1.20 The following data represent the length of life, in seconds, of 50 fruit flies subject to a new spray in a controlled laboratory experiment:

17	20	10	9	23	13	12	19	18	24
12	14	6	9	13	6	7	10	13	7
16	18	8	13	3	32	9	7	10	11
13	7	18	7	10	4	27	19	16	8
7	10	5	14	15	10	9	6	7	15

(a) Construct a double-stem-and-leaf plot for the life span of the fruit flies using the stems 0⋆, 0·, 1⋆, 1·, 2⋆, 2·, and 3⋆ such that stems coded by the symbols ⋆ and · are associated, respectively, with leaves 0 through 4 and 5 through 9.

(b) Set up a relative frequency distribution.

(c) Construct a relative frequency histogram.
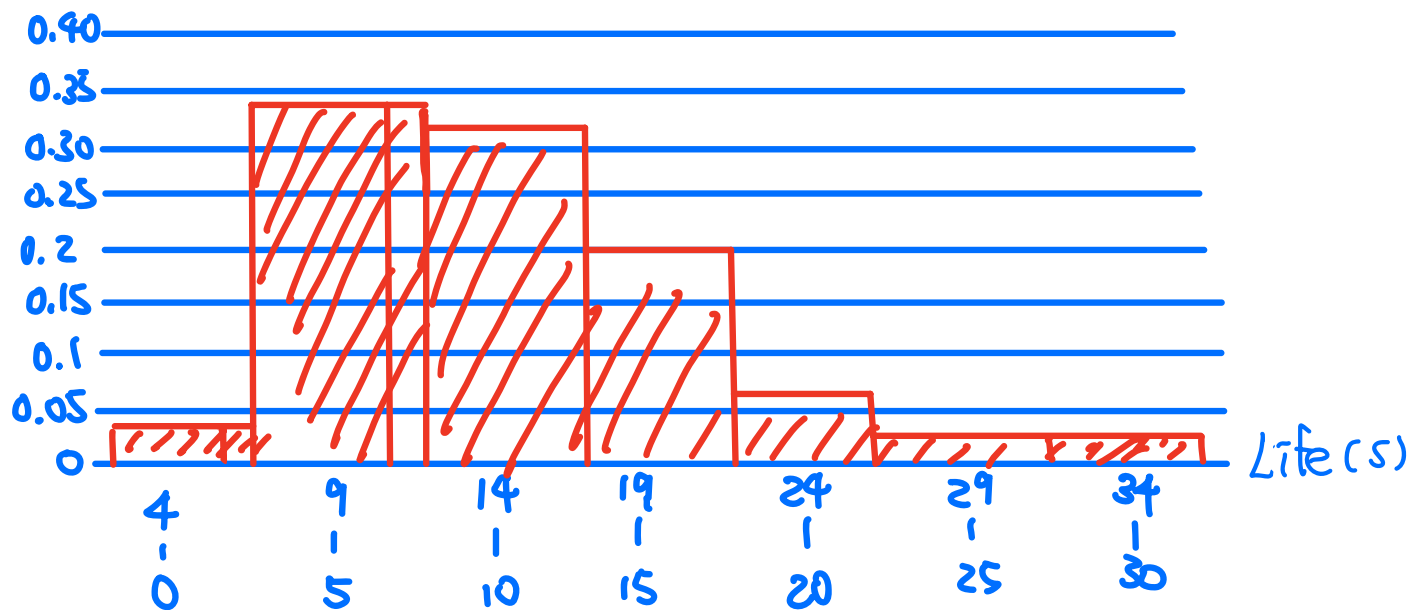
(d) Find the median.

(a)

Stem	Leaf	Frequency
0*	34	2
0.	5666777777778889999	17
1*	0000001223333344	16
1.	5555788899	10
2*	034	3
2.	7	1
3*	2	1

(b)

Interval	Frequency	Relative Frequency
0-4	2	0.04
5-9	17	0.34
10-14	16	0.32
15-19	10	0.20
20-24	3	0.06
25-29	1	0.02
30-34	1	0.02

(c)

(relative frequency)

(d)

$$P = \frac{N}{2} \Rightarrow P = \frac{50}{2} \Rightarrow P = 25$$

$$R = \frac{N}{2} + 1 \Rightarrow R = 26$$

$$M = \frac{10+11}{2} \Rightarrow M = \frac{21}{2} = 10.5$$

value at 25th is 10 , value at 26th is 11

$\therefore$ the Median of the given experiment

is   10.5   seconds

2.10 An engineering firm is hired to determine if certain waterways in Virginia are safe for fishing. Samples are taken from three rivers.

(a) List the elements of a sample space S, using the letters F for safe to fish and N for not safe to fish.

(b) List the elements of S corresponding to event E that at least two of the rivers are safe for fishing.

(c) Define an event that has as its elements the points

$$\{FFF, NFF, FFN, NFN\}.$$

(a)

$$S = \{\ FFF,\ FNN,\ NFN,\ NNN,$$
$$FFN,\ NFF,\ NNF,\ FNF\ \}$$

(b)

$$S(E) = \quad FFF,\ FFN,\ NFF,\ FNF$$

(c)

F is the second component of all
elements in this set

2.19 Suppose that a family is leaving on a summer vacation in their camper and that M is the event that they will experience mechanical problems, T is the event that they will receive a ticket for committing a traffic violation, and V is the event that they will arrive at a campsite with no vacancies. Referring to the Venn diagram of Figure 2.5, state in words the events represented by the following regions:
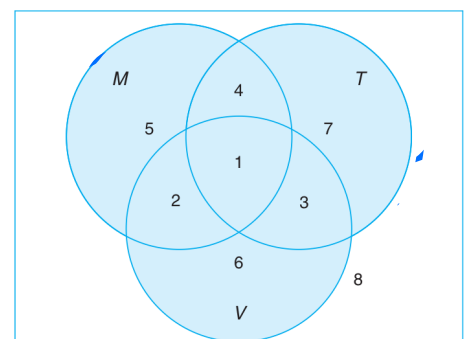

Figure 2.5: Venn diagram for Exercises 2.19 and 2.20.

2.20 Referring to Exercise 2.19 and the Venn diagram of Figure 2.5, list the numbers of the regions that represent the following events:

(a) The family will experience no mechanical problems and will not receive a ticket for a traffic violation but will arrive at a campsite with no vacancies.

(b) The family will experience both mechanical problems and trouble in locating a campsite with a vacancy but will not receive a ticket for a traffic violation.

(c) The family will either have mechanical trouble or arrive at a campsite with no vacancies but will not receive a ticket for a traffic violation.

(d) The family will not arrive at a campsite with no vacancies.

(a)

$$M' \cap T' \cap V$$

region = 6

(b)

$$M \cap T' \cap V$$

region = 2

(c) $(M \cup V) \cap T'$

region = (2, 5, 6)

(d) V'

region = (4, 5, 7, 8)

2.38 Three married couples have bought 6 seats in the same row for a concert. In how many different ways can they be seated

(a) with no restrictions?

(b) if each couple is to sit together?

(c) if all the men sit together to the right of all the women?
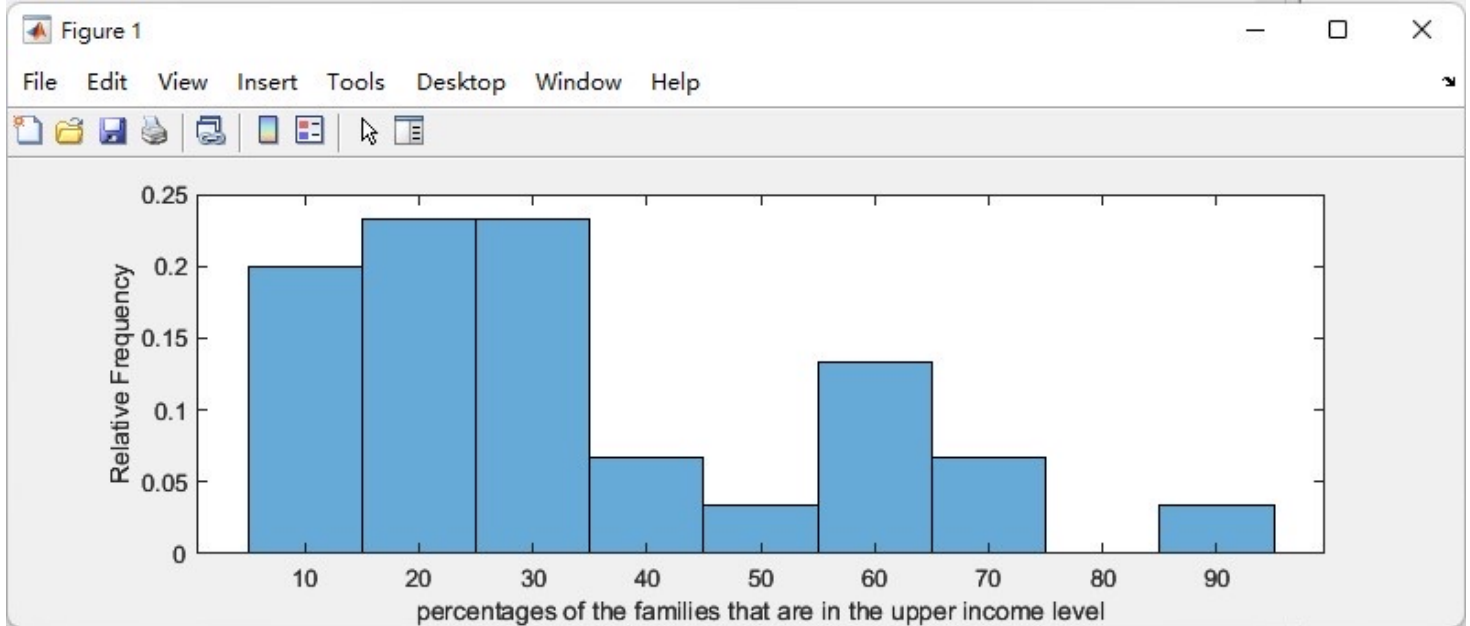
(a) $6! = 720$

(b) $3! \cdot 2^3 = 48$

(c) $3! \cdot 3! = 36$

Matlab 5.25

```
sample =

  Columns 1 through 13

    72.2000   31.9000   26.5000   29.1000   27.3000    8.6000   22.3000   26.5000   20.4000   12.8000   25.1000   19.2000   24.1000

  Columns 14 through 26

    58.2000   68.1000   89.2000   55.1000    9.4000   14.5000   13.9000   20.7000   17.9000    8.5000   55.4000   38.1000   54.2000

  Columns 27 through 30

    21.5000   26.2000   59.1000   43.3000


M =

    33.3100                    ⟶  *sample mean*


m =

    26.3500                    ⟶  *sample Median*
```


relative frequency histogram

```
trim =

  Columns 1 through 13

    31.9000   26.5000   29.1000   27.3000   22.3000   26.5000   20.4000   12.8000   25.1000   19.2000   24.1000   58.2000   55.1000

  Columns 14 through 24

    14.5000   13.9000   20.7000   17.9000   55.4000   38.1000   54.2000   21.5000   26.2000   59.1000   43.3000


t =

    30.9708                    ⟶  *10% trimmed mean*
```

$26.85 < 30.97 < 33.31$

→ 比原先的平均值更接近中位数

Matlab 1.30