

RWorksheet_Llanera#4c

LlaneraExerRepo

2024-12-16

1. Use the dataset mpg

a. Show your solutions on how to import a csv file into the environment.

```
mpgdata <- read.csv("mpg.csv")  
mpgdata
```

##	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(l4)	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
```

2. Which manufacturer has the most models in this data set? Which model has the most variations? Show your answer.

```
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_count <- mpgdata %>%
  group_by(manufacturer) %>%
  summarise(model_count = n_distinct(model)) %>%
  arrange(desc(model_count))

most_models_manufacturer <- manufacturer_count[1, ]

model_variation_count <- mpgdata %>%
  group_by(model) %>%
  summarise(variation_count = n()) %>%
  arrange(desc(variation_count))

most_variations_model <- model_variation_count[1, ]

most_models_manufacturer
```

```
## # A tibble: 1 x 2
##   manufacturer model_count
##   <chr>           <int>
## 1 toyota             6
most_variations_model
```

```
## # A tibble: 1 x 2
##   model          variation_count
##   <chr>           <int>
## 1 caravan 2wd           11
```

- a. Group the manufacturers and find the unique models. Show your codes and result.

```
unique_models <- mpgdata %>%
  group_by(manufacturer) %>%
  summarise(unique_models = list(unique(model))) %>%
  arrange(manufacturer)

print(unique_models)
```

```
## # A tibble: 15 x 2
##   manufacturer unique_models
##   <chr>           <list>
## 1 audi           <chr [3]>
```

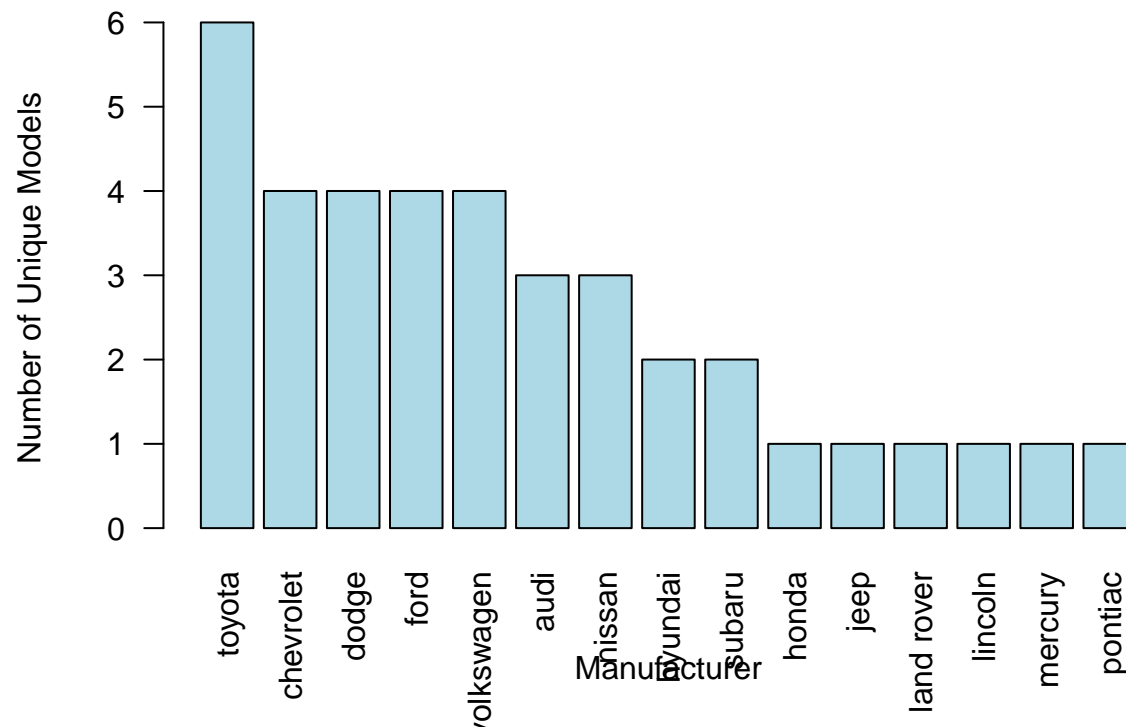
```
## 2 chevrolet    <chr [4]>
## 3 dodge       <chr [4]>
## 4 ford        <chr [4]>
## 5 honda       <chr [1]>
## 6 hyundai     <chr [2]>
## 7 jeep        <chr [1]>
## 8 land rover  <chr [1]>
## 9 lincoln     <chr [1]>
## 10 mercury    <chr [1]>
## 11 nissan      <chr [3]>
## 12 pontiac    <chr [1]>
## 13 subaru     <chr [2]>
## 14 toyota     <chr [6]>
## 15 volkswagen <chr [4]>
```

b. Graph the result by using `plot()` and `ggplot()`. Write the codes and its result.

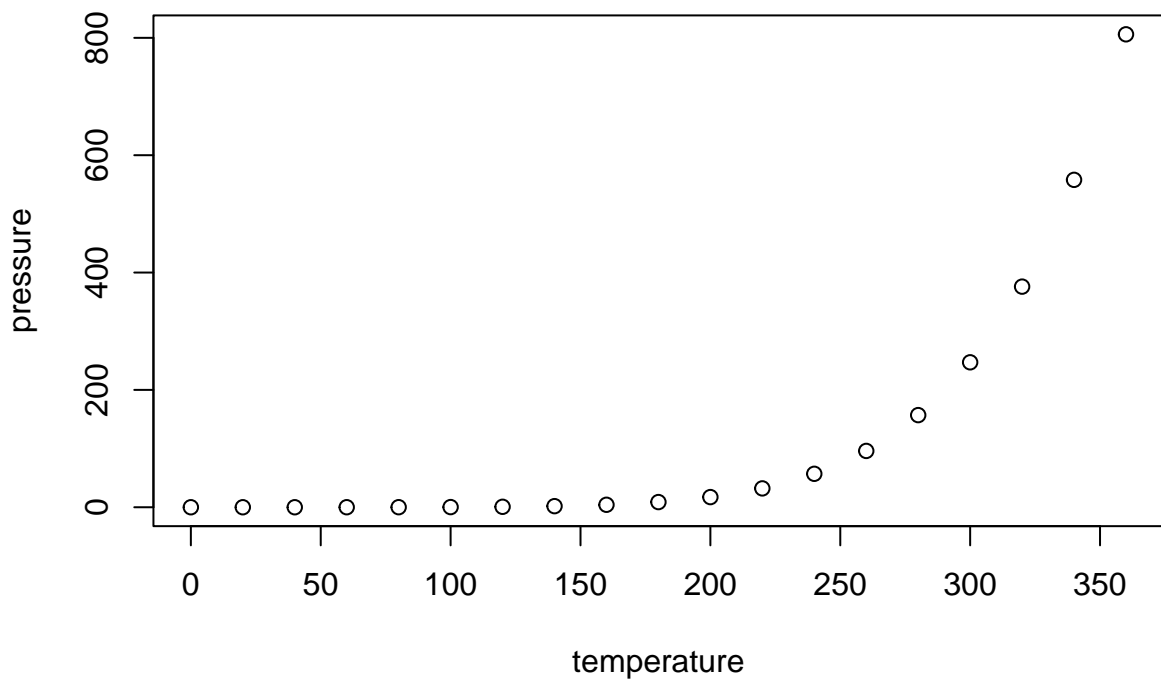
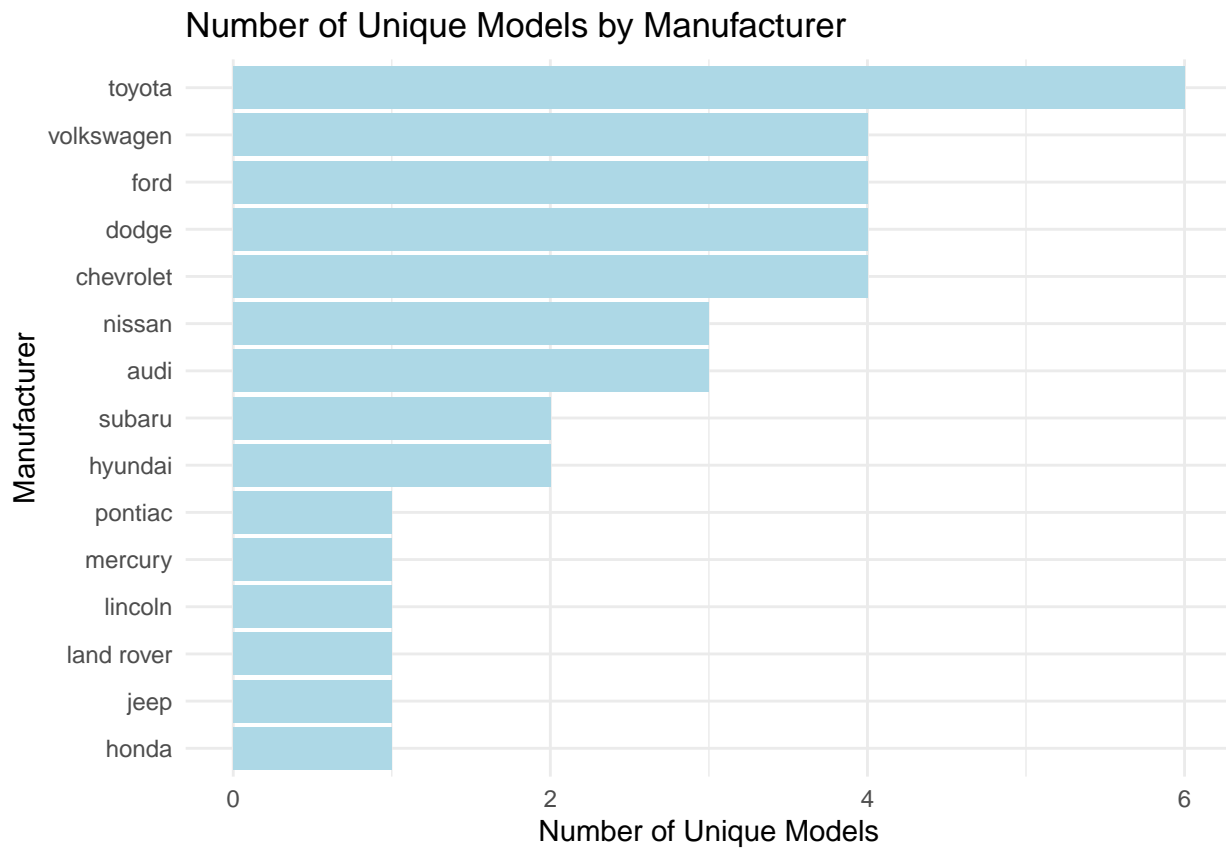
```
model_counts <- mpgdata %>%
  group_by(manufacturer) %>%
  summarise(unique_model_count = n_distinct(model)) %>%
  arrange(desc(unique_model_count))

barplot(model_counts$unique_model_count,
        names.arg = model_counts$manufacturer,
        las = 2,
        col = "lightblue",
        main = "Number of Unique Models by Manufacturer",
        xlab = "Manufacturer",
        ylab = "Number of Unique Models")
library(ggplot2)
```

Number of Unique Models by Manufacturer



```
ggplot(model_counts, aes(x = reorder(manufacturer, unique_model_count), y = unique_model_count)) +
  geom_bar(stat = "identity", fill = "lightblue") +
  coord_flip() +
  labs(title = "Number of Unique Models by Manufacturer",
       x = "Manufacturer",
       y = "Number of Unique Models") +
  theme_minimal()
```



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