Chapter 25: Bar Chart

The purpose of the bar plot is to display the frequencies (or proportions) of levels of a factor variable. For example, a bar plot is used to pictorially display the frequencies (or proportions) of individuals in various socio-economic (factor) groups(levels-high, middle, low). Such a plot will help to provide a visual comparison among the various factor levels.

Section 25.1: barplot() function

In barplot, factor-levels are placed on the x-axis and frequencies (or proportions) of various factor-levels are considered on the y-axis. For each factor-level one bar of uniform width with heights being proportional to factor level frequency (or proportion) is constructed.
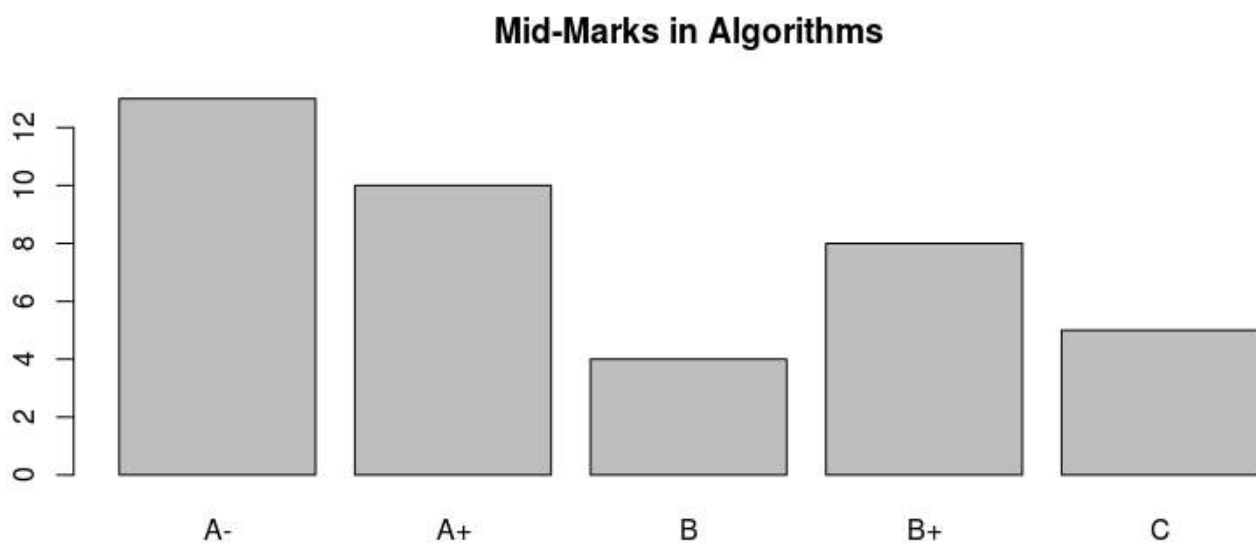
The **barplot**() function is in the graphics package of the R's System Library. The **barplot**() function must be supplied at least one argument. The R help calls this as `heights`, which must be either vector or a matrix. If it is vector, its members are the various factor-levels.

To illustrate **barplot**(), consider the following data preparation:

```
> grades<-c("A+","A-","B+","B","C")
> Marks<-sample(grades,40,replace=T,prob=c(.2,.3,.25,.15,.1))
> Marks
 [1] "A+" "A-" "B+" "A-" "A+" "B"  "A+" "B+" "A-" "B"  "A+" "A-"
[13] "A-" "B+" "A-" "A-" "A-" "A-" "A+" "A-" "A+" "A+" "C"  "C"
[25] "B"  "C"  "B+" "C"  "B+" "B+" "B+" "A+" "B+" "A-" "A+" "A-"
[37] "A-" "B"  "C"  "A+"
>
```

A bar chart of the Marks vector is obtained from

```
> barplot(table(Marks),main="Mid-Marks in Algorithms")
```


Notice that, the barplot() function places the factor levels on the x-axis in the `lexicographical` **order** of the levels. Using the parameter `names.arg`, the bars in plot can be placed in the order as stated in the vector, *grades*.

```
# plot to the desired horizontal axis labels
> barplot(table(Marks),names.arg=grades ,main="Mid-Marks in Algorithms")
```

Mid-Marks in Algorithms
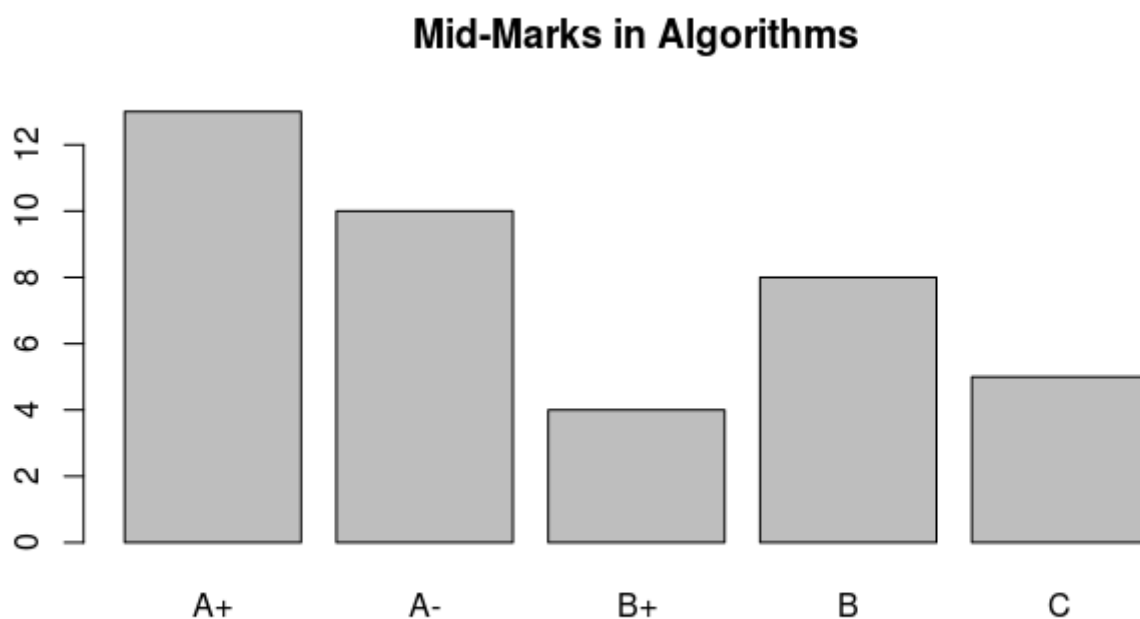
Colored bars can be drawn using the **col**= parameter.
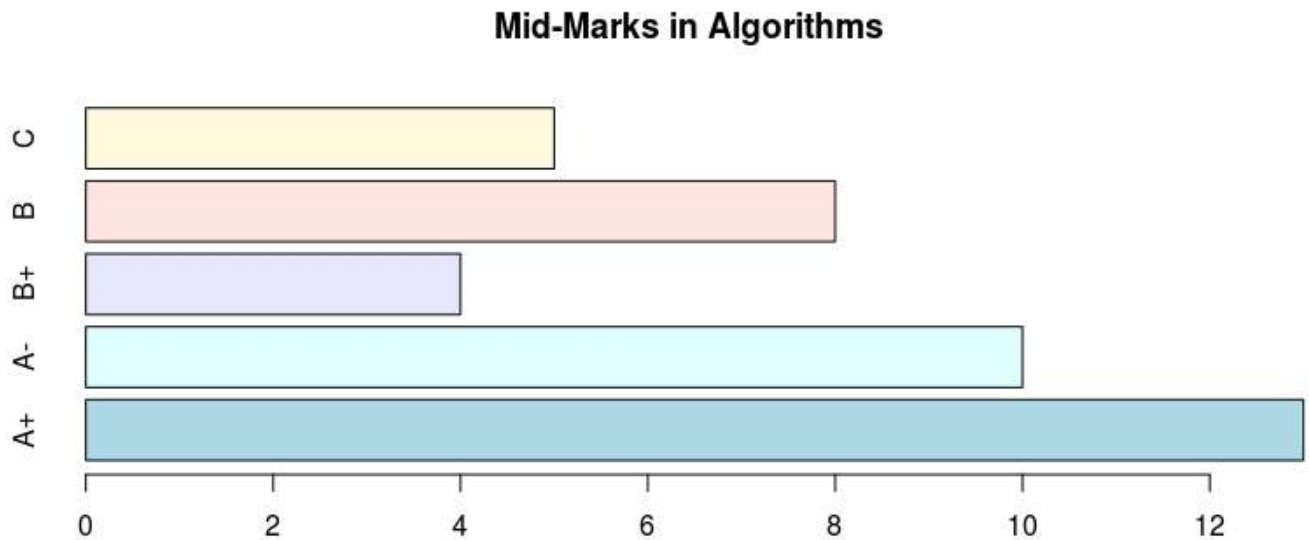
```
> barplot(table(Marks),names.arg=grades,col = c("lightblue",
        "lightcyan", "lavender", "mistyrose",  "cornsilk"),
        main="Mid-Marks in Algorithms")
```

Mid-Marks in Algorithms
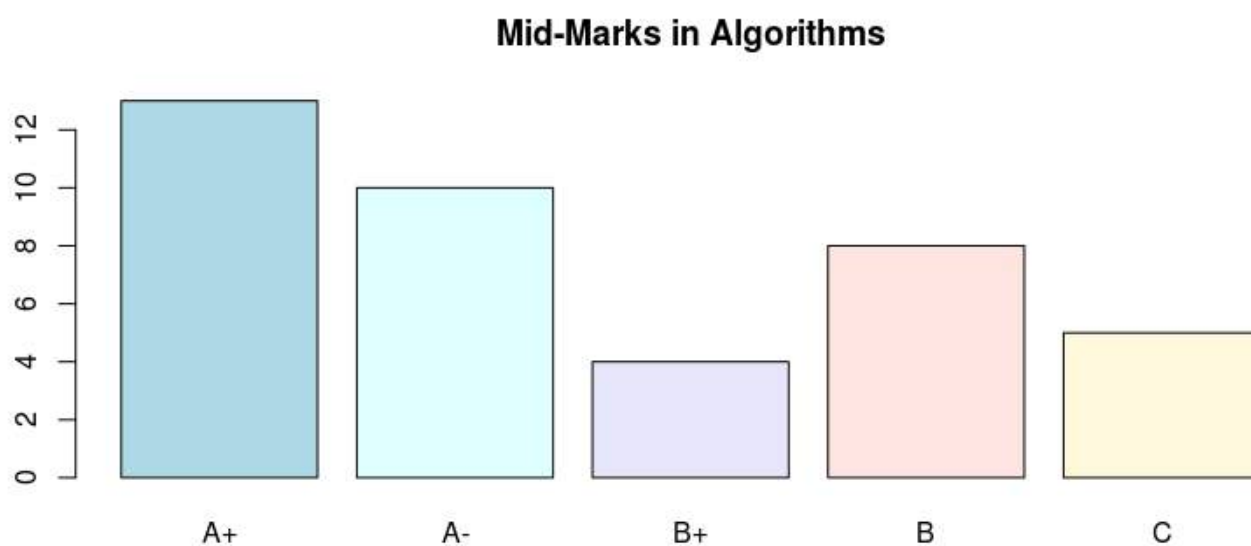
A bar chart with *horizontal bars* can be obtained as follows:
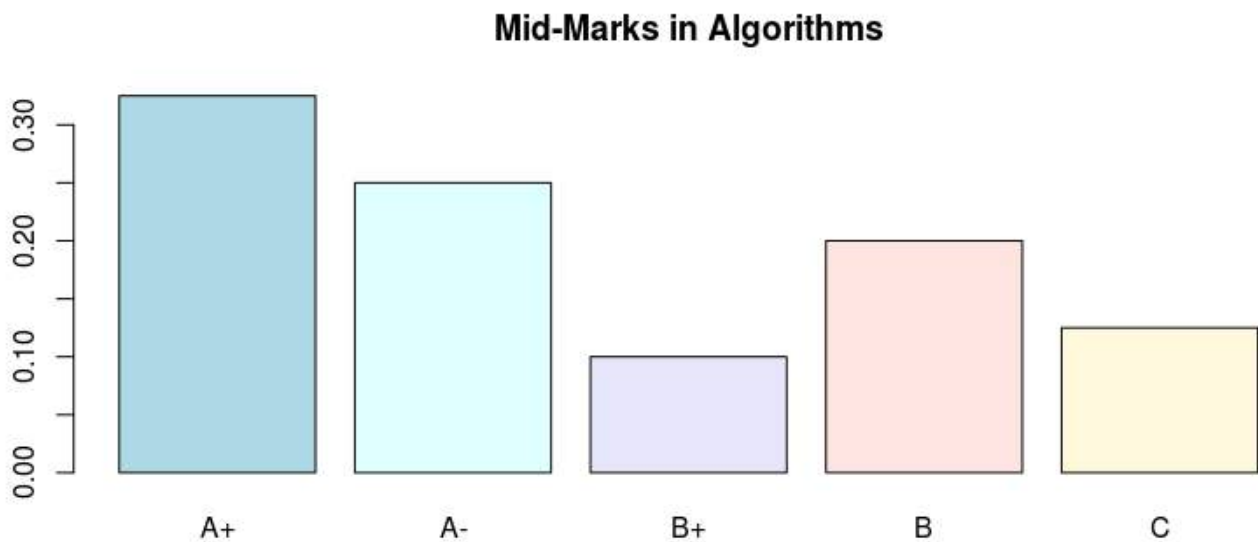
```
> barplot(table(Marks),names.arg=grades,horiz=TRUE,col = c("lightblue",
        "lightcyan", "lavender", "mistyrose",  "cornsilk"),
```

```
                main="Mid-Marks in Algorithms")
```

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A bar chart with *proportions* on the y-axis can be obtained as follows:

```
> barplot(prop.table(table(Marks)),names.arg=grades,col = c("lightblue",
          "lightcyan", "lavender", "mistyrose",  "cornsilk"),
          main="Mid-Marks in Algorithms")
```

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The sizes of the factor-level names on the x-axis can be increased using `cex.names` parameter.

```
> barplot(prop.table(table(Marks)),names.arg=grades,col = c("lightblue",
          "lightcyan", "lavender", "mistyrose",  "cornsilk"),
          main="Mid-Marks in Algorithms",cex.names=2)
```
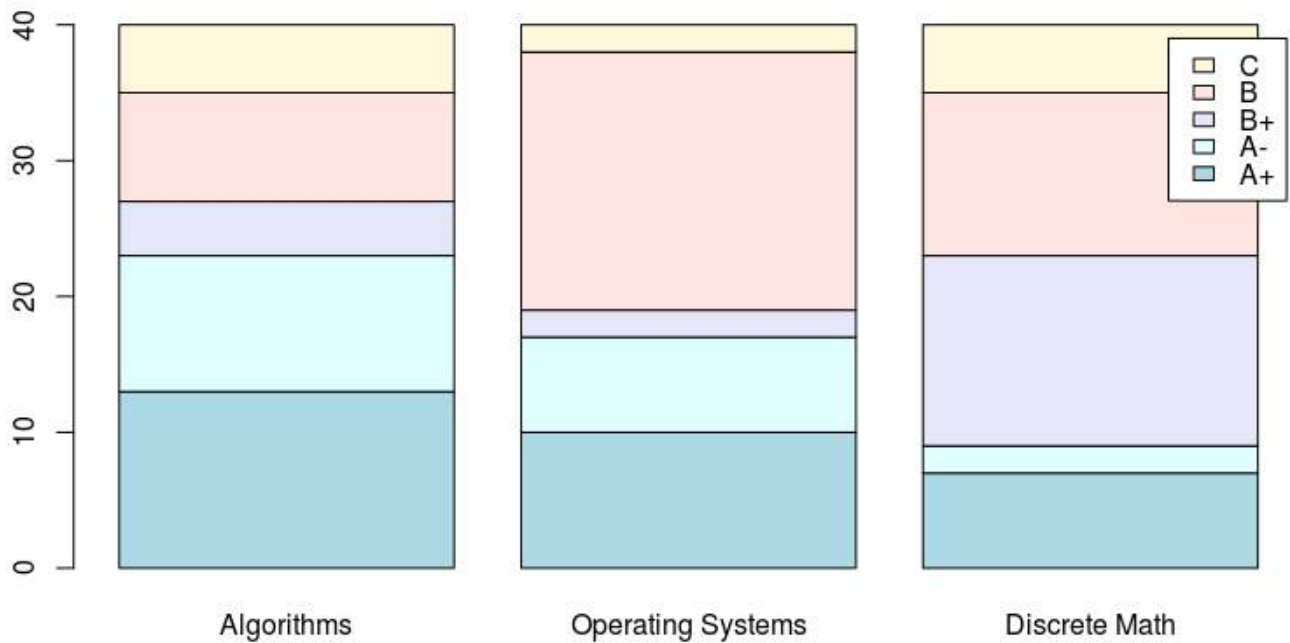
Mid-Marks in Algorithms
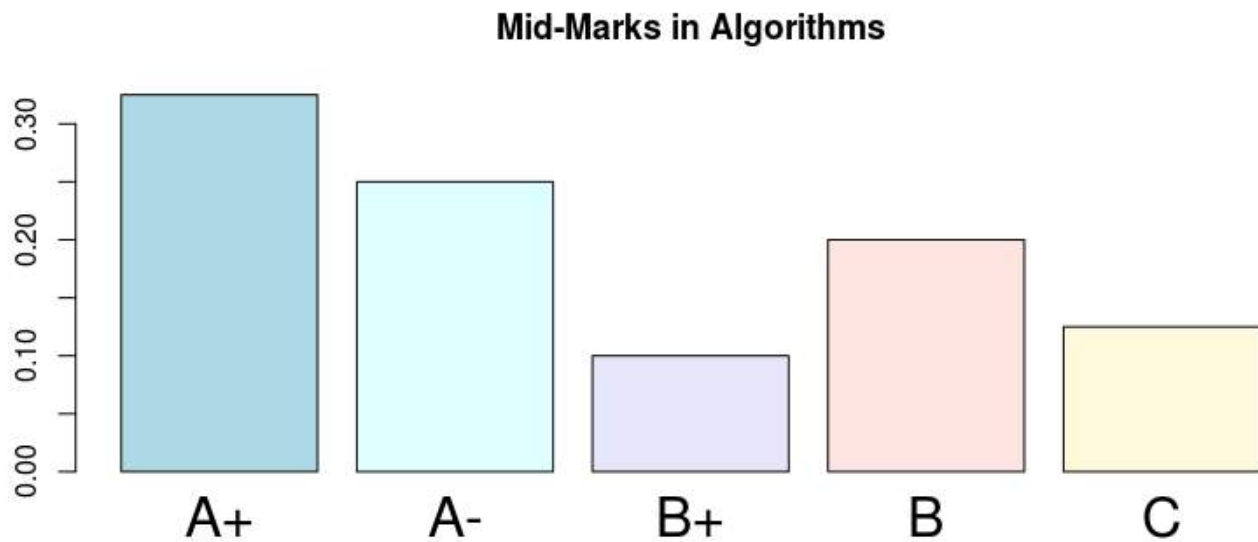
The `heights` parameter of the **barplot**() could be a matrix. For example it could be matrix, where the columns are the various subjects taken in a course, the rows could be the labels of the grades. Consider the following matrix:

```
> gradTab
    Algorithms Operating Systems Discrete Math
A-          13                10            7
A+          10                 7            2
B            4                 2           14
B+           8                19           12
C            5                 2            5
```

To draw a stacked bar, simply use the command:

```
> barplot(gradTab,col = c("lightblue","lightcyan",
      "lavender", "mistyrose",  "cornsilk"),legend.text = grades,
      main="Mid-Marks in Algorithms")
```
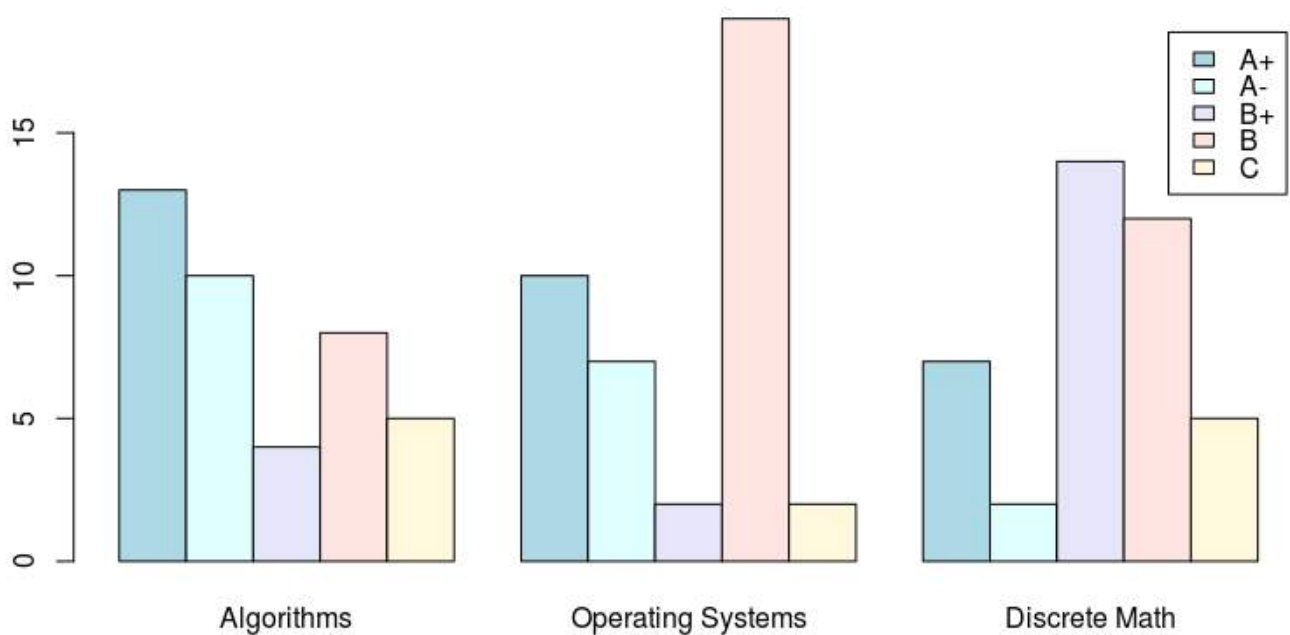
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To draw a juxtaposed bars, use the `besides` parameter, as given under:

```
> barplot(gradTab,beside = T,col = c("lightblue","lightcyan",
      "lavender", "mistyrose",  "cornsilk"),legend.text = grades,
       main="Mid-Marks in Algorithms")
```

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A horizontal bar chart can be obtained using `horiz=T` parameter:

```
> barplot(gradTab,beside = T,horiz=T,col = c("lightblue","lightcyan",
        "lavender", "mistyrose",  "cornsilk"),legend.text = grades,
        cex.names=.75,main="Mid-Marks in Algorithms")
```


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