

# STA201 Assignment 1 Solution

## Question 1

The following table shows some information on a variety of different vehicles. Using the information given in table 1, answer question 1a – 1d

**Table 1: Vehicles**

Model	Engine size	Cylinders	Transmission	Number of gears	Fuel	Vehicle Class	City MPG	Hwy MPG	Model Year
ACURA RDX	3.5	6	Automatic	6	Gasoline	small SUV	19	28	2010
HYUNDAI Sonata	1.6	4	Manual	7	Gasoline	large car	28	38	2015
Ford Fiesta	1.6	4	Manual	5	Gasoline	Small car	28	36	2006
DODGE Challenger	6.4	8	Automatic	8	Gasoline	midsize car	14	25	2010
BMW X5 xDrive35i	3	6	Automatic	8	Gasoline	standard SUV	18	24	2013
HONDA Accord	3.5	6	Automatic	6	Gasoline	midsize car	21	32	2014
LAND ROVER Range Rover	3	6	Automatic	8	Diesel	standard SUV	22	29	2008
BENTLEY Mulsanne	6.8	8	Automatic	8	Gasoline	midsize car	11	18	2012
MAZDA CX-5	2.5	4	Automatic	6	Gasoline	small SUV	24	30	2013
PORSCHE Cayman GTS	3.4	6	Manual	6	Gasoline	small car	19	26	2015

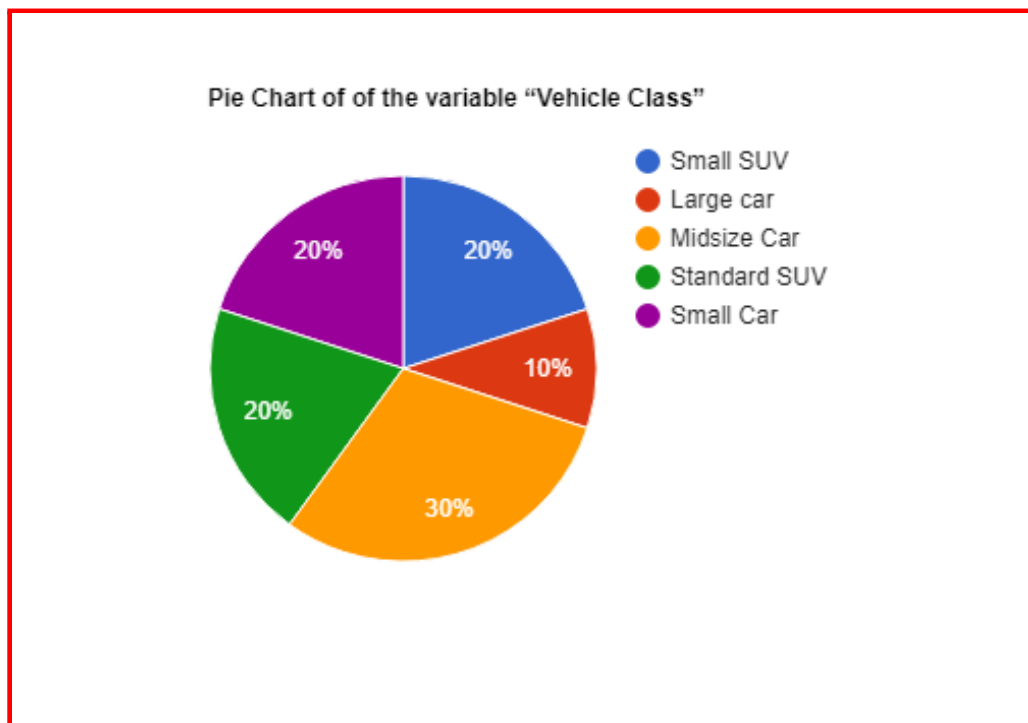
### 1a)

- How many variables are listed in Table 1? **Answer: 10 variables (0.5)**
- Classify the variables according to their types (Qualitative / Quantitative). **(0.5)**

Qualitative	Quantitative
Model	Engine Size
Transmission	Cylinders
Fuel	Number of Gears
Vehicle Class	City MPG
Model Year	Hwy MPG

**1b)** Construct a frequency distribution table to represent the summary information of the variable “Vehicle Class” and display the results in a pie chart. **(1 + 1)**

Vehicle Class	Frequency	Relative Frequency	Angles in degree
Small Car	2	2/10	72
Midsize Car	3	3/10	108
Large Car	1	1/10	36
Small SUV	2	2/10	72
Standard SUV	2	2/10	72
	Total = 10	Total = 1	Total = 360

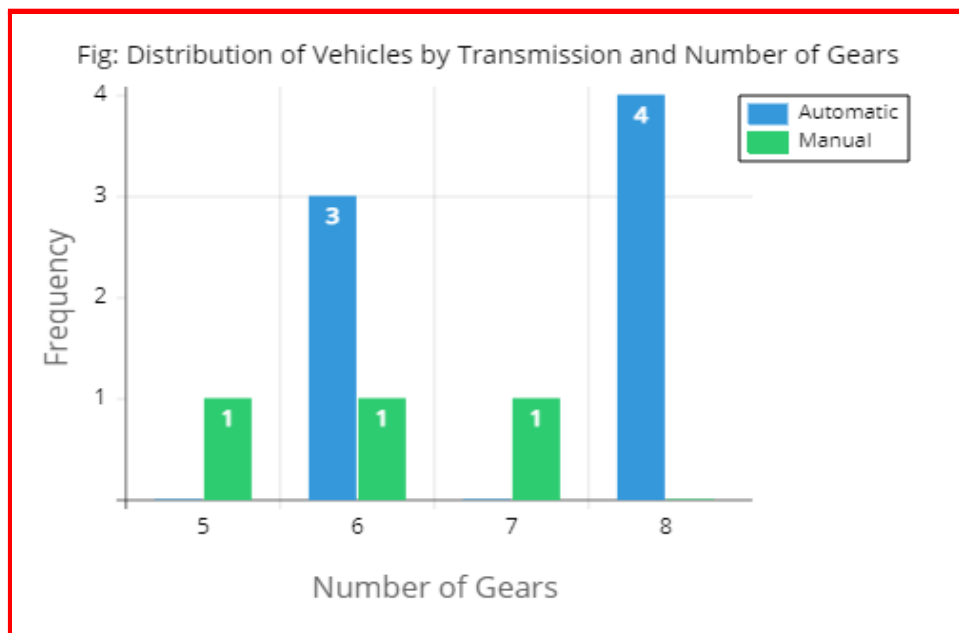


1c) Complete the following table and answer the questions

***Table 2: Frequency distribution of Transmission by Number of Gears (1)***

Transmission	Number of Gears				Total
	5	6	7	8	
Automatic	0	3	0	4	7
Manual	1	1	1	0	3
Total	1	4	1	4	10

- What is the modal response for the variable “Transmission”? (Which has the highest frequency?) **Answer: Automatic (0.5)**
- What proportion of vehicles have 7 gears? **Answer: 1/10 or 10% (0.5)**
- What proportion of Automatic vehicles have 8 gears? **Answer: 4/7 or 57.14% (0.5)**
- What proportion of vehicles with 6 gears are Manual? **Answer: 1/4 or 25% (0.5)**
- Construct a side by side bar chart to represent the information given in table 2. **(1)**

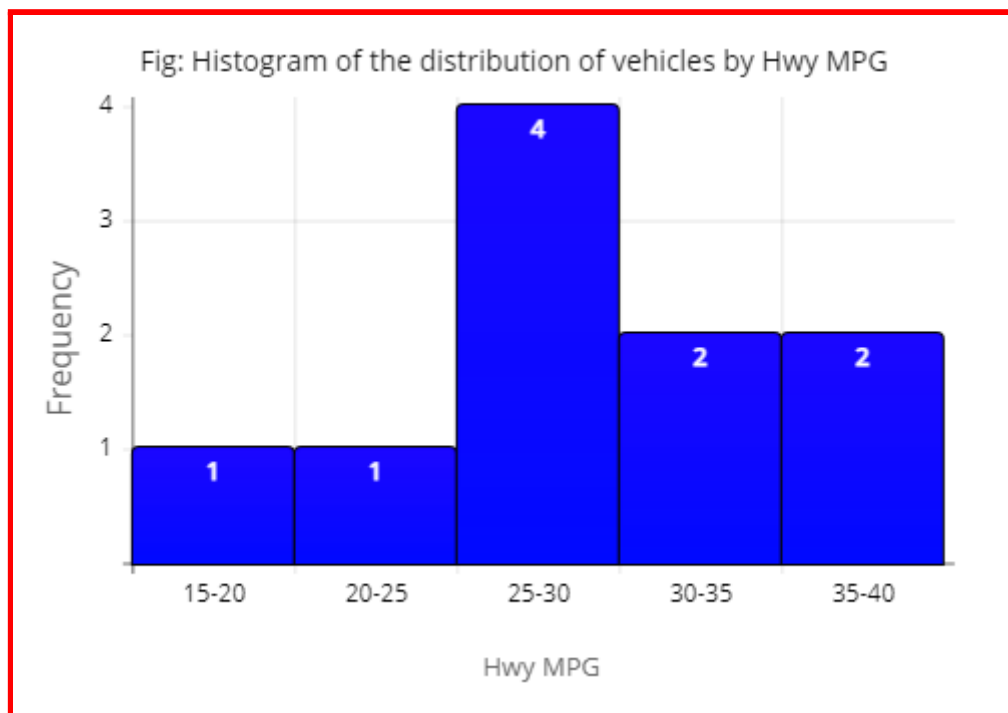


**1d)** Complete the following table and answer the questions

**Table 3: Frequency distribution of Hwy MPG (1)**

Hwy MPG	Tally	Frequency	Relative frequency	Cumulative relative frequency
15 – 20		1	1/10	1/10
20 – 25		1	1/10	2/10
25 – 30		4	4/10	6/10
30 – 35		2	2/10	8/10
35 – 40		2	2/10	10/10

- i. What proportion of vehicles have mileage between 20 and 30 MPG **Answer: 5/10 or 50% (0.5)**
- ii. What proportion of vehicles have mileage greater than 30 MPG **Answer: 4/10 or 40% (0.5)**
- iii. Construct a histogram to display the data represented in table 3. **(1)**



## Question 2

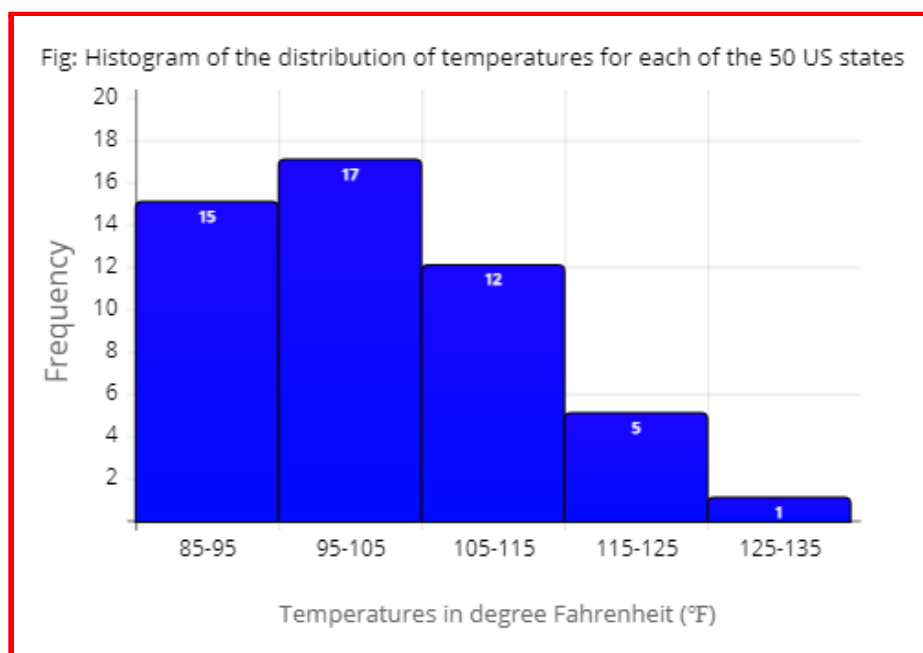
The following data set represents the record high temperatures in degree Fahrenheit (°F) for each of the 50 US states:

106	98	96	108	90	93	89	103	104	119
111	85	97	102	85	109	93	120	98	102
90	96	114	108	91	100	96	105	89	96
107	99	113	125	88	122	110	85	99	90
93	102	123	110	111	101	92	96	89	116

- i. Construct a suitable frequency distribution table using interval 85 – 95, 95 – 105 and so on. **(1)**

Class Limit	Tally	Frequency
85-95		15
95-105		17
105-115		12
115-125		5
125-135		1
* lower limit included and upper limit excluded		

- ii. Construct a histogram to visualise the data represented in the frequency distribution table from part (i). **(1)**



### Question 3

Do running times of American movies differ somehow from running times of French movies?  
A researcher investigated this question by randomly selecting 25 recent movies of each type, resulting in the following running times:

**Am:** 94 90 95 93 128 95 125 91 104 116 162 102 90  
110 92 113 116 90 97 103 95 120 109 91 138

**Fr:** 123 116 90 158 122 119 125 90 96 94 137 102 105  
106 95 125 122 103 96 111 81 113 128 93 92

Construct a comparative stem-and-leaf display by listing stems in the middle of your paper and then placing the Am leaves out to the left and the Fr leaves out to the right. Then comment on the interesting features of the display. **(1.5)**

Am	Stem	Fr
	8	1
7, 5, 5, 5, 4, 3, 2, 1, 1, 0, 0, 0	9	0, 0, 2, 3, 4, 5, 6, 6
9, 4, 3, 2	10	2, 3, 5, 6
6, 6, 3, 0	11	1, 3, 6, 9
8, 5, 0	12	2, 2, 3, 5, 5, 8
8	13	7
	14	
	15	8
2	16	

Comments on display: **(1.5)**

For American (Am) movies the running times are ranging from lowest 90 to highest 162. And for French (Fr) movies the running times are ranging from lowest 81 to highest 158. Neither Am nor Fr movies have any runtime in the 140s. Majority of the runtimes are between 90 minutes and 120 minutes range for both Am and Fr. For Am, most common runtimes are in the 90s and for Fr, most common runtimes in the 90s and 120s.