Problem Statement

1. How many vowels are there in the names of USA States?

Answer :

The R-script for the given problem is as follows:

```
USArrests

USA_States <- rownames(USArrests)

USA_States <- paste(USA_States, collapse = "")

USA_States <- tolower(strsplit(USA_States, "")[[1]])

distribution <- as.data.frame(table(USA_States))

names(distribution)

library(dplyr)

filter(distribution, USA_States %in% c("a","e","i","o","u"))
```

Explanation:

To find the no. of vowels present in the names of USA States, a dataset **"**USArrests" is considered. Then the names of the states are extracted using rownames(USArrests) which are then converted into lower case strings and the string is split. Frequency of each letter is computed and USA_States is converted to data frame using as.data.frame(table(USA_States)).Finally filter() function is used to find the number of vowels in USA_States.
Thus ,there are 61 a, 28 e , 44 i , 36 o and 8 u in the names of USA States.

The output of the R-Script is given as follows:

```
> USArrests
             Murder Assault UrbanPop Rape
Alabama        13.2     236       58 21.2
Alaska         10.0     263       48 44.5
Arizona         8.1     294       80 31.0
Arkansas        8.8     190       50 19.5
California      9.0     276       91 40.6
Colorado        7.9     204       78 38.7
Connecticut     3.3     110       77 11.1
Delaware        5.9     238       72 15.8
```

```
Florida          15.4     335       80 31.9
Georgia          17.4     211       60 25.8
Hawaii            5.3      46       83 20.2
Idaho             2.6     120       54 14.2
Illinois         10.4     249       83 24.0
Indiana           7.2     113       65 21.0
Iowa              2.2      56       57 11.3
Kansas            6.0     115       66 18.0
Kentucky          9.7     109       52 16.3
Louisiana        15.4     249       66 22.2
Maine             2.1      83       51  7.8
Maryland         11.3     300       67 27.8
Massachusetts     4.4     149       85 16.3
Michigan         12.1     255       74 35.1
Minnesota         2.7      72       66 14.9
Mississippi      16.1     259       44 17.1
Missouri          9.0     178       70 28.2
Montana           6.0     109       53 16.4
Nebraska          4.3     102       62 16.5
Nevada           12.2     252       81 46.0
New Hampshire     2.1      57       56  9.5
New Jersey        7.4     159       89 18.8
New Mexico       11.4     285       70 32.1
New York         11.1     254       86 26.1
North Carolina   13.0     337       45 16.1
North Dakota      0.8      45       44  7.3
Ohio              7.3     120       75 21.4
Oklahoma          6.6     151       68 20.0
Oregon            4.9     159       67 29.3
Pennsylvania      6.3     106       72 14.9
Rhode Island      3.4     174       87  8.3
South Carolina   14.4     279       48 22.5
South Dakota      3.8      86       45 12.8
Tennessee        13.2     188       59 26.9
Texas            12.7     201       80 25.5
Utah              3.2     120       80 22.9
Vermont           2.2      48       32 11.2
Virginia          8.5     156       63 20.7
Washington        4.0     145       73 26.2
West Virginia     5.7      81       39  9.3
Wisconsin         2.6      53       66 10.8
Wyoming           6.8     161       60 15.6
```

```
        USA_States      Freq
1          a            61
2          e            28
3          i            44
4          o            36
5          u            8
```

2. Visualize the vowels distribution.

Answer :

```
vowel_dist <- filter(distribution, USA_States %in% c("a","e","i","o","u"))
vowel_dist
```

barplot(vowel_dist$Freq, axes = TRUE, axisnames = TRUE, xlab = "Vowels", ylab = "frequency")

The output of the R-Script (from Console window) is given as follows

The output of the R-Script is given as follows:

```
> vowel_dist <- filter(distribution, USA_States %in% c("a","e","i","o","u"
))
> vowel_dist
  USA_States Freq
1          a   61
2          e   28
3          i   44
4          o   36
5          u    8
> barplot(vowel_dist$Freq, axes = TRUE, axisnames = TRUE, xlab = "Vowels",
ylab = "frequency"
```