Week 2: Organizing Data

Example 1

The software R comes with some built-in data sets. Below is one of them, related to the 50 states.

```
data("state")
state.name
```

```
##  [1] "Alabama"        "Alaska"         "Arizona"        "Arkansas"
##  [5] "California"     "Colorado"       "Connecticut"    "Delaware"
##  [9] "Florida"        "Georgia"        "Hawaii"         "Idaho"
## [13] "Illinois"       "Indiana"        "Iowa"           "Kansas"
## [17] "Kentucky"       "Louisiana"      "Maine"          "Maryland"
## [21] "Massachusetts"  "Michigan"       "Minnesota"      "Mississippi"
## [25] "Missouri"       "Montana"        "Nebraska"       "Nevada"
## [29] "New Hampshire"  "New Jersey"     "New Mexico"     "New York"
## [33] "North Carolina" "North Dakota"   "Ohio"           "Oklahoma"
## [37] "Oregon"         "Pennsylvania"   "Rhode Island"   "South Carolina"
## [41] "South Dakota"   "Tennessee"      "Texas"          "Utah"
## [45] "Vermont"        "Virginia"       "Washington"     "West Virginia"
## [49] "Wisconsin"      "Wyoming"
```

```
state.region
```

```
##  [1] South         West          West          South         West
##  [6] West          Northeast     South         South         South
## [11] West          West          North Central North Central North Central
## [16] North Central South         South         Northeast     South
## [21] Northeast     North Central North Central South         North Central
## [26] West          North Central West          Northeast     Northeast
## [31] West          Northeast     South         North Central North Central
## [36] South         West          Northeast     Northeast     South
## [41] North Central South         South         West          Northeast
## [46] South         West          South         North Central West
## Levels: Northeast South North Central West
```

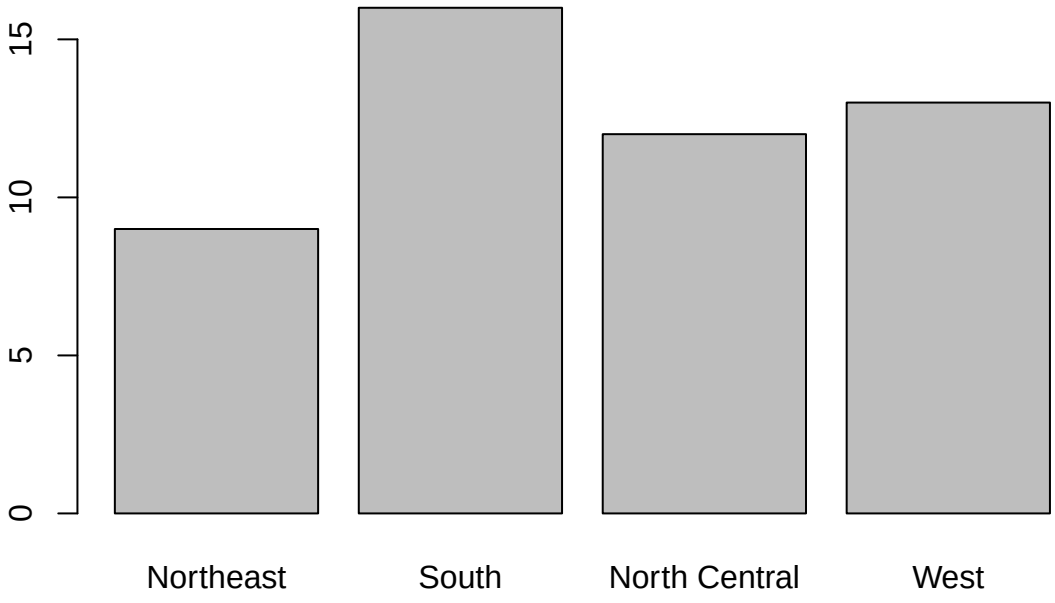
To create a frequency distribution, we use the table function.

```
table(state.region)
```

```
## state.region
##     Northeast         South North Central          West
##             9            16            12            13
```

We create a bar chart to visualize it.

```
barplot(table(state.region))
```



Example 2

Professor Nick Horton's website contains a data set of student survey result. We use the function read.csv to open the file remotely. The head function shows the first part of the dataframe, and names returns the variable names

```
dat <- read.csv(url("https://nhorton.people.amherst.edu/is5/data/Student_survey.csv"))
head(dat)
```

```
##      Sex Do.you.believe.in.God Pick.Random.Number Height
## 1 Female              Not sure                  6     71
## 2   Male                    No                  2     66
## 3   Male                   Yes                  9     73
## 4 Female                    No                  6     67
## 5   Male                   Yes                  7     71
## 6   Male              Not sure                  9     75
##                         Hand Dates FB.Friends Weight Drinks Varsity Songs
## 1  Predominantly Left Handed     1        314    138      0     Yes  1564
## 2 Predominantly Right Handed     2       1228    130      0      No    97
## 3 Predominantly Right Handed     1       1189    183      0     Yes  1397
## 4 Predominantly Right Handed     1          0    125      0      No  2241
## 5 Predominantly Right Handed     0        709    245      0      No  1299
## 6 Predominantly Right Handed     0       1072    161      0     Yes  1718
##         Diet                 Politics.9Cat Politics.numeric Politics.3Cat
## 1   Omnivore               2. Very Liberal                2       Liberal
## 2 Vegetarian               2. Very Liberal                2       Liberal
## 3  Carnivore     7. Moderatly Conservative                7  Conservative
## 4   Omnivore         3. Moderately Liberal                3       Liberal
## 5   Omnivore 5. Independent/Middle of Road                5      Moderate
## 6 Vegetarian         3. Moderately Liberal                3       Liberal
```

```
names(dat)
```

```
##  [1] "Sex"                 "Do.you.believe.in.God" "Pick.Random.Number"
##  [4] "Height"              "Hand"                  "Dates"
##  [7] "FB.Friends"          "Weight"                "Drinks"
```

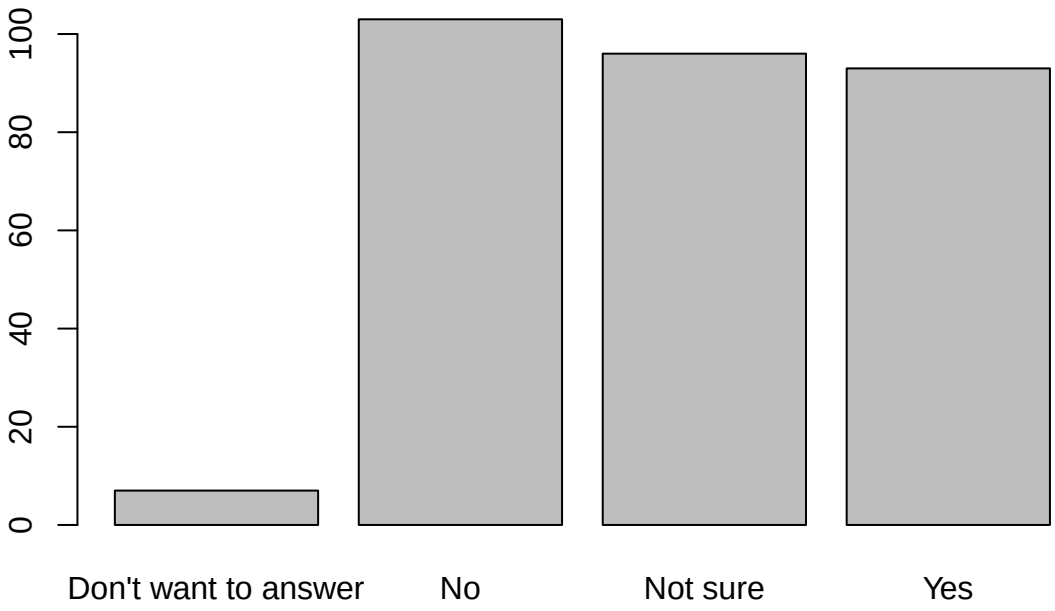
```
## [10] "Varsity"               "Songs"                 "Diet"
## [13] "Politics.9Cat"         "Politics.numeric"      "Politics.3Cat"
```

We use the table function to construct the frequency distribution of the response to the question "Do you believe in God?" in the example below, and the barplot function to build a bar chart.

```
tb1 <- table(dat$Do.you.believe.in.God)
tb1
```

```
##
## Don't want to answer                  No            Not sure
##                    7                 103                  96
##                  Yes
##                   93
```

```
barplot(tb1)
```



A relative frequency table displays percentages or proportions rather than the counts in each category.

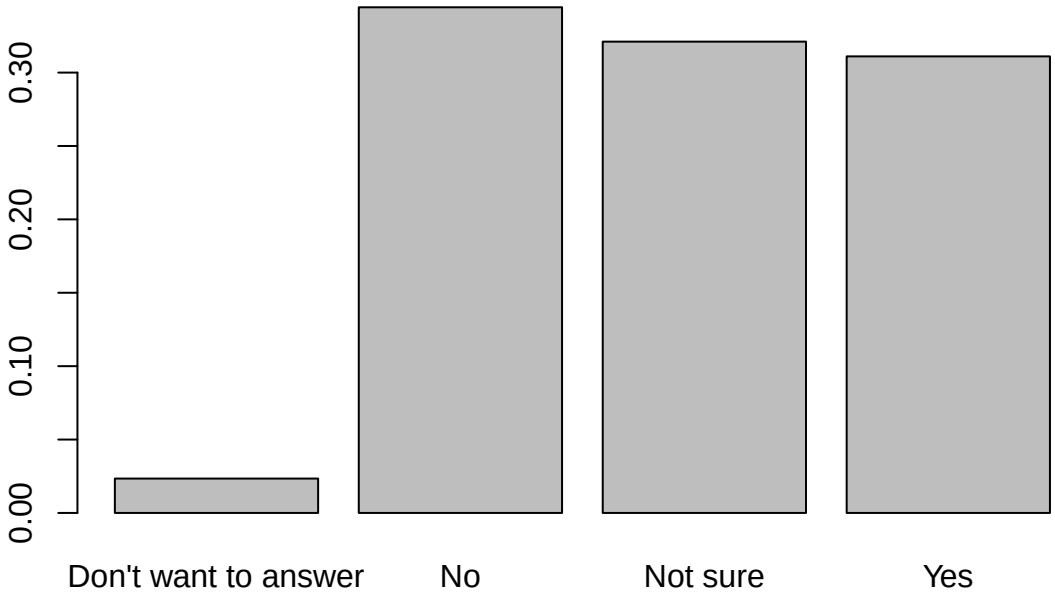
```
n <- sum(tb1)
n
```

```
## [1] 299
```

```
tb2 <- tb1/n
tb2
```

```
##
## Don't want to answer                  No            Not sure
##           0.02341137           0.34448161           0.32107023
##                  Yes
##           0.31103679
```

```
barplot(tb2)
```



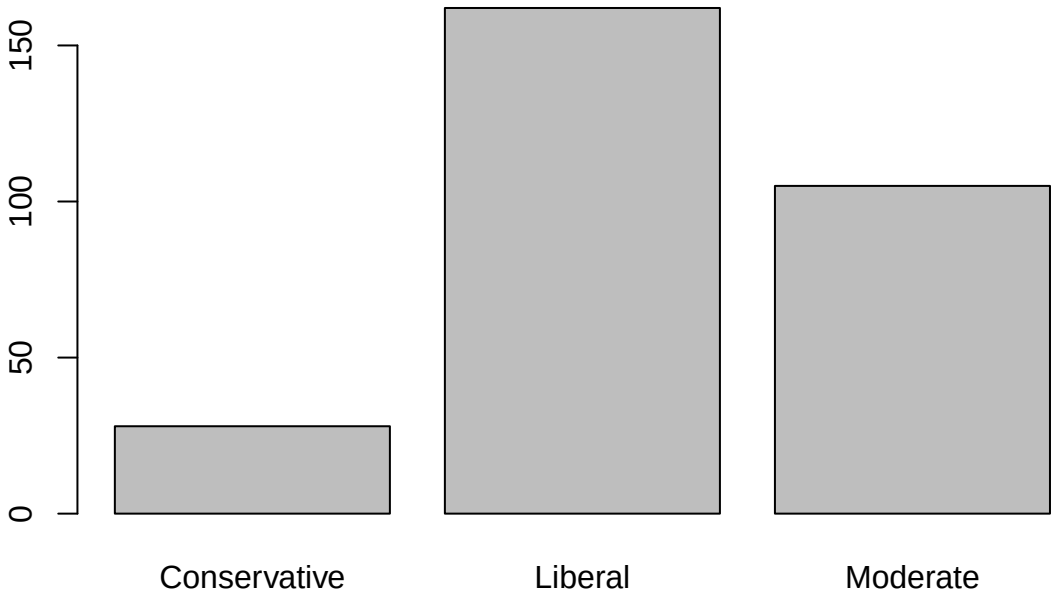
Example 2 (continued)

We analyze students' self rating of their political inclination below.

```
tb3 <- table(dat$Politics.3Cat)
tb3
```

```
##
## Conservative      Liberal     Moderate
##           28          162          105
```

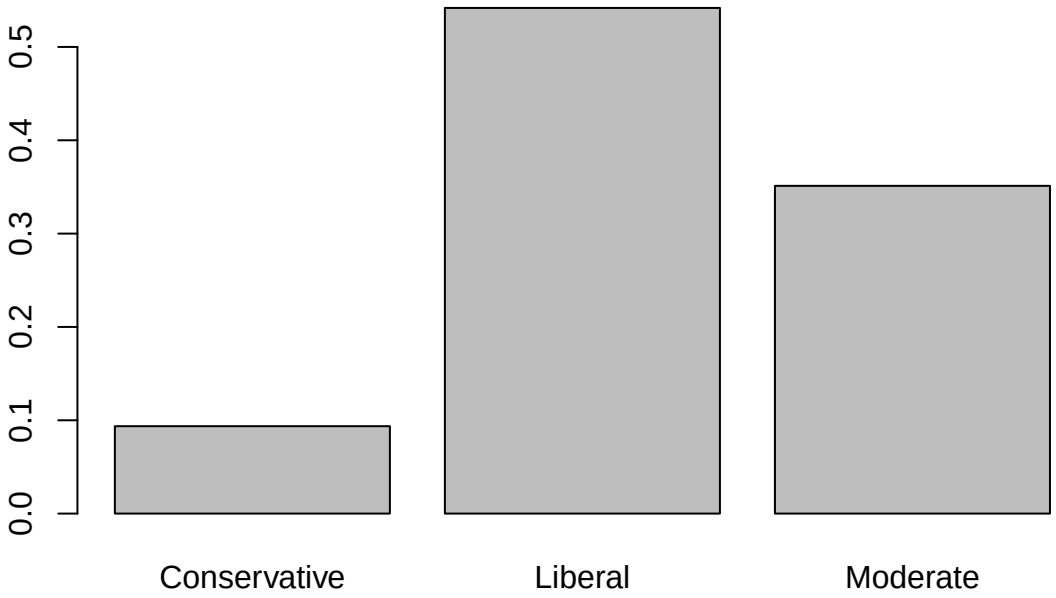
```
barplot(tb3)
```




```
tb4 <- tb3/n
tb4
```

```
##
## Conservative      Liberal     Moderate
##   0.09364548   0.54180602   0.35117057
```

```
barplot(tb4)
```



Follow Up

Use the method demonstrated above to analyze the question on "How would you describe your diet?" The variable name is "Diet".