ACADGILD

SESSION 6:
Visualization & Plotting
Assignment 1

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1. Problem Statement

1. Import the Titanic Dataset from the following link:
   https://drive.google.com/file/d/1JTJCjdGuUxzKXYlwOavwovB01k6FWg3r/view?ts=5b42ea10

Perform the below operations:

a) Pre-process the passenger names to come up with a list of titles that represent families and represent using appropriate visualization graph.

b) Represent the proportion of people survived by family size using a graph.

c) Impute the missing values in Age variable using Mice library, create two different graphs showing Age distribution before and after imputation

2. Solution

Import the Titanic Dataset

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

```
library("readr")
# Import Data Set Titanic
TitanicData <- read.csv("E:/munmun_acadgild/acadgild data analytics/supporting files/titanic3.csv")
View(TitanicData)
str(TitanicData)

psych::describe(TitanicData)

colnames(TitanicData) <-
c("Pclass","Survived","Name","Sex","Age","SibSp","Parch","Ticket","Fare",
                    "Cabin","Embarked")
```

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

```
Console  Terminal
~/
> library("readr")
> # Import Data Set ; Titanic
> TitanicData <- read.csv("E:/munmun_acadgild/acadgild data analytics/supporting files/titanic3.csv")
> View(TitanicData)
> str(TitanicData)
'data.frame':   1309 obs. of  14 variables:
 $ pclass   : int  1 1 1 1 1 1 1 1 1 1 ...
 $ survived : int  1 1 0 0 0 1 1 0 1 0 ...
 $ name     : Factor w/ 1307 levels "Abbing, Mr. Anthony",..: 22 24 25 26 27 31 46 47 51 55 ...
 $ sex      : Factor w/ 2 levels "female","male": 1 2 1 2 1 2 1 2 1 2 ...
 $ age      : num  29 0.917 2 30 25 ...
 $ sibsp    : int  0 1 1 1 1 0 1 0 2 0 ...
 $ parch    : int  0 2 2 2 2 0 0 0 0 0 ...
 $ ticket   : Factor w/ 929 levels "110152","110413",..: 188 50 50 50 50 125 93 16 77 826 ...
 $ fare     : num  211 152 152 152 152 ...
 $ cabin    : Factor w/ 187 levels "","A10","A11",..: 45 81 81 81 81 151 147 17 63 1 ...
 $ embarked : Factor w/ 4 levels "","C","Q","S": 4 4 4 4 4 4 4 4 4 2 ...
 $ boat     : Factor w/ 28 levels "","1","10","11",..: 13 4 1 1 1 14 3 1 28 1 ...
 $ body     : int  NA NA NA 135 NA NA NA NA NA 22 ...
 $ home.dest: Factor w/ 370 levels "","?Havana, Cuba",..: 310 232 232 232 232 238 163 25 23 230 ...
>
> psych::describe(TitanicData)
           vars    n   mean     sd median trimmed    mad  min     max   range  skew kurtosis    se
pclass        1 1309   2.29   0.84   3.00    2.37   0.00 1.00    3.00    2.00 -0.60    -1.32  0.02
survived      2 1309   0.38   0.49   0.00    0.35   0.00 0.00    1.00    1.00  0.49    -1.77  0.01
name*         3 1309 653.69 377.31 653.00  653.62 484.81 1.00 1307.00 1306.00  0.00    -1.20 10.43
sex*          4 1309   1.64   0.48   2.00    1.68   0.00 1.00    2.00    1.00 -0.60    -1.64  0.01
age           5 1046  29.88  14.41  28.00   29.39  11.86 0.17   80.00   79.83  0.41     0.13  0.45
sibsp         6 1309   0.50   1.04   0.00    0.27   0.00 0.00    8.00    8.00  3.84    19.93  0.03
parch         7 1309   0.39   0.87   0.00    0.18   0.00 0.00    9.00    9.00  3.66    21.42  0.02
ticket*       8 1309 464.60 278.04 460.00  465.23 379.55 1.00  929.00  928.00 -0.01    -1.33  7.68
fare          9 1308  33.30  51.76  14.45   21.57  10.24 0.00  512.33  512.33  4.36    26.87  1.43
cabin*       10 1309  23.04  47.82   1.00   10.17   0.00 1.00  187.00  186.00  2.10     3.14  1.32
embarked*    11 1309   3.49   0.82   4.00    3.61   0.00 1.00    4.00    3.00 -1.13    -0.51  0.02
boat*        12 1309   5.97   8.00   1.00    4.29   0.00 1.00   28.00   27.00  1.42     0.64  0.22
body         13  121 160.81  97.70 155.00  160.34 130.47 1.00  328.00  327.00  0.09    -1.28  8.88
home.dest*   14 1309 113.16 124.56  54.00   98.99  78.58 1.00  370.00  369.00  0.59    -1.19  3.44
>
> colnames(TitanicData) <- c("Pclass","Survived","Name","Sex","Age","SibSp","Parch","Ticket","Fare",
+                            "Cabin","Embarked")
```

The titanic dataset is shown as follows:

Assignment 6_1.R* | TitanicData | Untitled1* | Untitled2*

Filter

	pclass	survived	name	sex	age	sibsp	parch	ticket	fare	cabin	embarked	boat	body	home.dest
1	1	1	Allen, Miss. Elisabeth Walton	female	29.0000	0	0	24160	211.3375	B5	S	2	NA	St Louis, MO
2	1	1	Allison, Master. Hudson Trevor	male	0.9167	1	2	113781	151.5500	C22 C26	S	11	NA	Montreal, PQ / Chesterville, ON
3	1	0	Allison, Miss. Helen Loraine	female	2.0000	1	2	113781	151.5500	C22 C26	S		NA	Montreal, PQ / Chesterville, ON
4	1	0	Allison, Mr. Hudson Joshua Creighton	male	30.0000	1	2	113781	151.5500	C22 C26	S		135	Montreal, PQ / Chesterville, ON
5	1	0	Allison, Mrs. Hudson J C (Bessie Waldo Daniels)	female	25.0000	1	2	113781	151.5500	C22 C26	S		NA	Montreal, PQ / Chesterville, ON
6	1	1	Anderson, Mr. Harry	male	48.0000	0	0	19952	26.5500	E12	S	3	NA	New York, NY
7	1	1	Andrews, Miss. Kornelia Theodosia	female	63.0000	1	0	13502	77.9583	D7	S	10	NA	Hudson, NY
8	1	0	Andrews, Mr. Thomas Jr	male	39.0000	0	0	112050	0.0000	A36	S		NA	Belfast, NI
9	1	1	Appleton, Mrs. Edward Dale (Charlotte Lamson)	female	53.0000	2	0	11769	51.4792	C101	S	D	NA	Bayside, Queens, NY
10	1	0	Artagaveytia, Mr. Ramon	male	71.0000	0	0	PC 17609	49.5042		C		22	Montevideo, Uruguay
11	1	0	Astor, Col. John Jacob	male	47.0000	1	0	PC 17757	227.5250	C62 C64	C		124	New York, NY
12	1	1	Astor, Mrs. John Jacob (Madeleine Talmadge Force)	female	18.0000	1	0	PC 17757	227.5250	C62 C64	C	4	NA	New York, NY
13	1	1	Aubart, Mme. Leontine Pauline	female	24.0000	0	0	PC 17477	69.3000	B35	C	9	NA	Paris, France
14	1	1	Barber, Miss. Ellen "Nellie"	female	26.0000	0	0	19877	78.8500		S	6	NA	
15	1	1	Barkworth, Mr. Algernon Henry Wilson	male	80.0000	0	0	27042	30.0000	A23	S	B	NA	Hessle, Yorks
16	1	0	Baumann, Mr. John D	male	NA	0	0	PC 17318	25.9250		S		NA	New York, NY
17	1	0	Baxter, Mr. Quigg Edmond	male	24.0000	0	1	PC 17558	247.5208	B58 B60	C		NA	Montreal, PQ
18	1	1	Baxter, Mrs. James (Helene DeLaudeniere Chaput)	female	50.0000	0	1	PC 17558	247.5208	B58 B60	C	6	NA	Montreal, PQ
19	1	1	Bazzani, Miss. Albina	female	32.0000	0	0	11813	76.2917	D15	C	8	NA	
20	1	0	Beattie, Mr. Thomson	male	36.0000	0	0	13050	75.2417	C6	C	A	NA	Winnipeg, MN
21	1	1	Beckwith, Mr. Richard Leonard	male	37.0000	1	1	11751	52.5542	D35	S	5	NA	New York, NY
22	1	1	Beckwith, Mrs. Richard Leonard (Sallie Monypeny)	female	47.0000	1	1	11751	52.5542	D35	S	5	NA	New York, NY

Showing 1 to 23 of 1,309 entries

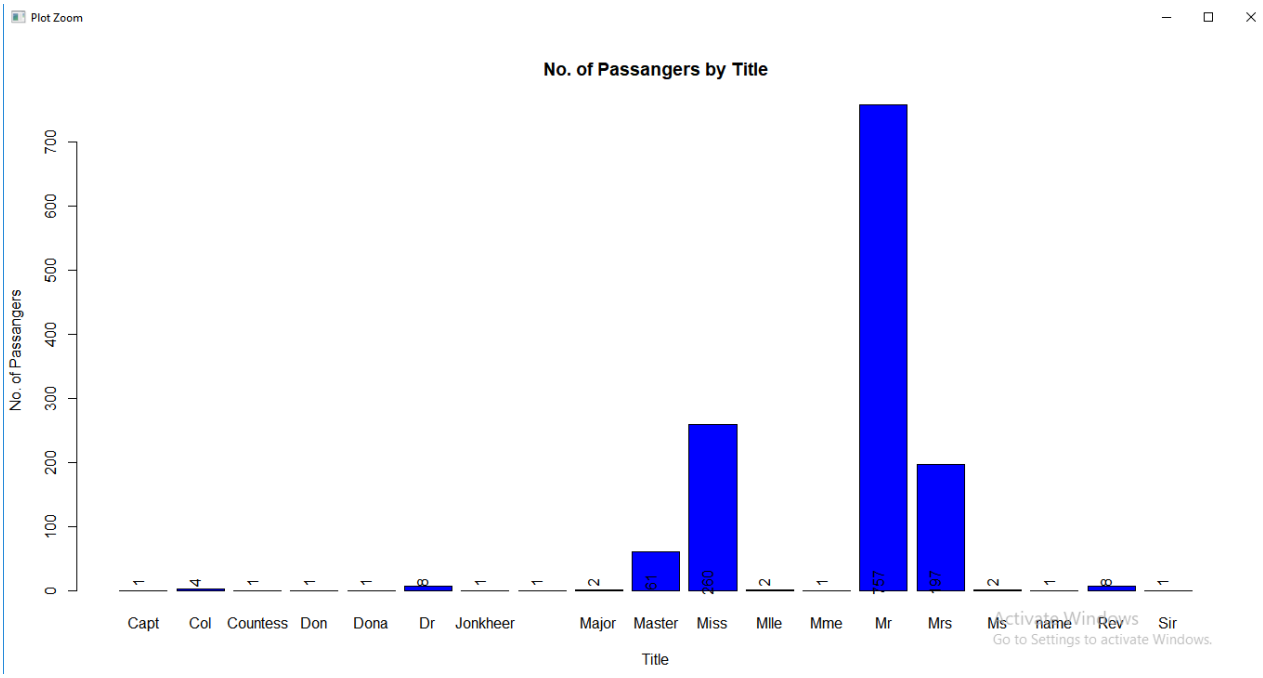
a. **Pre-process the passenger names to come up with a list of titles that represent families and represent using appropriate visualization graph.**

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

```
# Convert Names as character
TitanicData$Name <- as.character(TitanicData$Name)

# Extract the title from passenger names
TitanicData$SubTitle <- gsub("\\..*", "", TitanicData$Name)
TitanicData$Title <- gsub(".*\\ ", "", TitanicData$SubTitle)

table(TitanicData$Title)  # Count of Titles

# Plot a bar-graph showing Number of Passengers by Title

Title <- barplot(table(TitanicData$Title),
                 main = "No. of Passangers by Title", xlab = "Title",
                 ylab = "No. of Passangers", col = "Blue")
text(Title, 0,table(TitanicData$Title), pos = 3, srt = 90)
```

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

```
Console  Terminal
~/
> # Convert Name as character
> TitanicData$Name <- as.character(TitanicData$Name)
>
> # Extract the title from passenger names
> TitanicData$SubTitle <- gsub("\\..*", "", TitanicData$Name)
> TitanicData$Title <- gsub(".*\\ ", "", TitanicData$SubTitle)
>
> table(TitanicData$Title)  # Count of Titles

    Capt      Col Countess      Don     Dona       Dr Jonkheer     Lady    Major   Master     Miss     Mlle      Mme
       1        4        1        1        1        8        1        1        2       61      260        2        1
      Mr      Mrs       Ms      Rev      Sir
     757      197        2        8        1
>
> # Plot a bar-graph showing Number of Passengers by Title
>
> Title <- barplot(table(TitanicData$Title),
+                  main = "No. of Passangers by Title", xlab = "Title",
+                  ylab = "No. of Passangers", col = "Blue")
> text(Title, 0,table(TitanicData$Title), pos = 3, srt = 90)
>
```



b) Represent the proportion of people survived by family size using a graph.

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

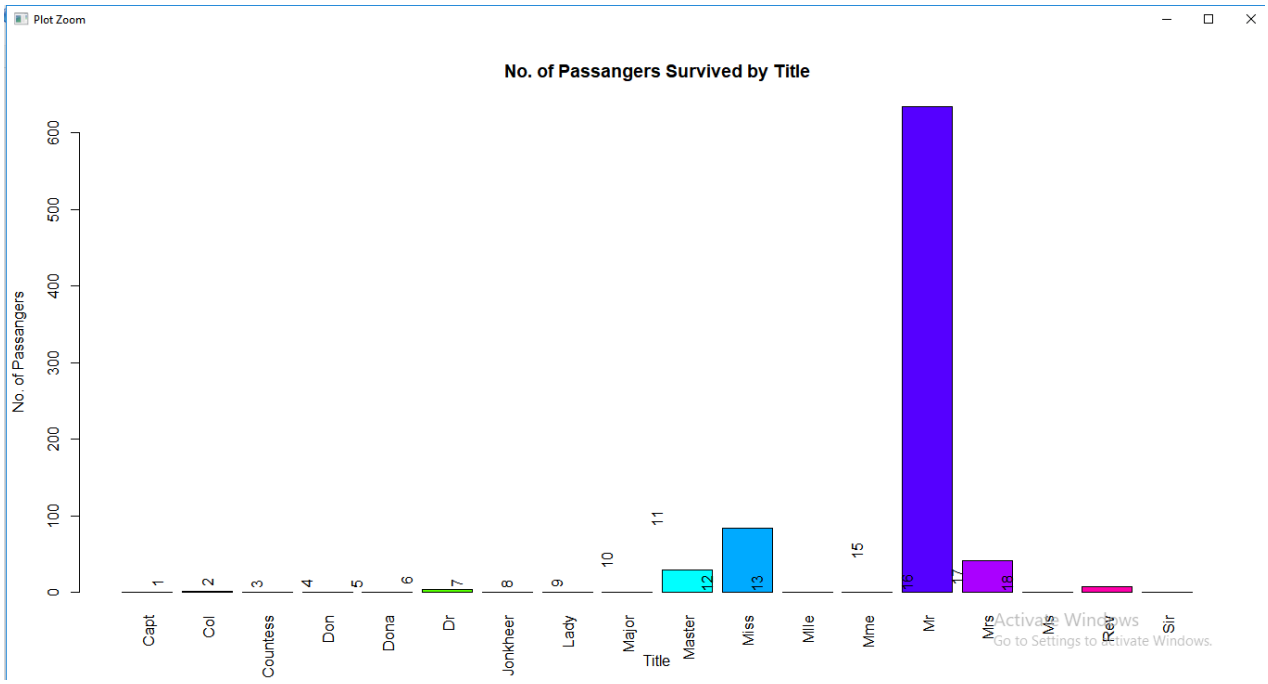
```
x <- table(TitanicData$Survived, TitanicData$Title) # table for survived and died
x                                    # 0 for survived and 1 for died
p <- x[1,]    # number of passengers survived
p

prop <- round(p*100/sum(p),1)  # proportion of passangers survived
prop
# in barchart format
# for number of Passengers
barplot(p,
      main = "No. of Passangers Survived by Title",
      xlab = "Title",
      ylab = "No. of Passangers", col = rainbow(length(p)), las =3)
text(p, pos = 3, srt = 90)
# for percentage of passengers
barplot(prop, main = "No. of Passangers by Title", xlab = "Title",
      ylab = "Proportion  of Passangers", col = c("Blue","Red"),
      legend = rownames(prop), ylim=c(0, 100), las = 3)
text(prop, pos = 3, srt = 90)

# in Pie Chart format

pie_chart <- pie(p, labels = p, main = " No.of passengers of Survival by Family",
```

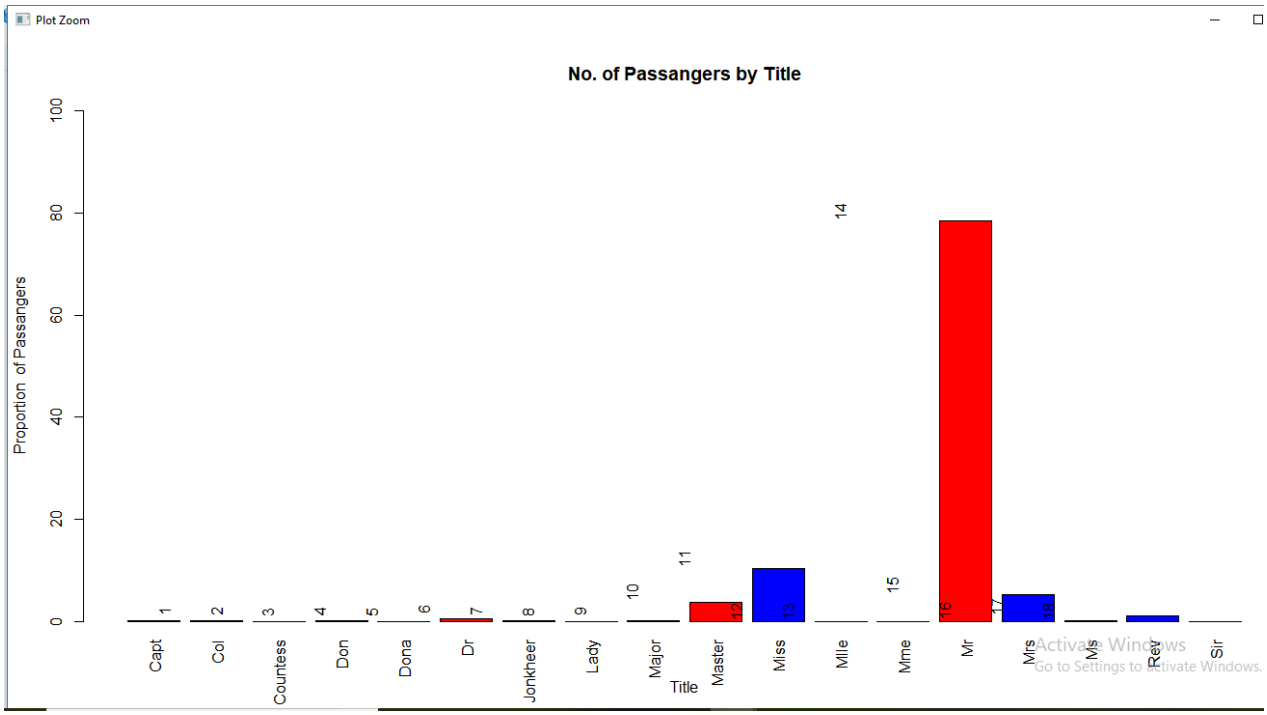
```
        col = rainbow(length(p)), cex = 1)
legend("topright", names(p), cex= 0.5, fill = rainbow(length(p)))

pie(prop, labels = prop, main = " Proportion of Survival by Family",
   col = rainbow(length(prop)), cex = 1)
legend("topright", names(prop), cex= 0.5, fill = rainbow(length(prop)))
```

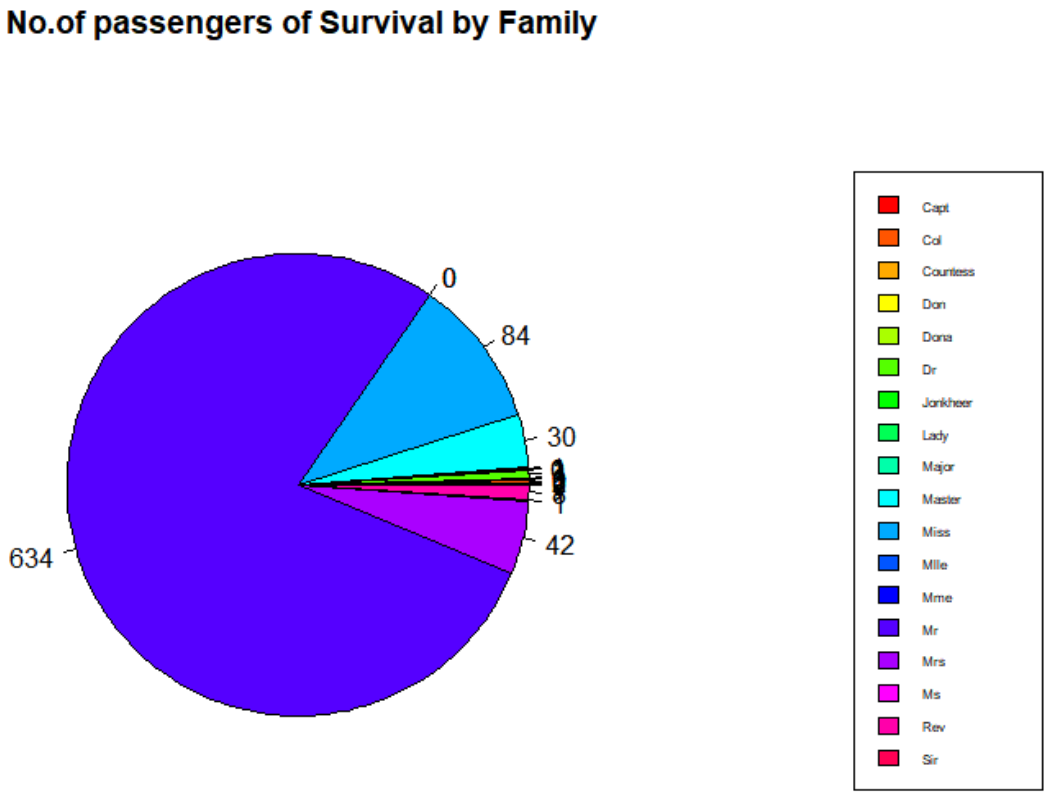
The output of the R-Script (from Console window) is given as follows:

```
> x <- table(TitanicData$Survived, TitanicData$Title) # table for survived
and died
> x                                                   # 0 for survived and 1
for died

    Capt Col Countess Don Dona  Dr Jonkheer Lady Major Master Miss Mlle Mme
Mr Mrs  Ms Rev Sir
  0    1   2        0   1    0   4        1    0     1     30   84    0   0
634  42   1   8   0
  1    0   2        1   0    1   4        0    1     1     31  176    2   1
123 155   1   0   1
> p <- x[1,]    # number of passengers survived
> p
    Capt      Col Countess      Don     Dona       Dr Jonkheer     Lady
Major   Master     Miss
       1        2        0        1        0        4        1        0
1       30       84
    Mlle      Mme       Mr      Mrs       Ms      Rev      Sir
       0        0      634       42        1        8        0
>
> prop <- round(p*100/sum(p),1)  # proportion of passangers survived
> prop
    Capt      Col Countess      Don     Dona       Dr Jonkheer     Lady
Major   Master     Miss
     0.1      0.2      0.0      0.1      0.0      0.5      0.1      0.0
0.1      3.7     10.4
    Mlle      Mme       Mr      Mrs       Ms      Rev      Sir
     0.0      0.0     78.4      5.2      0.1      1.0      0.0
> # in barchart format
>
> barplot(p,                          # for number of Passangers
+         main = "No. of Passangers Survived by Title",
+         xlab = "Title",
+         ylab = "No. of Passangers", col = rainbow(length(p)), las =3)
> text(p, pos = 3, srt = 90)
>
> barplot(prop,                       # for percentage of passangers
+         main = "No. of Passangers by Title", xlab = "Title",
+         ylab = "Proportion  of Passangers", col = c("Blue","Red"),
+         legend = rownames(prop), ylim=c(0, 100), las = 3)
> text(prop, pos = 3, srt = 90)
>
> # in Pie Chart format
>
> pie_chart <- pie(p, labels = p, main = " No.of passengers of Survival by
Family",
+                  col = rainbow(length(p)), cex = 1)
> legend("topright", names(p), cex= 0.5, fill = rainbow(length(p)))
```

```
>
>
> pie(prop, labels = prop, main = " Proportion of Survival by Family",
+     col = rainbow(length(prop)), cex = 1)
> legend("topright", names(prop), cex= 0.5, fill = rainbow(length(prop)))
```







c)Impute the missing values in Age variable using Mice library, create two different graphs showing Age distribution before and after imputation

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

```
# c. Impute the missing values in Age variable using Mice Library, create two
# different graphs showing Age distribution before and after imputation.


library(readr)
TitanicData <- within(TitanicData,
                      {
                        agecat <- NA
                        agecat[Age>=0 & Age<=25] <- "Low"
                        agecat[Age>=26 & Age<=40] <- "Middle"
                        agecat[Age>=41] <- "High"
                      })
head(TitanicData)

# Title and Age Group before imputation
```

```
count <- table(TitanicData$agecat, TitanicData$Title)
count
library(ggplot2)
p <- ggplot(data = TitanicData,
        mapping = aes(Title, fill = agecat))
p + geom_bar(position = "stack") + theme(axis.text.x = element_text(angle = 90)) + labs(title
= "Counts of Title with Age Groups")



library(mice)

# All variables shoud be either factor or numeric.

library(dplyr)
str(TitanicData)

dat <- TitanicData[,-13]
str(dat)
dat <- dat %>% mutate(agecat = as.factor(agecat),Title = as.factor(Title)) # convert as
factor
str(dat)    # Check the data set

# Now the data set is ready for imputation
# using library mice. called earlier
init = mice(dat, maxit=0)
meth = init$method
predM = init$predictorMatrix

# below variable are not required for predicting the age
predM[, c("PassengerId","Name", "Age","Ticket","Cabin", "Embarked")]=0
# specify method for imputing the missing value
meth[c("Age")]="norm"
set.seed(1)
# impute the missing values
imputed = mice(dat, method=meth, predictorMatrix=predM, m=5)
imputed <- complete(imputed)
# check for missings in the imputed dataset
sapply(imputed, function(x) sum(is.na(x)))

# Title and Age Group after imputation
library(ggplot2)
p <- ggplot(data = imputed,
        mapping = aes(Title, fill = agecat))
```

```
p + geom_bar(position = "stack")+theme(axis.text.x = element_text(angle = 90)) + labs(title
= "Counts of Title with Age Groups")
```