

# RWorksheet\_Lumauag#4c

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```
#1
#a
library(readxl)
dataset <- read.csv ("C:/RPROJS/mpg.csv")
dataset
```

##	X	manufacturer	model	displ	year	cyl	trans	drv	cty
## 1	1	audi	a4	1.8	1999	4	auto(l5)	f	18
## 2	2	audi	a4	1.8	1999	4	manual(m5)	f	21
## 3	3	audi	a4	2.0	2008	4	manual(m6)	f	20
## 4	4	audi	a4	2.0	2008	4	auto(av)	f	21
## 5	5	audi	a4	2.8	1999	6	auto(l5)	f	16
## 6	6	audi	a4	2.8	1999	6	manual(m5)	f	18
## 7	7	audi	a4	3.1	2008	6	auto(av)	f	18
## 8	8	audi	a4 quattro	1.8	1999	4	manual(m5)	4	18
## 9	9	audi	a4 quattro	1.8	1999	4	auto(l5)	4	16
## 10	10	audi	a4 quattro	2.0	2008	4	manual(m6)	4	20
## 11	11	audi	a4 quattro	2.0	2008	4	auto(s6)	4	19
## 12	12	audi	a4 quattro	2.8	1999	6	auto(l5)	4	15
## 13	13	audi	a4 quattro	2.8	1999	6	manual(m5)	4	17
## 14	14	audi	a4 quattro	3.1	2008	6	auto(s6)	4	17
## 15	15	audi	a4 quattro	3.1	2008	6	manual(m6)	4	15
## 16	16	audi	a6 quattro	2.8	1999	6	auto(l5)	4	15
## 17	17	audi	a6 quattro	3.1	2008	6	auto(s6)	4	17
## 18	18	audi	a6 quattro	4.2	2008	8	auto(s6)	4	16
## 19	19	chevrolet	c1500 suburban 2wd	5.3	2008	8	auto(l4)	r	14
## 20	20	chevrolet	c1500 suburban 2wd	5.3	2008	8	auto(l4)	r	11
## 21	21	chevrolet	c1500 suburban 2wd	5.3	2008	8	auto(l4)	r	14
## 22	22	chevrolet	c1500 suburban 2wd	5.7	1999	8	auto(l4)	r	13
## 23	23	chevrolet	c1500 suburban 2wd	6.0	2008	8	auto(l4)	r	12
## 24	24	chevrolet	corvette	5.7	1999	8	manual(m6)	r	16
## 25	25	chevrolet	corvette	5.7	1999	8	auto(l4)	r	15
## 26	26	chevrolet	corvette	6.2	2008	8	manual(m6)	r	16
## 27	27	chevrolet	corvette	6.2	2008	8	auto(s6)	r	15
## 28	28	chevrolet	corvette	7.0	2008	8	manual(m6)	r	15
## 29	29	chevrolet	k1500 tahoe 4wd	5.3	2008	8	auto(l4)	4	14
## 30	30	chevrolet	k1500 tahoe 4wd	5.3	2008	8	auto(l4)	4	11
## 31	31	chevrolet	k1500 tahoe 4wd	5.7	1999	8	auto(l4)	4	11
## 32	32	chevrolet	k1500 tahoe 4wd	6.5	1999	8	auto(l4)	4	14
## 33	33	chevrolet	malibu	2.4	1999	4	auto(l4)	f	19
## 34	34	chevrolet	malibu	2.4	2008	4	auto(l4)	f	22
## 35	35	chevrolet	malibu	3.1	1999	6	auto(l4)	f	18

##	36	36	chevrolet	malibu	3.5	2008	6	auto(14)	f	18
##	37	37	chevrolet	malibu	3.6	2008	6	auto(s6)	f	17
##	38	38	dodge	caravan 2wd	2.4	1999	4	auto(13)	f	18
##	39	39	dodge	caravan 2wd	3.0	1999	6	auto(14)	f	17
##	40	40	dodge	caravan 2wd	3.3	1999	6	auto(14)	f	16
##	41	41	dodge	caravan 2wd	3.3	1999	6	auto(14)	f	16
##	42	42	dodge	caravan 2wd	3.3	2008	6	auto(14)	f	17
##	43	43	dodge	caravan 2wd	3.3	2008	6	auto(14)	f	17
##	44	44	dodge	caravan 2wd	3.3	2008	6	auto(14)	f	11
##	45	45	dodge	caravan 2wd	3.8	1999	6	auto(14)	f	15
##	46	46	dodge	caravan 2wd	3.8	1999	6	auto(14)	f	15
##	47	47	dodge	caravan 2wd	3.8	2008	6	auto(16)	f	16
##	48	48	dodge	caravan 2wd	4.0	2008	6	auto(16)	f	16
##	49	49	dodge	dakota pickup 4wd	3.7	2008	6	manual(m6)	4	15
##	50	50	dodge	dakota pickup 4wd	3.7	2008	6	auto(14)	4	14
##	51	51	dodge	dakota pickup 4wd	3.9	1999	6	auto(14)	4	13
##	52	52	dodge	dakota pickup 4wd	3.9	1999	6	manual(m5)	4	14
##	53	53	dodge	dakota pickup 4wd	4.7	2008	8	auto(15)	4	14
##	54	54	dodge	dakota pickup 4wd	4.7	2008	8	auto(15)	4	14
##	55	55	dodge	dakota pickup 4wd	4.7	2008	8	auto(15)	4	9
##	56	56	dodge	dakota pickup 4wd	5.2	1999	8	manual(m5)	4	11
##	57	57	dodge	dakota pickup 4wd	5.2	1999	8	auto(14)	4	11
##	58	58	dodge	durango 4wd	3.9	1999	6	auto(14)	4	13
##	59	59	dodge	durango 4wd	4.7	2008	8	auto(15)	4	13
##	60	60	dodge	durango 4wd	4.7	2008	8	auto(15)	4	9
##	61	61	dodge	durango 4wd	4.7	2008	8	auto(15)	4	13
##	62	62	dodge	durango 4wd	5.2	1999	8	auto(14)	4	11
##	63	63	dodge	durango 4wd	5.7	2008	8	auto(15)	4	13
##	64	64	dodge	durango 4wd	5.9	1999	8	auto(14)	4	11
##	65	65	dodge	ram 1500 pickup 4wd	4.7	2008	8	manual(m6)	4	12
##	66	66	dodge	ram 1500 pickup 4wd	4.7	2008	8	auto(15)	4	9
##	67	67	dodge	ram 1500 pickup 4wd	4.7	2008	8	auto(15)	4	13
##	68	68	dodge	ram 1500 pickup 4wd	4.7	2008	8	auto(15)	4	13
##	69	69	dodge	ram 1500 pickup 4wd	4.7	2008	8	manual(m6)	4	12
##	70	70	dodge	ram 1500 pickup 4wd	4.7	2008	8	manual(m6)	4	9
##	71	71	dodge	ram 1500 pickup 4wd	5.2	1999	8	auto(14)	4	11
##	72	72	dodge	ram 1500 pickup 4wd	5.2	1999	8	manual(m5)	4	11
##	73	73	dodge	ram 1500 pickup 4wd	5.7	2008	8	auto(15)	4	13
##	74	74	dodge	ram 1500 pickup 4wd	5.9	1999	8	auto(14)	4	11
##	75	75	ford	expedition 2wd	4.6	1999	8	auto(14)	r	11
##	76	76	ford	expedition 2wd	5.4	1999	8	auto(14)	r	11
##	77	77	ford	expedition 2wd	5.4	2008	8	auto(16)	r	12
##	78	78	ford	explorer 4wd	4.0	1999	6	auto(15)	4	14
##	79	79	ford	explorer 4wd	4.0	1999	6	manual(m5)	4	15
##	80	80	ford	explorer 4wd	4.0	1999	6	auto(15)	4	14
##	81	81	ford	explorer 4wd	4.0	2008	6	auto(15)	4	13
##	82	82	ford	explorer 4wd	4.6	2008	8	auto(16)	4	13
##	83	83	ford	explorer 4wd	5.0	1999	8	auto(14)	4	13
##	84	84	ford	f150 pickup 4wd	4.2	1999	6	auto(14)	4	14
##	85	85	ford	f150 pickup 4wd	4.2	1999	6	manual(m5)	4	14
##	86	86	ford	f150 pickup 4wd	4.6	1999	8	manual(m5)	4	13
##	87	87	ford	f150 pickup 4wd	4.6	1999	8	auto(14)	4	13
##	88	88	ford	f150 pickup 4wd	4.6	2008	8	auto(14)	4	13
##	89	89	ford	f150 pickup 4wd	5.4	1999	8	auto(14)	4	11

## 90	90	ford	f150 pickup 4wd	5.4 2008	8	auto(14)	4	13
## 91	91	ford	mustang	3.8 1999	6	manual(m5)	r	18
## 92	92	ford	mustang	3.8 1999	6	auto(14)	r	18
## 93	93	ford	mustang	4.0 2008	6	manual(m5)	r	17
## 94	94	ford	mustang	4.0 2008	6	auto(15)	r	16
## 95	95	ford	mustang	4.6 1999	8	auto(14)	r	15
## 96	96	ford	mustang	4.6 1999	8	manual(m5)	r	15
## 97	97	ford	mustang	4.6 2008	8	manual(m5)	r	15
## 98	98	ford	mustang	4.6 2008	8	auto(15)	r	15
## 99	99	ford	mustang	5.4 2008	8	manual(m6)	r	14
## 100	100	honda	civic	1.6 1999	4	manual(m5)	f	28
## 101	101	honda	civic	1.6 1999	4	auto(14)	f	24
## 102	102	honda	civic	1.6 1999	4	manual(m5)	f	25
## 103	103	honda	civic	1.6 1999	4	manual(m5)	f	23
## 104	104	honda	civic	1.6 1999	4	auto(14)	f	24
## 105	105	honda	civic	1.8 2008	4	manual(m5)	f	26
## 106	106	honda	civic	1.8 2008	4	auto(15)	f	25
## 107	107	honda	civic	1.8 2008	4	auto(15)	f	24
## 108	108	honda	civic	2.0 2008	4	manual(m6)	f	21
## 109	109	hyundai	sonata	2.4 1999	4	auto(14)	f	18
## 110	110	hyundai	sonata	2.4 1999	4	manual(m5)	f	18
## 111	111	hyundai	sonata	2.4 2008	4	auto(14)	f	21
## 112	112	hyundai	sonata	2.4 2008	4	manual(m5)	f	21
## 113	113	hyundai	sonata	2.5 1999	6	auto(14)	f	18
## 114	114	hyundai	sonata	2.5 1999	6	manual(m5)	f	18
## 115	115	hyundai	sonata	3.3 2008	6	auto(15)	f	19
## 116	116	hyundai	tiburon	2.0 1999	4	auto(14)	f	19
## 117	117	hyundai	tiburon	2.0 1999	4	manual(m5)	f	19
## 118	118	hyundai	tiburon	2.0 2008	4	manual(m5)	f	20
## 119	119	hyundai	tiburon	2.0 2008	4	auto(14)	f	20
## 120	120	hyundai	tiburon	2.7 2008	6	auto(14)	f	17
## 121	121	hyundai	tiburon	2.7 2008	6	manual(m6)	f	16
## 122	122	hyundai	tiburon	2.7 2008	6	manual(m5)	f	17
## 123	123	jeep	grand cherokee 4wd	3.0 2008	6	auto(15)	4	17
## 124	124	jeep	grand cherokee 4wd	3.7 2008	6	auto(15)	4	15
## 125	125	jeep	grand cherokee 4wd	4.0 1999	6	auto(14)	4	15
## 126	126	jeep	grand cherokee 4wd	4.7 1999	8	auto(14)	4	14
## 127	127	jeep	grand cherokee 4wd	4.7 2008	8	auto(15)	4	9
## 128	128	jeep	grand cherokee 4wd	4.7 2008	8	auto(15)	4	14
## 129	129	jeep	grand cherokee 4wd	5.7 2008	8	auto(15)	4	13
## 130	130	jeep	grand cherokee 4wd	6.1 2008	8	auto(15)	4	11
## 131	131	land rover	range rover	4.0 1999	8	auto(14)	4	11
## 132	132	land rover	range rover	4.2 2008	8	auto(s6)	4	12
## 133	133	land rover	range rover	4.4 2008	8	auto(s6)	4	12
## 134	134	land rover	range rover	4.6 1999	8	auto(14)	4	11
## 135	135	lincoln	navigator 2wd	5.4 1999	8	auto(14)	r	11
## 136	136	lincoln	navigator 2wd	5.4 1999	8	auto(14)	r	11
## 137	137	lincoln	navigator 2wd	5.4 2008	8	auto(16)	r	12
## 138	138	mercury	mountaineer 4wd	4.0 1999	6	auto(15)	4	14
## 139	139	mercury	mountaineer 4wd	4.0 2008	6	auto(15)	4	13
## 140	140	mercury	mountaineer 4wd	4.6 2008	8	auto(16)	4	13
## 141	141	mercury	mountaineer 4wd	5.0 1999	8	auto(14)	4	13
## 142	142	nissan	altima	2.4 1999	4	manual(m5)	f	21
## 143	143	nissan	altima	2.4 1999	4	auto(14)	f	19

## 144	144	nissan	altima	2.5	2008	4	auto(av)	f	23
## 145	145	nissan	altima	2.5	2008	4	manual(m6)	f	23
## 146	146	nissan	altima	3.5	2008	6	manual(m6)	f	19
## 147	147	nissan	altima	3.5	2008	6	auto(av)	f	19
## 148	148	nissan	maxima	3.0	1999	6	auto(l4)	f	18
## 149	149	nissan	maxima	3.0	1999	6	manual(m5)	f	19
## 150	150	nissan	maxima	3.5	2008	6	auto(av)	f	19
## 151	151	nissan	pathfinder 4wd	3.3	1999	6	auto(l4)	4	14
## 152	152	nissan	pathfinder 4wd	3.3	1999	6	manual(m5)	4	15
## 153	153	nissan	pathfinder 4wd	4.0	2008	6	auto(l5)	4	14
## 154	154	nissan	pathfinder 4wd	5.6	2008	8	auto(s5)	4	12
## 155	155	pontiac	grand prix	3.1	1999	6	auto(l4)	f	18
## 156	156	pontiac	grand prix	3.8	1999	6	auto(l4)	f	16
## 157	157	pontiac	grand prix	3.8	1999	6	auto(l4)	f	17
## 158	158	pontiac	grand prix	3.8	2008	6	auto(l4)	f	18
## 159	159	pontiac	grand prix	5.3	2008	8	auto(s4)	f	16
## 160	160	subaru	forester awd	2.5	1999	4	manual(m5)	4	18
## 161	161	subaru	forester awd	2.5	1999	4	auto(l4)	4	18
## 162	162	subaru	forester awd	2.5	2008	4	manual(m5)	4	20
## 163	163	subaru	forester awd	2.5	2008	4	manual(m5)	4	19
## 164	164	subaru	forester awd	2.5	2008	4	auto(l4)	4	20
## 165	165	subaru	forester awd	2.5	2008	4	auto(l4)	4	18
## 166	166	subaru	impreza awd	2.2	1999	4	auto(l4)	4	21
## 167	167	subaru	impreza awd	2.2	1999	4	manual(m5)	4	19
## 168	168	subaru	impreza awd	2.5	1999	4	manual(m5)	4	19
## 169	169	subaru	impreza awd	2.5	1999	4	auto(l4)	4	19
## 170	170	subaru	impreza awd	2.5	2008	4	auto(s4)	4	20
## 171	171	subaru	impreza awd	2.5	2008	4	auto(s4)	4	20
## 172	172	subaru	impreza awd	2.5	2008	4	manual(m5)	4	19
## 173	173	subaru	impreza awd	2.5	2008	4	manual(m5)	4	20
## 174	174	toyota	4runner 4wd	2.7	1999	4	manual(m5)	4	15
## 175	175	toyota	4runner 4wd	2.7	1999	4	auto(l4)	4	16
## 176	176	toyota	4runner 4wd	3.4	1999	6	auto(l4)	4	15
## 177	177	toyota	4runner 4wd	3.4	1999	6	manual(m5)	4	15
## 178	178	toyota	4runner 4wd	4.0	2008	6	auto(l5)	4	16
## 179	179	toyota	4runner 4wd	4.7	2008	8	auto(l5)	4	14
## 180	180	toyota	camry	2.2	1999	4	manual(m5)	f	21
## 181	181	toyota	camry	2.2	1999	4	auto(l4)	f	21
## 182	182	toyota	camry	2.4	2008	4	manual(m5)	f	21
## 183	183	toyota	camry	2.4	2008	4	auto(l5)	f	21
## 184	184	toyota	camry	3.0	1999	6	auto(l4)	f	18
## 185	185	toyota	camry	3.0	1999	6	manual(m5)	f	18
## 186	186	toyota	camry	3.5	2008	6	auto(s6)	f	19
## 187	187	toyota	camry solara	2.2	1999	4	auto(l4)	f	21
## 188	188	toyota	camry solara	2.2	1999	4	manual(m5)	f	21
## 189	189	toyota	camry solara	2.4	2008	4	manual(m5)	f	21
## 190	190	toyota	camry solara	2.4	2008	4	auto(s5)	f	22
## 191	191	toyota	camry solara	3.0	1999	6	auto(l4)	f	18
## 192	192	toyota	camry solara	3.0	1999	6	manual(m5)	f	18
## 193	193	toyota	camry solara	3.3	2008	6	auto(s5)	f	18
## 194	194	toyota	corolla	1.8	1999	4	auto(l3)	f	24
## 195	195	toyota	corolla	1.8	1999	4	auto(l4)	f	24
## 196	196	toyota	corolla	1.8	1999	4	manual(m5)	f	26
## 197	197	toyota	corolla	1.8	2008	4	manual(m5)	f	28

##	198	198	toyota	corolla	1.8	2008	4	auto(l4)	f	26
##	199	199	toyota	land cruiser wagon 4wd	4.7	1999	8	auto(l4)	4	11
##	200	200	toyota	land cruiser wagon 4wd	5.7	2008	8	auto(s6)	4	13
##	201	201	toyota	toyota tacoma 4wd	2.7	1999	4	manual(m5)	4	15
##	202	202	toyota	toyota tacoma 4wd	2.7	1999	4	auto(l4)	4	16
##	203	203	toyota	toyota tacoma 4wd	2.7	2008	4	manual(m5)	4	17
##	204	204	toyota	toyota tacoma 4wd	3.4	1999	6	manual(m5)	4	15
##	205	205	toyota	toyota tacoma 4wd	3.4	1999	6	auto(l4)	4	15
##	206	206	toyota	toyota tacoma 4wd	4.0	2008	6	manual(m6)	4	15
##	207	207	toyota	toyota tacoma 4wd	4.0	2008	6	auto(l5)	4	16
##	208	208	volkswagen	gti	2.0	1999	4	manual(m5)	f	21
##	209	209	volkswagen	gti	2.0	1999	4	auto(l4)	f	19
##	210	210	volkswagen	gti	2.0	2008	4	manual(m6)	f	21
##	211	211	volkswagen	gti	2.0	2008	4	auto(s6)	f	22
##	212	212	volkswagen	gti	2.8	1999	6	manual(m5)	f	17
##	213	213	volkswagen	jetta	1.9	1999	4	manual(m5)	f	33
##	214	214	volkswagen	jetta	2.0	1999	4	manual(m5)	f	21
##	215	215	volkswagen	jetta	2.0	1999	4	auto(l4)	f	19
##	216	216	volkswagen	jetta	2.0	2008	4	auto(s6)	f	22
##	217	217	volkswagen	jetta	2.0	2008	4	manual(m6)	f	21
##	218	218	volkswagen	jetta	2.5	2008	5	auto(s6)	f	21
##	219	219	volkswagen	jetta	2.5	2008	5	manual(m5)	f	21
##	220	220	volkswagen	jetta	2.8	1999	6	auto(l4)	f	16
##	221	221	volkswagen	jetta	2.8	1999	6	manual(m5)	f	17
##	222	222	volkswagen	new beetle	1.9	1999	4	manual(m5)	f	35
##	223	223	volkswagen	new beetle	1.9	1999	4	auto(l4)	f	29
##	224	224	volkswagen	new beetle	2.0	1999	4	manual(m5)	f	21
##	225	225	volkswagen	new beetle	2.0	1999	4	auto(l4)	f	19
##	226	226	volkswagen	new beetle	2.5	2008	5	manual(m5)	f	20
##	227	227	volkswagen	new beetle	2.5	2008	5	auto(s6)	f	20
##	228	228	volkswagen	passat	1.8	1999	4	manual(m5)	f	21
##	229	229	volkswagen	passat	1.8	1999	4	auto(l5)	f	18
##	230	230	volkswagen	passat	2.0	2008	4	auto(s6)	f	19
##	231	231	volkswagen	passat	2.0	2008	4	manual(m6)	f	21
##	232	232	volkswagen	passat	2.8	1999	6	auto(l5)	f	16
##	233	233	volkswagen	passat	2.8	1999	6	manual(m5)	f	18
##	234	234	volkswagen	passat	3.6	2008	6	auto(s6)	f	17
##			hwy	fl						
##	1	29	p	compact						
##	2	29	p	compact						
##	3	31	p	compact						
##	4	30	p	compact						
##	5	26	p	compact						
##	6	26	p	compact						
##	7	27	p	compact						
##	8	26	p	compact						
##	9	25	p	compact						
##	10	28	p	compact						
##	11	27	p	compact						
##	12	25	p	compact						
##	13	25	p	compact						
##	14	25	p	compact						
##	15	25	p	compact						
##	16	24	p	midsize						

## 17	25	p	midsize
## 18	23	p	midsize
## 19	20	r	suv
## 20	15	e	suv
## 21	20	r	suv
## 22	17	r	suv
## 23	17	r	suv
## 24	26	p	2seater
## 25	23	p	2seater
## 26	26	p	2seater
## 27	25	p	2seater
## 28	24	p	2seater
## 29	19	r	suv
## 30	14	e	suv
## 31	15	r	suv
## 32	17	d	suv
## 33	27	r	midsize
## 34	30	r	midsize
## 35	26	r	midsize
## 36	29	r	midsize
## 37	26	r	midsize
## 38	24	r	minivan
## 39	24	r	minivan
## 40	22	r	minivan
## 41	22	r	minivan
## 42	24	r	minivan
## 43	24	r	minivan
## 44	17	e	minivan
## 45	22	r	minivan
## 46	21	r	minivan
## 47	23	r	minivan
## 48	23	r	minivan
## 49	19	r	pickup
## 50	18	r	pickup
## 51	17	r	pickup
## 52	17	r	pickup
## 53	19	r	pickup
## 54	19	r	pickup
## 55	12	e	pickup
## 56	17	r	pickup
## 57	15	r	pickup
## 58	17	r	suv
## 59	17	r	suv
## 60	12	e	suv
## 61	17	r	suv
## 62	16	r	suv
## 63	18	r	suv
## 64	15	r	suv
## 65	16	r	pickup
## 66	12	e	pickup
## 67	17	r	pickup
## 68	17	r	pickup
## 69	16	r	pickup
## 70	12	e	pickup

## 71	15	r	pickup
## 72	16	r	pickup
## 73	17	r	pickup
## 74	15	r	pickup
## 75	17	r	suv
## 76	17	r	suv
## 77	18	r	suv
## 78	17	r	suv
## 79	19	r	suv
## 80	17	r	suv
## 81	19	r	suv
## 82	19	r	suv
## 83	17	r	suv
## 84	17	r	pickup
## 85	17	r	pickup
## 86	16	r	pickup
## 87	16	r	pickup
## 88	17	r	pickup
## 89	15	r	pickup
## 90	17	r	pickup
## 91	26	r	subcompact
## 92	25	r	subcompact
## 93	26	r	subcompact
## 94	24	r	subcompact
## 95	21	r	subcompact
## 96	22	r	subcompact
## 97	23	r	subcompact
## 98	22	r	subcompact
## 99	20	p	subcompact
## 100	33	r	subcompact
## 101	32	r	subcompact
## 102	32	r	subcompact
## 103	29	p	subcompact
## 104	32	r	subcompact
## 105	34	r	subcompact
## 106	36	r	subcompact
## 107	36	c	subcompact
## 108	29	p	subcompact
## 109	26	r	midsize
## 110	27	r	midsize
## 111	30	r	midsize
## 112	31	r	midsize
## 113	26	r	midsize
## 114	26	r	midsize
## 115	28	r	midsize
## 116	26	r	subcompact
## 117	29	r	subcompact
## 118	28	r	subcompact
## 119	27	r	subcompact
## 120	24	r	subcompact
## 121	24	r	subcompact
## 122	24	r	subcompact
## 123	22	d	suv
## 124	19	r	suv

##	125	20	r	suv
##	126	17	r	suv
##	127	12	e	suv
##	128	19	r	suv
##	129	18	r	suv
##	130	14	p	suv
##	131	15	p	suv
##	132	18	r	suv
##	133	18	r	suv
##	134	15	p	suv
##	135	17	r	suv
##	136	16	p	suv
##	137	18	r	suv
##	138	17	r	suv
##	139	19	r	suv
##	140	19	r	suv
##	141	17	r	suv
##	142	29	r	compact
##	143	27	r	compact
##	144	31	r	midsize
##	145	32	r	midsize
##	146	27	p	midsize
##	147	26	p	midsize
##	148	26	r	midsize
##	149	25	r	midsize
##	150	25	p	midsize
##	151	17	r	suv
##	152	17	r	suv
##	153	20	p	suv
##	154	18	p	suv
##	155	26	r	midsize
##	156	26	p	midsize
##	157	27	r	midsize
##	158	28	r	midsize
##	159	25	p	midsize
##	160	25	r	suv
##	161	24	r	suv
##	162	27	r	suv
##	163	25	p	suv
##	164	26	r	suv
##	165	23	p	suv
##	166	26	r	subcompact
##	167	26	r	subcompact
##	168	26	r	subcompact
##	169	26	r	subcompact
##	170	25	p	compact
##	171	27	r	compact
##	172	25	p	compact
##	173	27	r	compact
##	174	20	r	suv
##	175	20	r	suv
##	176	19	r	suv
##	177	17	r	suv
##	178	20	r	suv



##	179	17	r	suv
##	180	29	r	midsize
##	181	27	r	midsize
##	182	31	r	midsize
##	183	31	r	midsize
##	184	26	r	midsize
##	185	26	r	midsize
##	186	28	r	midsize
##	187	27	r	compact
##	188	29	r	compact
##	189	31	r	compact
##	190	31	r	compact
##	191	26	r	compact
##	192	26	r	compact
##	193	27	r	compact
##	194	30	r	compact
##	195	33	r	compact
##	196	35	r	compact
##	197	37	r	compact
##	198	35	r	compact
##	199	15	r	suv
##	200	18	r	suv
##	201	20	r	pickup
##	202	20	r	pickup
##	203	22	r	pickup
##	204	17	r	pickup
##	205	19	r	pickup
##	206	18	r	pickup
##	207	20	r	pickup
##	208	29	r	compact
##	209	26	r	compact
##	210	29	p	compact
##	211	29	p	compact
##	212	24	r	compact
##	213	44	d	compact
##	214	29	r	compact
##	215	26	r	compact
##	216	29	p	compact
##	217	29	p	compact
##	218	29	r	compact
##	219	29	r	compact
##	220	23	r	compact
##	221	24	r	compact
##	222	44	d	subcompact
##	223	41	d	subcompact
##	224	29	r	subcompact
##	225	26	r	subcompact
##	226	28	r	subcompact
##	227	29	r	subcompact
##	228	29	p	midsize
##	229	29	p	midsize
##	230	28	p	midsize
##	231	29	p	midsize
##	232	26	p	midsize

```
## 233 26 p      midsize
## 234 26 p      midsize
```

```
#b
```

```
#The categorical variables in the mpg dataset are manufacturer, model, trans, drv, fl, and class.
```

```
#c
```

```
#The continuous variables in the mpg dataset are displ, cty, and hwy.
```

```
#2
```

```
#The manufacturer with the most models in this dataset is Toyota, with 6 unique models. The model with
```

```
#a
```

```
library(ggplot2)
```

```
library(dplyr)
```

```
##
```

```
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
```

```
##
```

```
##      filter, lag
```

```
## The following objects are masked from 'package:base':
```

```
##
```

```
##      intersect, setdiff, setequal, union
```

```
manufacturer_model_count <- dataset %>%
  group_by(manufacturer) %>%
  summarise(unique_models = n_distinct(model)) %>%
  arrange(desc(unique_models))
```

```
manufacturer_model_count
```

```
## # A tibble: 15 x 2
```

```
##   manufacturer unique_models
```

```
##   <chr>          <int>
```

```
## 1 toyota          6
```

```
## 2 chevrolet       4
```

```
## 3 dodge           4
```

```
## 4 ford            4
```

```
## 5 volkswagen      4
```

```
## 6 audi            3
```

```
## 7 nissan           3
```

```
## 8 hyundai         2
```

```
## 9 subaru           2
```

```
## 10 honda           1
```

```
## 11 jeep            1
```

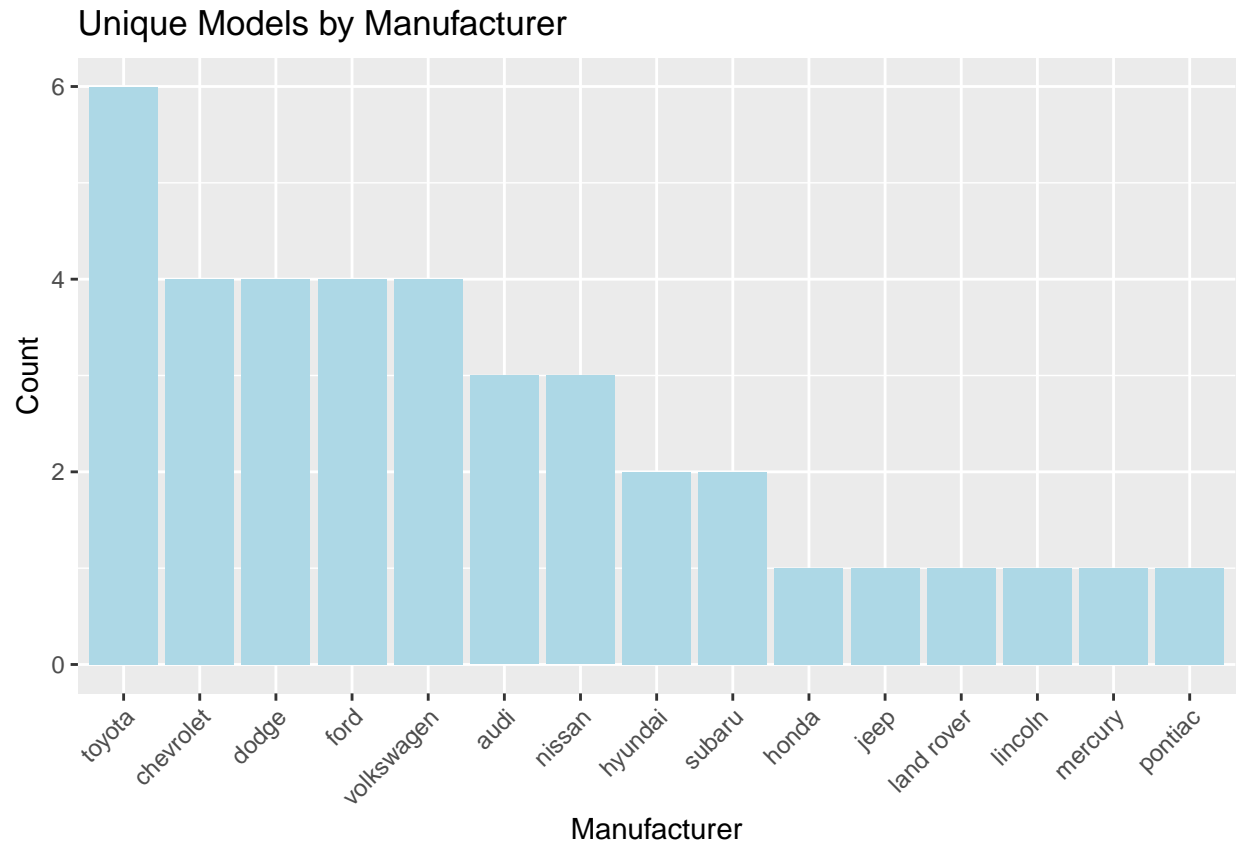
```
## 12 land rover     1
```

```
## 13 lincoln         1
```

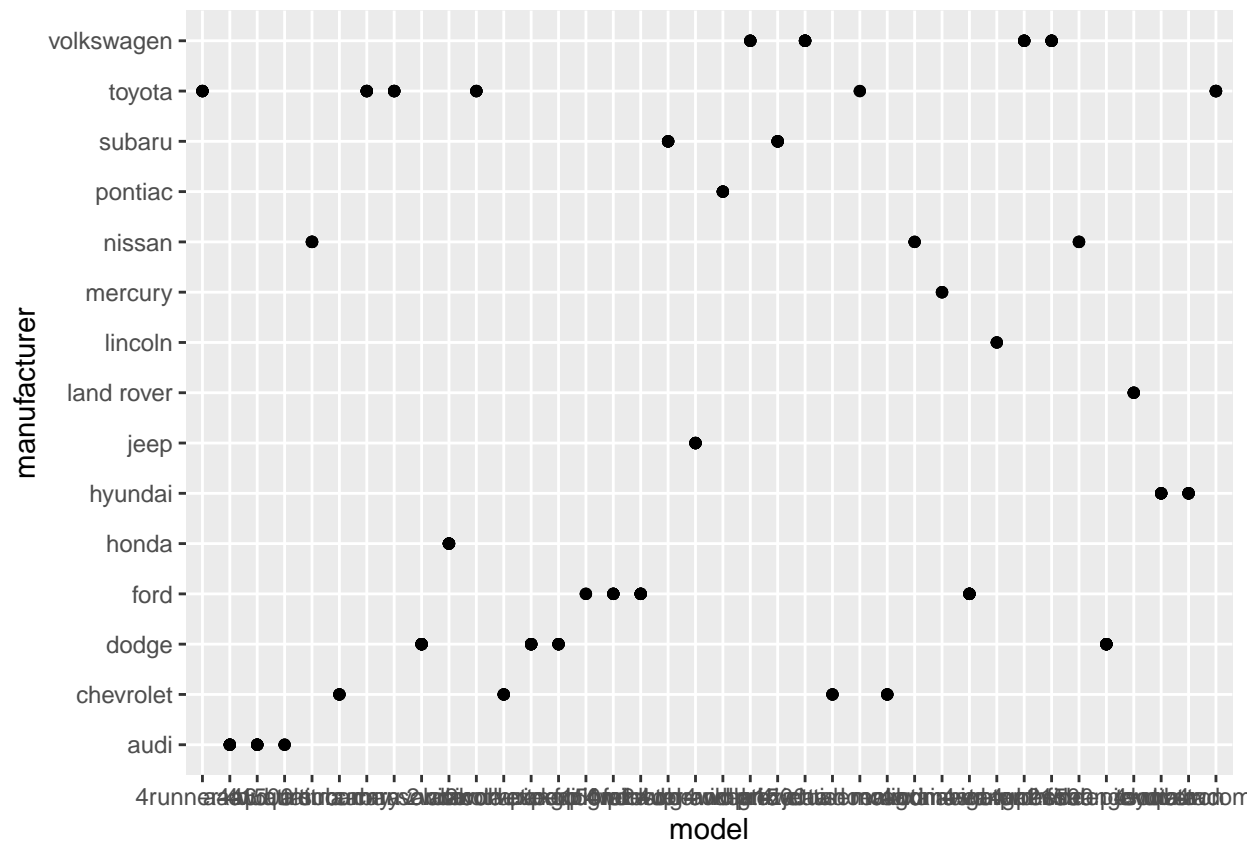
```
## 14 mercury         1
```

```
## 15 pontiac         1
```

```
#b
ggplot(manufacturer_model_count, aes(x = reorder(manufacturer, -unique_models), y = unique_models)) +
  geom_bar(stat = "identity", fill = "lightblue") +
  labs(title = "Unique Models by Manufacturer", x = "Manufacturer", y = "Count") + theme(axis.text.x = c
```



```
#2
#a
ggplot(mpg, aes(model, manufacturer)) + geom_point()
```



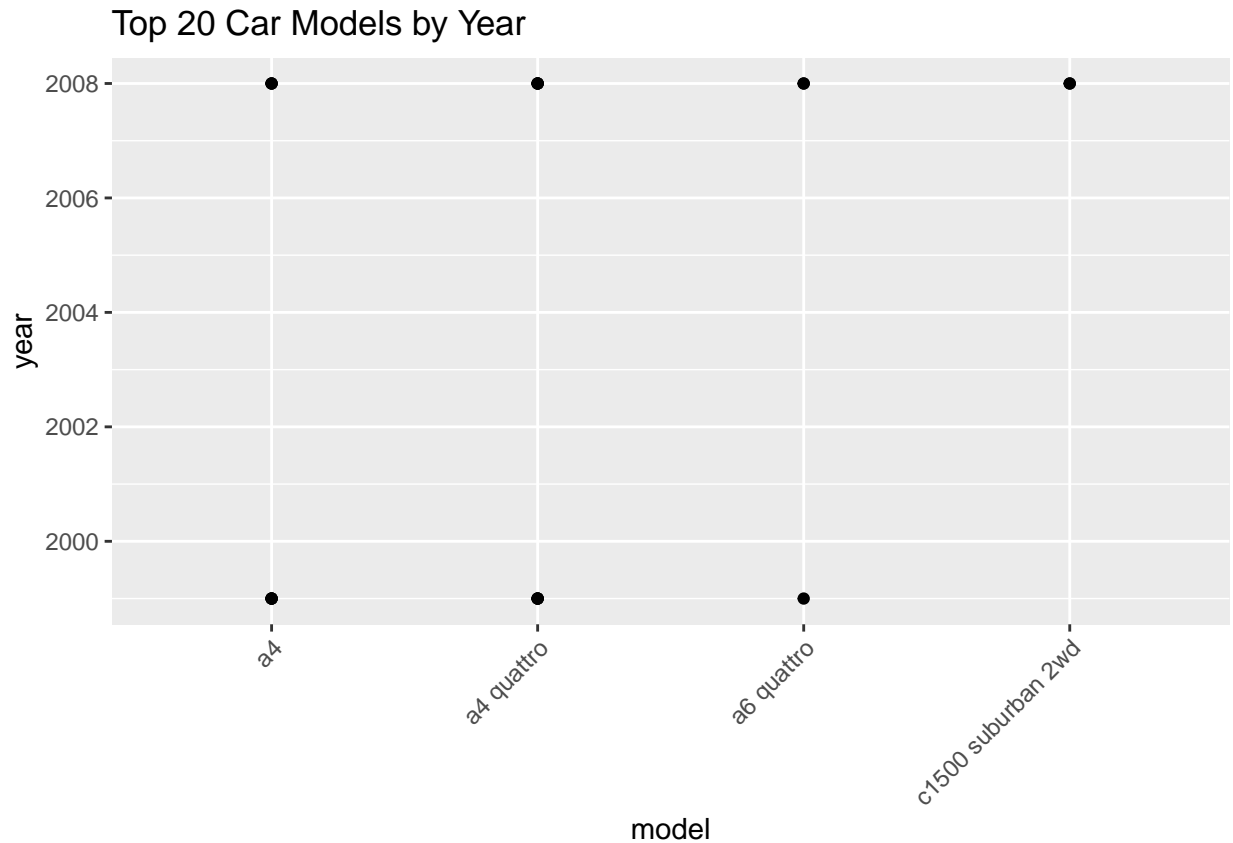
*#It creates a scatter plot where each point represents a specific model-manufacturer combination.*

*#b  
#It is useful but the x-axis have too many categories, making the plot cluttered and unreadable.*

```
#3
library(ggplot2)
library(dplyr)

top20data <- dataset %>% head(20)

ggplot(top20data, aes(x = model, y = year)) +
  geom_point() +
  labs(title = "Top 20 Car Models by Year") +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```



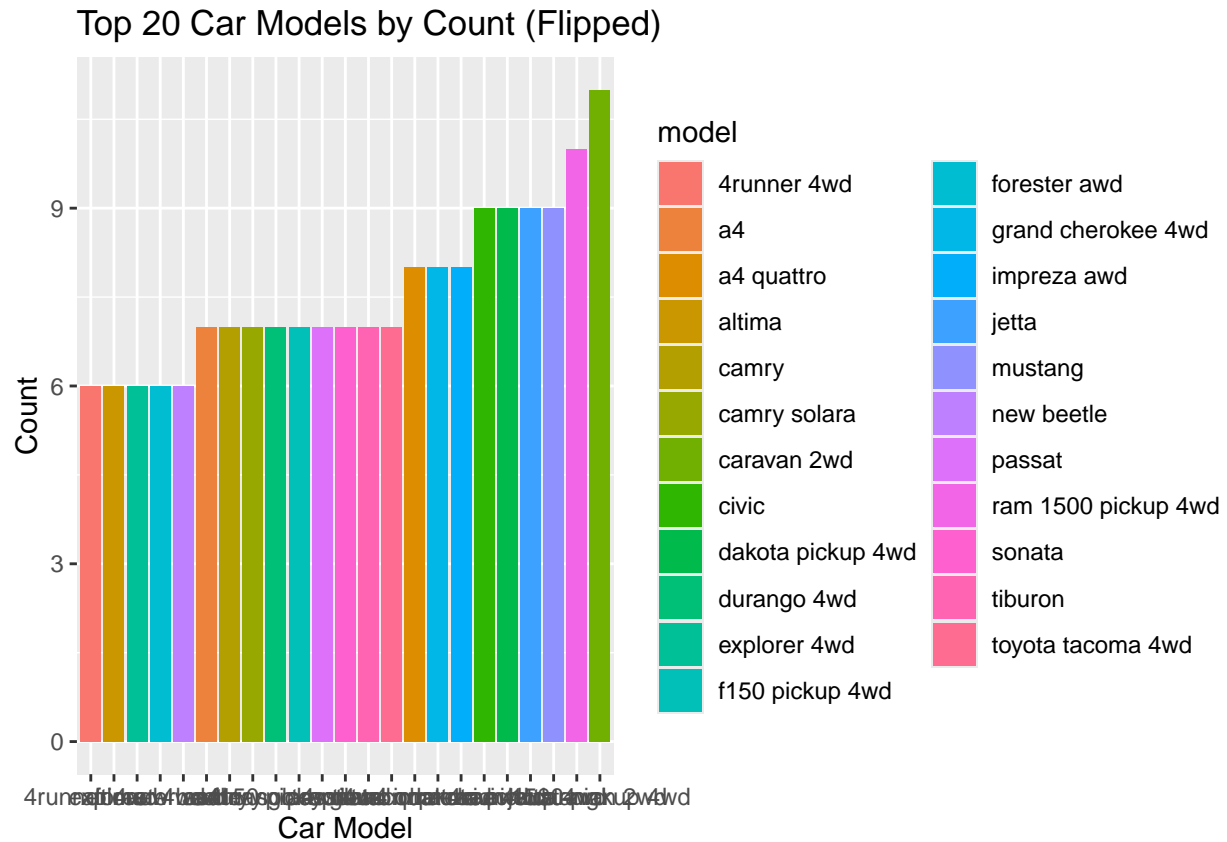
```
#4
modelcount <- dataset %>%
  group_by(model) %>%
  summarise(car_count = n())
```

```
modelcount
```

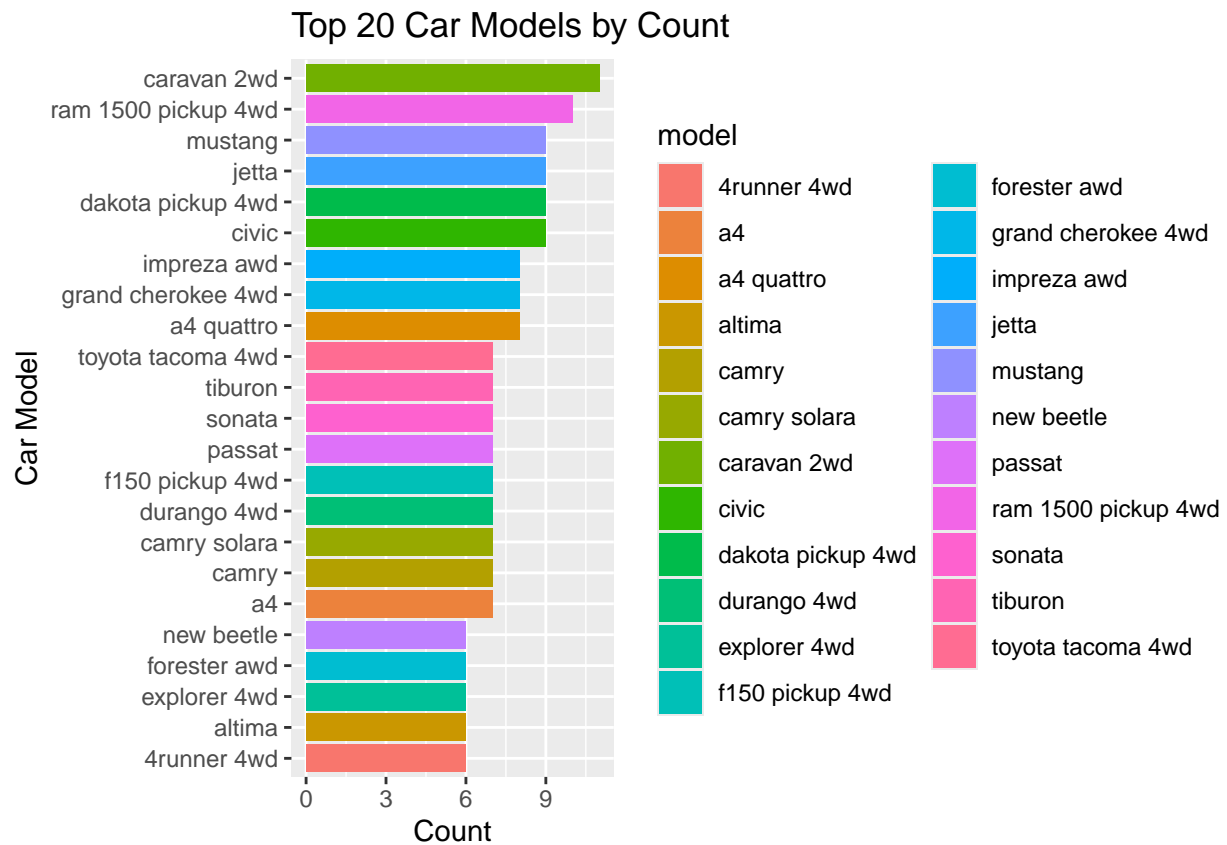
```
## # A tibble: 38 x 2
##   model          car_count
##   <chr>          <int>
## 1 4runner 4wd           6
## 2 a4                  7
## 3 a4 quattro           8
## 4 a6 quattro           3
## 5 altima              6
## 6 c1500 suburban 2wd   5
## 7 camry              7
## 8 camry solara        7
## 9 caravan 2wd         11
## 10 civic              9
## # i 28 more rows
```

```
#a
top_20_models <- modelcount %>% top_n(20, car_count)
```

```
ggplot(top_20_models, aes(x = reorder(model, car_count), y = car_count, fill = model)) +
  geom_bar(stat = "identity") +
  labs(title = "Top 20 Car Models by Count (Flipped)",
       x = "Car Model",
       y = "Count")
```



```
#b
ggplot(top_20_models, aes(x = reorder(model, car_count), y = car_count, fill = model)) +
  geom_bar(stat = "identity") +
  labs(title = "Top 20 Car Models by Count",
       x = "Car Model",
       y = "Count") + coord_flip()
```

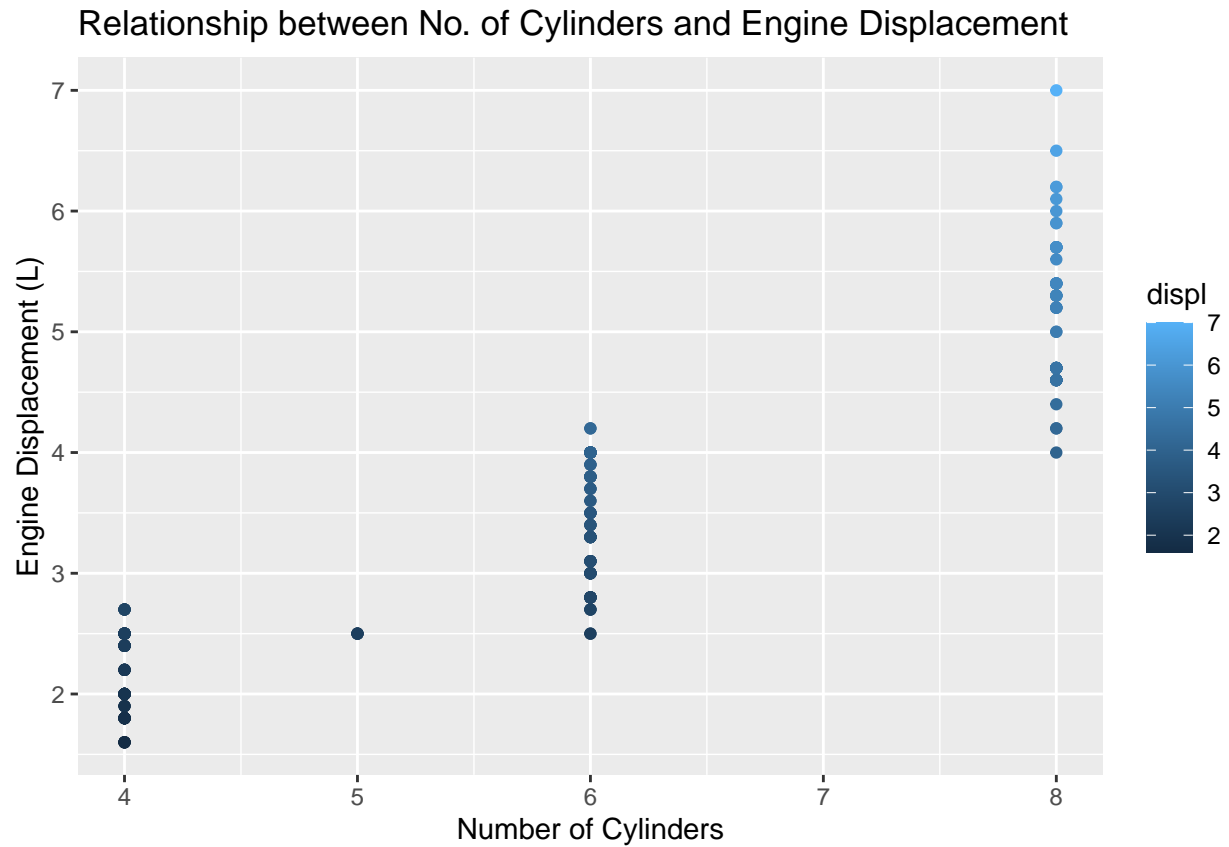


#5

#a

#I observed that points with higher cylinder counts (cyl) align with higher values of engine displacement

```
ggplot(dataset, aes(x = cyl, y = displ, color = displ)) +
  geom_point() +
  labs(title = "Relationship between No. of Cylinders and Engine Displacement",
        x = "Number of Cylinders",
        y = "Engine Displacement (L)")
```



```
#6
ggplot(dataset, aes(x = displ, y = hwy, color = cyl)) +
  geom_point() +
  labs(title = "Relationship between Engine Displacement and Highway MPG",
        x = "Engine Displacement (L)",
        y = "Highway MPG")
```



Relationship between Engine Displacement and Highway MPG

