.5	170	106.5	69.1
## 132	Passenger	16.240	2.0	125	106.5	69.1
## 133	Passenger	15.900	2.0	115	98.9	67.9
## 134	Passenger	14.900	2.0	115	98.9	68.3
## 135	Passenger	17.500	2.0	115	98.9	68.3
## 136	Passenger	13.260	2.2	115	104.1	67.9
## 137	Car	16.888	2.0	127	94.9	66.7
## 138	Passenger	21.500	1.8	140	101.2	67.3

## 139	Passenger	11.799	2.0	140	100.4	66.9
## 140	Passenger	13.499	1.8	126	99.8	67.3
## 141	Car	11.528	2.4	142	103.3	66.5
## 142	Passenger	12.640	2.0	132	105.0	74.4
## 143	Passenger	12.315	2.0	107	103.0	66.9
## 144	Passenger	12.640	2.0	132	105.0	74.4
## 145	Passenger	12.070	2.0	110	98.4	67.0
## 146	Passenger	14.290	1.9	124	102.4	66.4
## 147	Passenger	16.875	1.8	140	102.4	68.3
## 148	Passenger	13.108	1.8	120	97.0	66.7
## 149	Passenger	13.960	1.8	120	97.1	66.7
## 150	Passenger	12.535	1.9	100	102.4	66.4
## 151	Passenger	12.885	1.6	106	103.2	67.1
## 152	Passenger	10.685	1.9	100	102.4	66.4
## 153	Passenger	13.987	1.8	113	98.4	66.5
## 154	Passenger	9.699	1.5	92	96.1	65.7
## 155	Passenger	9.235	1.0	55	93.1	62.6
## 156	Passenger	44.475	4.6	275	112.2	75.0
## 157	Car	0.000	NA	NA	NA	NA
##	Length	Curb_weight	Fuel_capacity	Fuel_efficiency	Latest_Launch	
## 1	201.2	5.572	30.0	15	4/17/2012	
## 2	192.5	5.401	25.4	15	10/30/2012	
## 3	204.8	5.393	30.0	15	12/23/2012	
## 4	192.5	5.115	25.4	15	9/25/2011	
## 5	204.6	4.808	26.0	16	9/14/2012	
## 6	186.6	4.520	24.3	18	1/17/2012	
## 7	224.2	4.470	26.0	17	03-06-12	
## 8	193.5	4.394	25.0	17	6/27/2012	
## 9	180.6	4.387	19.0	20	02-10-11	
## 10	208.5	4.298	32.0	16	7/26/2012	
## 11	201.2	4.288	20.0	23	02-08-12	
## 12	192.6	4.245	32.0	15	01-06-12	
## 13	224.5	4.241	25.1	18	8/16/2012	
## 14	203.1	4.133	23.2	21	6/13/2011	
## 15	177.1	4.125	21.1	20	3/17/2011	
## 16	215.3	4.121	19.0	21	06-04-12	
## 17	196.6	4.115	23.2	20	04-11-11	
## 18	181.2	4.068	17.5	19	9/21/2011	
## 19	194.8	3.991	20.0	21	03-07-11	
## 20	207.2	3.978	18.5	22	2/23/2012	
## 21	205.4	3.967	18.5	22	2/18/2011	
## 22	212.0	3.958	19.0	21	7/24/2012	
## 23	201.4	3.948	25.0	22	6/25/2011	
## 24	182.6	3.947	21.0	19	9/25/2011	
## 25	194.7	3.944	20.0	21	10/20/2009	
## 26	201.3	3.942	25.0	23	7/22/2012	
## 27	212.0	3.908	19.0	21	9/26/2011	
## 28	198.2	3.902	23.7	21	2/27/2012	
## 29	180.1	3.900	17.2	21	01-04-12	
## 30	196.7	3.890	22.5	22	3/29/2012	
## 31	181.5	3.880	20.5	19	12-10-11	
## 32	190.7	3.876	21.0	19	4/25/2012	
## 33	190.1	3.876	21.0	18	2/13/2008	
## 34	208.5	3.868	20.0	22	08-03-12	



## 35	178.2	3.857	21.1	19	10-09-12
## 36	196.6	3.850	18.0	22	03-10-11
## 37	200.6	3.843	19.0	22	11/27/2011
## 38	189.4	3.823	21.1	25	07-12-11
## 39	178.0	3.821	19.4	18	1/24/2011
## 40	206.8	3.778	18.5	24	3/23/2012
## 41	194.8	3.770	18.0	22	9/28/2011
## 42	200.9	3.761	26.0	21	2/25/2012
## 43	193.5	3.759	20.9	22	10-05-12
## 44	189.2	3.693	19.8	21	11/28/2012
## 45	191.3	3.650	18.4	21	11-03-12
## 46	189.2	3.638	19.8	23	05-10-12
## 47	185.7	3.601	18.5	23	4/26/2011
## 48	189.8	3.600	21.1	24	11/14/2011
## 49	200.0	3.591	17.5	25	7/23/2011
## 50	202.5	3.590	17.5	24	5/18/2011
## 51	197.8	3.567	17.0	23	02-10-12
## 52	207.7	3.564	17.0	23	05-08-12
## 53	192.0	3.561	18.5	22	08-09-11
## 54	215.0	3.557	22.0	19	11/25/2011
## 55	196.2	3.543	17.5	23	09-03-11
## 56	186.3	3.533	20.0	24	09-01-11
## 57	186.3	3.528	20.0	24	4/24/2011
## 58	192.9	3.517	17.2	25	06-03-11
## 59	178.3	3.510	19.5	20	5/18/2012
## 60	193.2	3.500	16.8	25	10/23/2011
## 61	193.4	3.492	16.8	25	6/16/2012
## 62	203.7	3.489	17.0	NA	06-02-12
## 63	188.0	3.472	18.5	25	04-04-11
## 64	192.0	3.470	17.2	26	01-04-12
## 65	195.9	3.455	18.0	NA	04-01-11
## 66	209.1	3.452	17.0	26	06-06-12
## 67	194.1	3.443	19.0	22	8/28/2012
## 68	183.3	3.440	18.5	23	03-07-11
## 69	191.9	3.417	18.5	26	8/31/2011
## 70	185.8	3.415	16.9	25	07-07-11
## 71	196.5	3.396	18.0	25	10/15/2012
## 72	200.0	3.389	17.0	27	6/18/2011
## 73	199.7	3.379	16.0	24	9/22/2012
## 74	176.7	3.375	19.0	16	08-07-11
## 75	190.2	3.373	18.5	23	07-09-12
## 76	194.6	3.368	17.5	25	11-02-11
## 77	197.6	3.368	16.0	24	12/20/2011
## 78	193.7	3.342	18.5	25	4/15/2012
## 79	197.9	3.340	17.0	27	12/22/2011
## 80	193.0	3.332	16.0	24	11/17/2011
## 81	200.9	3.330	16.6	25	5/24/2011
## 82	190.5	3.294	18.5	25	05-06-11
## 83	189.2	3.280	18.5	23	11-09-12
## 84	186.2	3.259	17.9	25	6/25/2011
## 85	177.4	3.250	16.4	26	4/24/2011
## 86	177.6	3.219	15.3	24	3/21/2012
## 87	196.1	3.217	19.4	18	8/27/2011
## 88	180.3	3.213	16.4	26	07-08-11

## 89	179.7	3.210	19.1	22	05-12-12
## 90	185.9	3.208	17.9	25	11/24/2012
## 91	183.2	3.203	15.7	24	1/31/2012
## 92	176.0	3.197	16.6	24	1/29/2012
## 93	167.5	3.194	20.0	20	10-05-12
## 94	176.0	3.179	16.6	26	6/28/2011
## 95	180.3	3.131	19.8	21	6/29/2012
## 96	175.2	3.125	15.9	24	09-10-12
## 97	192.0	3.102	15.2	25	5/31/2011
## 98	186.3	3.091	15.2	25	11/26/2012
## 99	200.7	3.086	20.0	23	1/14/2012
## 100	160.4	3.079	13.7	26	5/31/2011
## 101	174.5	3.075	17.0	23	07-11-11
## 102	190.4	3.075	13.1	27	08-05-11
## 103	185.4	3.072	17.2	25	6/14/2012
## 104	186.0	3.058	16.0	24	10/31/2011
## 105	157.9	3.055	15.9	26	1/16/2011
## 106	190.4	3.051	15.0	25	3/19/2012
## 107	152.0	3.045	19.0	17	03-04-12
## 108	184.1	3.043	16.4	27	10/30/2012
## 109	176.6	3.042	15.8	25	9/21/2011
## 110	174.5	3.032	17.0	21	12/21/2012
## 111	183.5	3.012	15.9	25	08-02-11
## 112	178.0	2.998	16.4	27	10-08-11
## 113	188.5	2.998	18.5	27	02-10-11
## 114	176.6	2.998	15.8	25	2/18/2011
## 115	182.2	2.990	16.9	23	06-12-11
## 116	157.3	2.975	14.0	27	08-06-11
## 117	190.9	2.967	15.9	24	1/16/2012
## 118	186.7	2.958	15.0	27	10/20/2009
## 119	187.8	2.945	16.3	25	1/29/2012
## 120	186.3	2.942	16.0	27	11/14/2011
## 121	188.8	2.932	17.1	27	5/20/2012
## 122	186.0	2.911	16.0	27	10-06-11
## 123	175.4	2.910	15.9	24	11/24/2012
## 124	190.4	2.910	13.1	28	12-04-12
## 125	181.9	2.906	15.0	27	1/25/2012
## 126	185.0	2.892	16.0	30	2/23/2012
## 127	190.2	2.879	15.9	24	07-01-12
## 128	172.3	2.853	14.5	26	8/27/2011
## 129	165.4	2.850	12.0	21	6/27/2012
## 130	171.0	2.778	17.0	22	2/19/2012
## 131	184.6	2.769	15.0	25	8/20/2012
## 132	184.8	2.769	15.0	28	12/19/2012
## 133	161.1	2.769	14.5	26	10/20/2011
## 134	163.3	2.767	14.5	26	1/24/2011
## 135	163.3	2.762	14.6	26	04-01-11
## 136	180.9	2.676	14.3	27	8/17/2011
## 137	163.8	2.668	15.3	27	05-06-11
## 138	172.4	2.639	13.2	28	02-02-12
## 139	174.0	2.626	14.5	27	11/15/2011
## 140	177.5	2.593	13.2	30	8/31/2011
## 141	178.7	2.580	15.1	23	08-01-11
## 142	174.4	2.567	12.5	29	12-12-11

## 143	174.8	2.564	13.2	30	7/22/2012
## 144	174.4	2.559	12.5	29	4/26/2011
## 145	174.7	2.468	12.7	30	3/31/2012
## 146	176.9	2.452	12.1	31	1/15/2011
## 147	170.5	2.425	14.5	31	12/29/2012
## 148	174.0	2.420	13.2	33	04-11-11
## 149	174.3	2.398	13.2	33	09-11-11
## 150	180.0	2.367	12.1	33	3/16/2011
## 151	175.1	2.339	11.9	32	10/21/2011
## 152	176.9	2.332	12.1	33	8/16/2012
## 153	173.6	2.250	13.2	30	4/23/2012
## 154	166.7	2.240	11.9	31	09-10-12
## 155	149.4	1.895	10.3	45	4/13/2012
## 156	201.0	NA	18.5	22	4/29/2011
## 157	NA	NA	NA	NA	7/13/2011
##	Power_perf_factor	Fuel_capacitynew			
## 1	109.50912	90.0			
## 2	105.76046	76.2			
## 3	123.97205	90.0			
## 4	102.52898	76.2			
## 5	100.02480	78.0			
## 6	83.92082	72.9			
## 7	90.21170	78.0			
## 8	92.85413	75.0			
## 9	90.49553	57.0			
## 10	70.07832	96.0			
## 11	85.21769	60.0			
## 12	71.13529	96.0			
## 13	89.40193	75.3			
## 14	125.27388	69.6			
## 15	139.98229	63.3			
## 16	93.95792	57.0			
## 17	141.10098	69.6			
## 18	80.51167	52.5			
## 19	71.17166	60.0			
## 20	113.85460	55.5			
## 21	103.44169	55.5			
## 22	80.65770	57.0			
## 23	76.09657	75.0			
## 24	72.29036	63.0			
## 25	69.67146	60.0			
## 26	76.20844	75.0			
## 27	80.49954	57.0			
## 28	134.65686	71.1			
## 29	91.94380	51.6			
## 30	124.44672	67.5			
## 31	80.38778	61.5			
## 32	87.63550	63.0			
## 33	85.94974	63.0			
## 34	113.54021	60.0			
## 35	83.60250	63.3			
## 36	91.38978	54.0			
## 37	113.76587	57.0			
## 38	98.24974	63.3			

## 39	69.78294	58.2
## 40	85.82841	55.5
## 41	83.48309	54.0
## 42	62.09505	78.0
## 43	78.02722	62.7
## 44	125.01336	59.4
## 45	102.17898	55.2
## 46	94.94670	59.4
## 47	101.62336	55.5
## 48	85.73565	63.3
## 49	84.25453	52.5
## 50	82.66136	52.5
## 51	101.65524	51.0
## 52	101.32928	51.0
## 53	84.56511	55.5
## 54	49.64500	66.0
## 55	95.63670	52.5
## 56	61.22700	60.0
## 57	60.95119	60.0
## 58	91.37078	51.6
## 59	70.66094	58.5
## 60	81.11854	50.4
## 61	81.49273	50.4
## 62	80.83147	51.0
## 63	83.99872	55.5
## 64	NA	51.6
## 65	86.27252	54.0
## 66	80.02378	51.0
## 67	84.83078	57.0
## 68	62.35558	55.5
## 69	84.91190	55.5
## 70	67.76591	50.7
## 71	78.31817	54.0
## 72	71.83804	51.0
## 73	62.23997	48.0
## 74	188.14432	57.0
## 75	87.21100	55.5
## 76	71.18145	52.5
## 77	62.50374	48.0
## 78	92.43689	55.5
## 79	72.03092	51.0
## 80	69.52136	48.0
## 81	69.99140	49.8
## 82	89.42782	55.5
## 83	73.50378	55.5
## 84	71.15598	53.7
## 85	78.28073	49.2
## 86	60.08797	45.9
## 87	67.88927	58.2
## 88	92.92579	49.2
## 89	141.14115	57.3
## 90	70.65450	53.7
## 91	76.50918	47.1
## 92	81.87707	49.8

## 93	76.58444	60.0
## 94	71.19121	49.8
## 95	67.54415	59.4
## 96	66.76294	47.7
## 97	60.86161	45.6
## 98	70.38974	45.6
## 99	47.38953	60.0
## 100	48.90737	41.1
## 101	135.91471	51.0
## 102	56.29524	39.3
## 103	58.75825	51.6
## 104	67.87611	48.0
## 105	82.80736	47.7
## 106	67.31446	45.0
## 107	48.67290	57.0
## 108	61.70138	49.2
## 109	66.49881	47.4
## 110	134.39098	51.0
## 111	63.31373	47.7
## 112	62.77764	49.2
## 113	54.37242	55.5
## 114	66.11306	47.4
## 115	76.02305	50.7
## 116	81.84897	42.0
## 117	65.95718	47.7
## 118	60.72745	45.0
## 119	58.60677	48.9
## 120	53.41190	48.0
## 121	54.26955	51.3
## 122	53.56620	48.0
## 123	62.44196	47.7
## 124	54.81973	39.3
## 125	62.01587	45.0
## 126	51.11347	48.0
## 127	65.65051	47.7
## 128	47.63824	43.5
## 129	106.98446	36.0
## 130	93.43733	51.0
## 131	67.35101	45.0
## 132	50.99775	45.0
## 133	47.32963	43.5
## 134	46.94388	43.5
## 135	47.94684	43.8
## 136	46.36335	42.9
## 137	51.95511	45.9
## 138	58.28015	39.6
## 139	54.59005	43.5
## 140	50.24198	39.6
## 141	55.29712	45.3
## 142	52.08490	37.5
## 143	43.11713	39.6
## 144	52.08490	37.5
## 145	44.08371	38.1
## 146	49.86577	36.3

```
## 147      56.49603      43.5
## 148      47.96897      39.6
## 149      48.29764      39.6
## 150      40.70007      36.3
## 151      42.87910      35.7
## 152      39.98642      36.3
## 153      45.83218      39.6
## 154      36.67228      35.7
## 155      23.27627      30.9
## 156     115.62136      55.5
## 157           NA      NA
```

```
## Sorting Field Curb_Weight in descending order
```

Rename some of the column names

```
names(Car.Sales.1)[names(Car.Sales.1) == "Vehicle_type"] <- "vehicle_model"
## Renaming vehicle type to Vehicle model
```

Add new variables in your data frame by using a mathematical function

```
Car.Sales.1$Horsepowernew = Car.Sales.1$Horsepower*0.5
```

Create a training set using random number generator engine

```
set.seed(1234)
Car.Sales.1 %>% sample_n (5, replace = FALSE)
```

```
##   Manufacturer   Model Sales_in_thousands X__year_resale_value vehicle_model
## 1   Chevrolet   Impala      107.995      NA      Passenger
## 2   Mitsubishi   Mirage      26.232      8.325      Passenger
## 3   Volkswagen   GTI        5.596      13.760      Passenger
## 4   Mercedes-B   M-Class     28.976      NA        Car
## 5   Oldsmobile   Alero       80.255      NA      Passenger
##   Price_in_thousands Engine_size Horsepower Wheelbase Width Length Curb_weight
## 1          18.890         3.4        180     110.5   73.0   200.0      3.389
## 2          13.987         1.8        113     98.4   66.5   173.6      2.250
## 3          17.500         2.0        115     98.9   68.3   163.3      2.762
## 4          35.300         3.2        215    111.0   72.2   180.6      4.387
## 5          18.270         2.4        150    107.0   70.1   186.7      2.958
##   Fuel_capacity Fuel_efficiency Latest_Launch Power_perf_factor
## 1          17.0           27      6/18/2011      71.83804
## 2          13.2           30      4/23/2012      45.83218
## 3          14.6           26      04-01-11      47.94684
## 4          19.0           20      02-10-11      90.49553
## 5          15.0           27     10/20/2009      60.72745
##   Fuel_capacitynew Horsepowernew
```

```
## 1      51.0      90.0
## 2      39.6      56.5
## 3      43.8      57.5
## 4      57.0     107.5
## 5      45.0      75.0
```

## Print the summary statistics

```
Car.Sales.1 %>% group_by (Manufacturer) %>% summarise(mean(Price_in_thousands))
```

```
## # A tibble: 30 x 2
##   Manufacturer 'mean(Price_in_thousands)'
##   <chr>                                <dbl>
## 1 Acura                                23.0
## 2 Audi                                 40.0
## 3 BMW                                  33.1
## 4 Buick                                26.8
## 5 Cadillac                             40.3
## 6 Chevrolet                             20.0
## 7 Chrysler                             20.1
## 8 Dodge                                 24.2
## 9 Ford                                  21.0
## 10 Honda                               20.3
## # ... with 20 more rows
```

## Calculate Mean

```
mean(Car.Sales.1$Sales_in_thousands)
```

```
## [1] 52.99808
```

## Calculate Median

```
median(Car.Sales.1$Sales_in_thousands)
```

```
## [1] 29.45
```

## Calculate Mode

```
mode(Car.Sales.1$Sales_in_thousands)
```

```
## [1] "numeric"
```

## Calculate Range

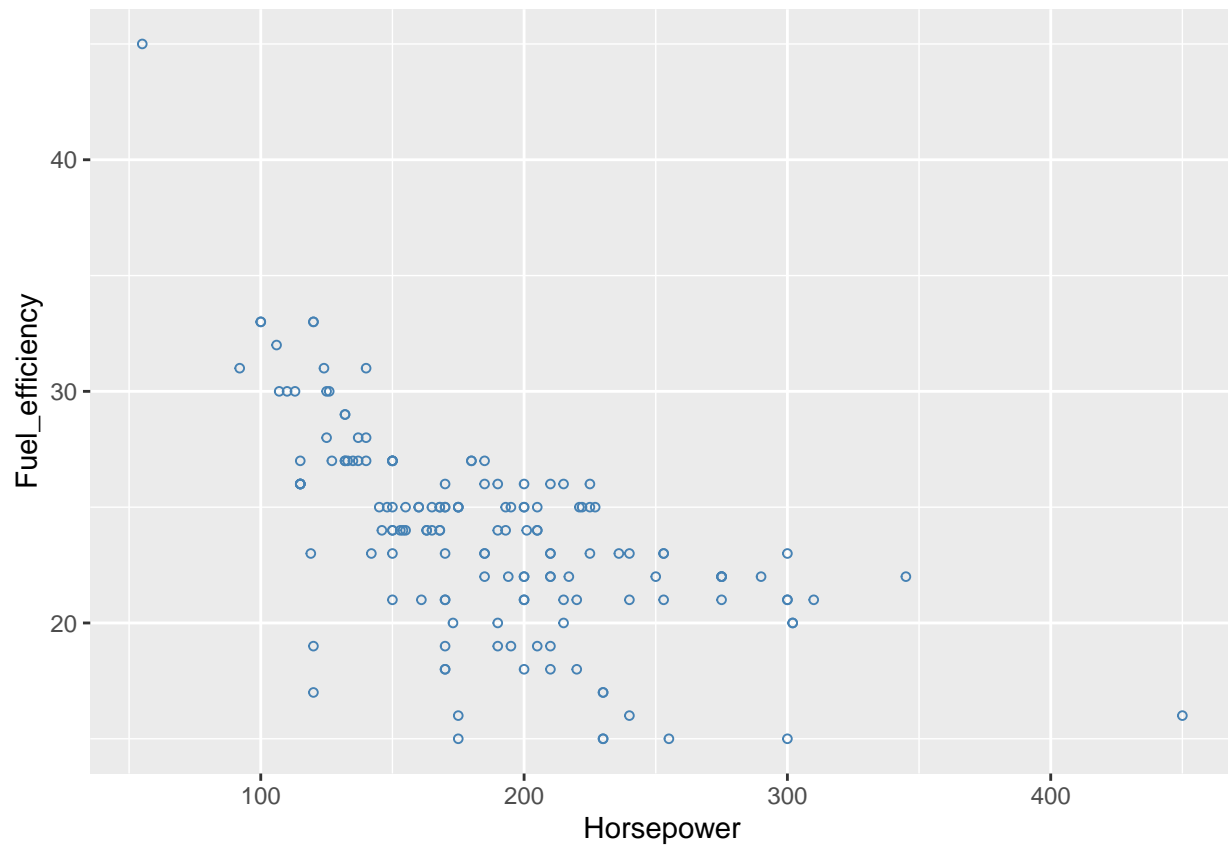
```
range(Car.Sales.1$Sales_in_thousands)
```

```
## [1] 0.110 540.561
```

## Scatter plot

```
ggplot(data = Car.Sales.1, aes(x = Horsepower, y = Fuel_efficiency))+geom_point(size=1.2, color = "steelblue")
```

```
## Warning: Removed 3 rows containing missing values (geom_point).
```



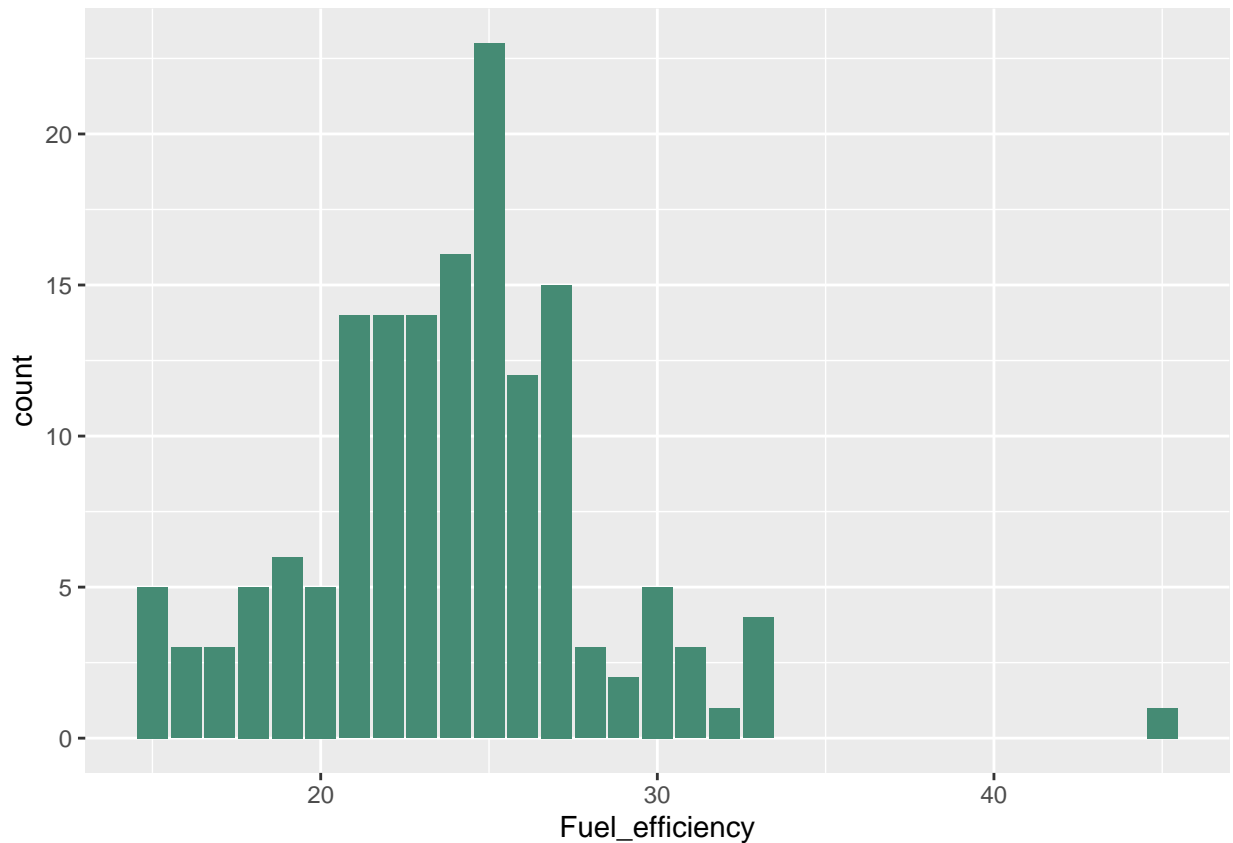
```
## Scatter plot of Horsepower vs Fuel efficiency
```

## Bar plot

```
ggplot(data = Car.Sales.1, aes(x = Fuel_efficiency))+geom_bar(fill = "aquamarine4")
```

```
## Warning: Removed 3 rows containing non-finite values (stat_count).
```





```
## Barplot of Fuelefficiency
```

## Find the correlation

```
y = Car.Sales.1[, "Sales_in_thousands"]
x = Car.Sales.1[, "Price_in_thousands"]
corr2 = cor(x, y, method = "pearson")
corr2
```

```
## [1] -0.2907503
```

```
## correlation between sales_in_thousands and price_in_thousands,
```

## Conclusion

After performing the analysis of the Car sales dataset, it is clear that correlation between sales vs price is negative meaning the price and sales are inversely proportional to each other. The sales price of car ranges from 0.110 to 540.651 (in thousands) and the mean sale value is 52.99808 (in thousands). The mean price in thousands for Porsche is 62.47 (highest) while for Saturn is 14.27 (lowest).

##Repository Link: <https://github.com/Pallu2812/Group5.git>