DhruvangPatel_M2_Project2.R

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```
#name
print("Plotting Basics:Dhruvang Patel")
```

```
## [1] "Plotting Basics:Dhruvang Patel"
```

```
r=getOption("repos")
r["CRAN"]="http://cran.us.r-project.org"
options(repos=r)
install.packages("vcd")
```

```
## Installing package into 'C:/Users/dhruvang/Documents/R/win-library/4.1'
## (as 'lib' is unspecified)

## package 'vcd' successfully unpacked and MD5 sums checked
##
## The downloaded binary packages are in
##  C:\Users\dhruvang\AppData\Local\Temp\RtmpYvAedw\downloaded_packages
```

```
library(vcd)
```

```
## Loading required package: grid
```

```
#install plyr package
install.packages("plyr")
```

```
## Installing package into 'C:/Users/dhruvang/Documents/R/win-library/4.1'
## (as 'lib' is unspecified)

## package 'plyr' successfully unpacked and MD5 sums checked

## Warning: cannot remove prior installation of package 'plyr'

## Warning in file.copy(savedcopy, lib, recursive = TRUE): problem copying C:
## \Users\dhruvang\Documents\R\win-library\4.1\00LOCK\plyr\libs\x64\plyr.dll to C:
## \Users\dhruvang\Documents\R\win-library\4.1\plyr\libs\x64\plyr.dll: Permission
## denied

## Warning: restored 'plyr'
```

```
##
## The downloaded binary packages are in
##  C:\Users\dhruvang\AppData\Local\Temp\RtmpYvAedw\downloaded_packages
```

```
library(plyr)

#install FSA package
install.packages("FSA")
```

```
## Installing package into 'C:/Users/dhruvang/Documents/R/win-library/4.1'
## (as 'lib' is unspecified)

## package 'FSA' successfully unpacked and MD5 sums checked
##
## The downloaded binary packages are in
##  C:\Users\dhruvang\AppData\Local\Temp\RtmpYvAedw\downloaded_packages
```

```
library(FSA)
```

```
## ## FSA v0.9.1. See citation('FSA') if used in publication.
## ## Run fishR() for related website and fishR('IFAR') for related book.

##
## Attaching package: 'FSA'

## The following object is masked from 'package:plyr':
##
##     mapvalues
```

```
#install FSAdata package
install.packages("FSAdata")
```

```
## Installing package into 'C:/Users/dhruvang/Documents/R/win-library/4.1'
## (as 'lib' is unspecified)

## package 'FSAdata' successfully unpacked and MD5 sums checked
##
## The downloaded binary packages are in
##  C:\Users\dhruvang\AppData\Local\Temp\RtmpYvAedw\downloaded_packages
```

```
library(FSAdata)
```

```
## ## FSAdata v0.3.8. See ?FSAdata to find data for specific fisheries analyses.
```

```
#install magrittr package
install.packages("magrittr")
```

```
## Installing package into 'C:/Users/dhruvang/Documents/R/win-library/4.1'
## (as 'lib' is unspecified)
```

```
## package 'magrittr' successfully unpacked and MD5 sums checked

## Warning: cannot remove prior installation of package 'magrittr'

## Warning in file.copy(savedcopy, lib, recursive = TRUE):
## problem copying C:\Users\dhruvang\Documents\R\win-
## library\4.1\00LOCK\magrittr\libs\x64\magrittr.dll to C:
## \Users\dhruvang\Documents\R\win-library\4.1\magrittr\libs\x64\magrittr.dll:
## Permission denied

## Warning: restored 'magrittr'

##
## The downloaded binary packages are in
##  C:\Users\dhruvang\AppData\Local\Temp\RtmpYvAedw\downloaded_packages
```

```
library(magrittr)

#install dplyr package
install.packages("dplyr")
```

```
## Installing package into 'C:/Users/dhruvang/Documents/R/win-library/4.1'
## (as 'lib' is unspecified)

## package 'dplyr' successfully unpacked and MD5 sums checked

## Warning: cannot remove prior installation of package 'dplyr'

## Warning in file.copy(savedcopy, lib, recursive = TRUE): problem copying C:
## \Users\dhruvang\Documents\R\win-library\4.1\00LOCK\dplyr\libs\x64\dplyr.dll
## to C:\Users\dhruvang\Documents\R\win-library\4.1\dplyr\libs\x64\dplyr.dll:
## Permission denied

## Warning: restored 'dplyr'

##
## The downloaded binary packages are in
##  C:\Users\dhruvang\AppData\Local\Temp\RtmpYvAedw\downloaded_packages
```

```
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:plyr':
##
##     arrange, count, desc, failwith, id, mutate, rename, summarise,
##     summarize
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
#install plotrix package
install.packages("plotrix")
```

```
## Installing package into 'C:/Users/dhruvang/Documents/R/win-library/4.1'
## (as 'lib' is unspecified)

## package 'plotrix' successfully unpacked and MD5 sums checked
##
## The downloaded binary packages are in
##  C:\Users\dhruvang\AppData\Local\Temp\RtmpYvAedw\downloaded_packages
```

```
library(plotrix)

#install ggplot2 package
install.packages("ggplot2")
```

```
## Installing package into 'C:/Users/dhruvang/Documents/R/win-library/4.1'
## (as 'lib' is unspecified)

## package 'ggplot2' successfully unpacked and MD5 sums checked
##
## The downloaded binary packages are in
##  C:\Users\dhruvang\AppData\Local\Temp\RtmpYvAedw\downloaded_packages
```

```
library(ggplot2)

#install moments package
install.packages("moments")
```

```
## Installing package into 'C:/Users/dhruvang/Documents/R/win-library/4.1'
## (as 'lib' is unspecified)

## package 'moments' successfully unpacked and MD5 sums checked
##
## The downloaded binary packages are in
##  C:\Users\dhruvang\AppData\Local\Temp\RtmpYvAedw\downloaded_packages
```

```
library(moments)

#Load the dataset
data(BullTroutRML2)
BullTroutRML2
```

```
##    age  fl     lake     era
## 1   14 459 Harrison 1977-80
## 2   12 449 Harrison 1977-80
## 3   10 471 Harrison 1977-80
## 4   10 446 Harrison 1977-80
## 5    9 400 Harrison 1977-80
## 6    9 440 Harrison 1977-80
## 7    9 462 Harrison 1977-80
## 8    8 480 Harrison 1977-80
## 9    8 449 Harrison 1977-80
## 10   7 437 Harrison 1977-80
## 11   7 431 Harrison 1977-80
## 12   7 425 Harrison 1977-80
## 13   7 419 Harrison 1977-80
## 14   6 409 Harrison 1977-80
## 15   6 397 Harrison 1977-80
## 16   5 419 Harrison 1977-80
## 17   5 381 Harrison 1977-80
## 18   5 363 Harrison 1977-80
## 19   5 351 Harrison 1977-80
## 20   4 372 Harrison 1977-80
## 21   2 199 Harrison 1977-80
## 22   2 184 Harrison 1977-80
## 23   1  91 Harrison 1977-80
## 24  12 440 Harrison 1997-01
## 25  11 428 Harrison 1997-01
## 26  10 440 Harrison 1997-01
## 27  10 422 Harrison 1997-01
## 28   9 434 Harrison 1997-01
## 29   9 415 Harrison 1997-01
## 30   9 406 Harrison 1997-01
## 31   8 434 Harrison 1997-01
## 32   8 406 Harrison 1997-01
## 33   8 375 Harrison 1997-01
## 34   7 415 Harrison 1997-01
## 35   7 394 Harrison 1997-01
## 36   6 381 Harrison 1997-01
## 37   6 357 Harrison 1997-01
## 38   5 341 Harrison 1997-01
## 39   5 326 Harrison 1997-01
## 40   4 304 Harrison 1997-01
## 41   4 292 Harrison 1997-01
## 42   4 270 Harrison 1997-01
## 43   4 252 Harrison 1997-01
## 44   4 221 Harrison 1997-01
## 45   3 258 Harrison 1997-01
## 46   3 233 Harrison 1997-01
## 47   3 211 Harrison 1997-01
## 48   3 205 Harrison 1997-01
## 49   3 180 Harrison 1997-01
## 50   2 196 Harrison 1997-01
## 51   2 171 Harrison 1997-01
## 52   2 143 Harrison 1997-01
## 53   1 131 Harrison 1997-01
```

```
## 54   1  88 Harrison 1997-01
## 55   1  75 Harrison 1997-01
## 56   0  51 Harrison 1997-01
## 57   0  41 Harrison 1997-01
## 58   0  20 Harrison 1997-01
## 59   7 245 Harrison 1997-01
## 60   7 279 Harrison 1997-01
## 61   5 245 Harrison 1997-01
## 62   8 360   Osprey 1977-80
## 63   8 357   Osprey 1977-80
## 64   7 357   Osprey 1977-80
## 65   7 329   Osprey 1977-80
## 66   6 385   Osprey 1977-80
## 67   6 323   Osprey 1977-80
## 68   5 369   Osprey 1977-80
## 69   5 326   Osprey 1977-80
## 70   4 357   Osprey 1977-80
## 71   4 326   Osprey 1977-80
## 72   4 258   Osprey 1977-80
## 73   4 239   Osprey 1977-80
## 74   3 221   Osprey 1977-80
## 75   3 258   Osprey 1977-80
## 76   3 276   Osprey 1977-80
## 77  11 688   Osprey 1997-01
## 78  10 369   Osprey 1997-01
## 79   9 400   Osprey 1997-01
## 80   8 381   Osprey 1997-01
## 81   8 332   Osprey 1997-01
## 82   7 394   Osprey 1997-01
## 83   7 388   Osprey 1997-01
## 84   7 354   Osprey 1997-01
## 85   7 320   Osprey 1997-01
## 86   6 320   Osprey 1997-01
## 87   6 347   Osprey 1997-01
## 88   6 360   Osprey 1997-01
## 89   5 354   Osprey 1997-01
## 90   5 335   Osprey 1997-01
## 91   5 313   Osprey 1997-01
## 92   5 289   Osprey 1997-01
## 93   4 313   Osprey 1997-01
## 94   4 298   Osprey 1997-01
## 95   3 279   Osprey 1997-01
## 96   3 273   Osprey 1997-01
```

```
#4. Print first and last three records
head(BullTroutRML2,3)
```

```
##   age  fl     lake     era
## 1  14 459 Harrison 1977-80
## 2  12 449 Harrison 1977-80
## 3  10 471 Harrison 1977-80
```

```r
tail(BullTroutRML2,3)
```

```
##    age  fl   lake     era
## 94   4 298 Osprey 1997-01
## 95   3 279 Osprey 1997-01
## 96   3 273 Osprey 1997-01
```

```r
#5. Remove all except Harrison Lake
Harrisonlake<-filter(BullTroutRML2, lake=="Harrison")
Harrisonlake
```

```
##    age  fl     lake     era
## 1   14 459 Harrison 1977-80
## 2   12 449 Harrison 1977-80
## 3   10 471 Harrison 1977-80
## 4   10 446 Harrison 1977-80
## 5    9 400 Harrison 1977-80
## 6    9 440 Harrison 1977-80
## 7    9 462 Harrison 1977-80
## 8    8 480 Harrison 1977-80
## 9    8 449 Harrison 1977-80
## 10   7 437 Harrison 1977-80
## 11   7 431 Harrison 1977-80
## 12   7 425 Harrison 1977-80
## 13   7 419 Harrison 1977-80
## 14   6 409 Harrison 1977-80
## 15   6 397 Harrison 1977-80
## 16   5 419 Harrison 1977-80
## 17   5 381 Harrison 1977-80
## 18   5 363 Harrison 1977-80
## 19   5 351 Harrison 1977-80
## 20   4 372 Harrison 1977-80
## 21   2 199 Harrison 1977-80
## 22   2 184 Harrison 1977-80
## 23   1  91 Harrison 1977-80
## 24  12 440 Harrison 1997-01
## 25  11 428 Harrison 1997-01
## 26  10 440 Harrison 1997-01
## 27  10 422 Harrison 1997-01
## 28   9 434 Harrison 1997-01
## 29   9 415 Harrison 1997-01
## 30   9 406 Harrison 1997-01
## 31   8 434 Harrison 1997-01
## 32   8 406 Harrison 1997-01
## 33   8 375 Harrison 1997-01
## 34   7 415 Harrison 1997-01
## 35   7 394 Harrison 1997-01
## 36   6 381 Harrison 1997-01
## 37   6 357 Harrison 1997-01
## 38   5 341 Harrison 1997-01
## 39   5 326 Harrison 1997-01
## 40   4 304 Harrison 1997-01
## 41   4 292 Harrison 1997-01
```

```
## 42   4 270 Harrison 1997-01
## 43   4 252 Harrison 1997-01
## 44   4 221 Harrison 1997-01
## 45   3 258 Harrison 1997-01
## 46   3 233 Harrison 1997-01
## 47   3 211 Harrison 1997-01
## 48   3 205 Harrison 1997-01
## 49   3 180 Harrison 1997-01
## 50   2 196 Harrison 1997-01
## 51   2 171 Harrison 1997-01
## 52   2 143 Harrison 1997-01
## 53   1 131 Harrison 1997-01
## 54   1  88 Harrison 1997-01
## 55   1  75 Harrison 1997-01
## 56   0  51 Harrison 1997-01
## 57   0  41 Harrison 1997-01
## 58   0  20 Harrison 1997-01
## 59   7 245 Harrison 1997-01
## 60   7 279 Harrison 1997-01
## 61   5 245 Harrison 1997-01
```

```
#6. Display first and last 5 records of new dataset
#first 5
head(Harrisonlake,5)
```

```
##   age  fl     lake     era
## 1  14 459 Harrison 1977-80
## 2  12 449 Harrison 1977-80
## 3  10 471 Harrison 1977-80
## 4  10 446 Harrison 1977-80
## 5   9 400 Harrison 1977-80
```

```
#last 5
tail(Harrisonlake,5)
```

```
##    age  fl     lake     era
## 57   0  41 Harrison 1997-01
## 58   0  20 Harrison 1997-01
## 59   7 245 Harrison 1997-01
## 60   7 279 Harrison 1997-01
## 61   5 245 Harrison 1997-01
```

```
#7. Structure of a dataset
structure(Harrisonlake)
```

```
##    age  fl     lake     era
## 1   14 459 Harrison 1977-80
## 2   12 449 Harrison 1977-80
## 3   10 471 Harrison 1977-80
## 4   10 446 Harrison 1977-80
## 5    9 400 Harrison 1977-80
## 6    9 440 Harrison 1977-80
```

```
## 7    9 462 Harrison 1977-80
## 8    8 480 Harrison 1977-80
## 9    8 449 Harrison 1977-80
## 10   7 437 Harrison 1977-80
## 11   7 431 Harrison 1977-80
## 12   7 425 Harrison 1977-80
## 13   7 419 Harrison 1977-80
## 14   6 409 Harrison 1977-80
## 15   6 397 Harrison 1977-80
## 16   5 419 Harrison 1977-80
## 17   5 381 Harrison 1977-80
## 18   5 363 Harrison 1977-80
## 19   5 351 Harrison 1977-80
## 20   4 372 Harrison 1977-80
## 21   2 199 Harrison 1977-80
## 22   2 184 Harrison 1977-80
## 23   1  91 Harrison 1977-80
## 24  12 440 Harrison 1997-01
## 25  11 428 Harrison 1997-01
## 26  10 440 Harrison 1997-01
## 27  10 422 Harrison 1997-01
## 28   9 434 Harrison 1997-01
## 29   9 415 Harrison 1997-01
## 30   9 406 Harrison 1997-01
## 31   8 434 Harrison 1997-01
## 32   8 406 Harrison 1997-01
## 33   8 375 Harrison 1997-01
## 34   7 415 Harrison 1997-01
## 35   7 394 Harrison 1997-01
## 36   6 381 Harrison 1997-01
## 37   6 357 Harrison 1997-01
## 38   5 341 Harrison 1997-01
## 39   5 326 Harrison 1997-01
## 40   4 304 Harrison 1997-01
## 41   4 292 Harrison 1997-01
## 42   4 270 Harrison 1997-01
## 43   4 252 Harrison 1997-01
## 44   4 221 Harrison 1997-01
## 45   3 258 Harrison 1997-01
## 46   3 233 Harrison 1997-01
## 47   3 211 Harrison 1997-01
## 48   3 205 Harrison 1997-01
## 49   3 180 Harrison 1997-01
## 50   2 196 Harrison 1997-01
## 51   2 171 Harrison 1997-01
## 52   2 143 Harrison 1997-01
## 53   1 131 Harrison 1997-01
## 54   1  88 Harrison 1997-01
## 55   1  75 Harrison 1997-01
## 56   0  51 Harrison 1997-01
## 57   0  41 Harrison 1997-01
## 58   0  20 Harrison 1997-01
## 59   7 245 Harrison 1997-01
## 60   7 279 Harrison 1997-01
```

```
## 61   5 245 Harrison 1997-01
```

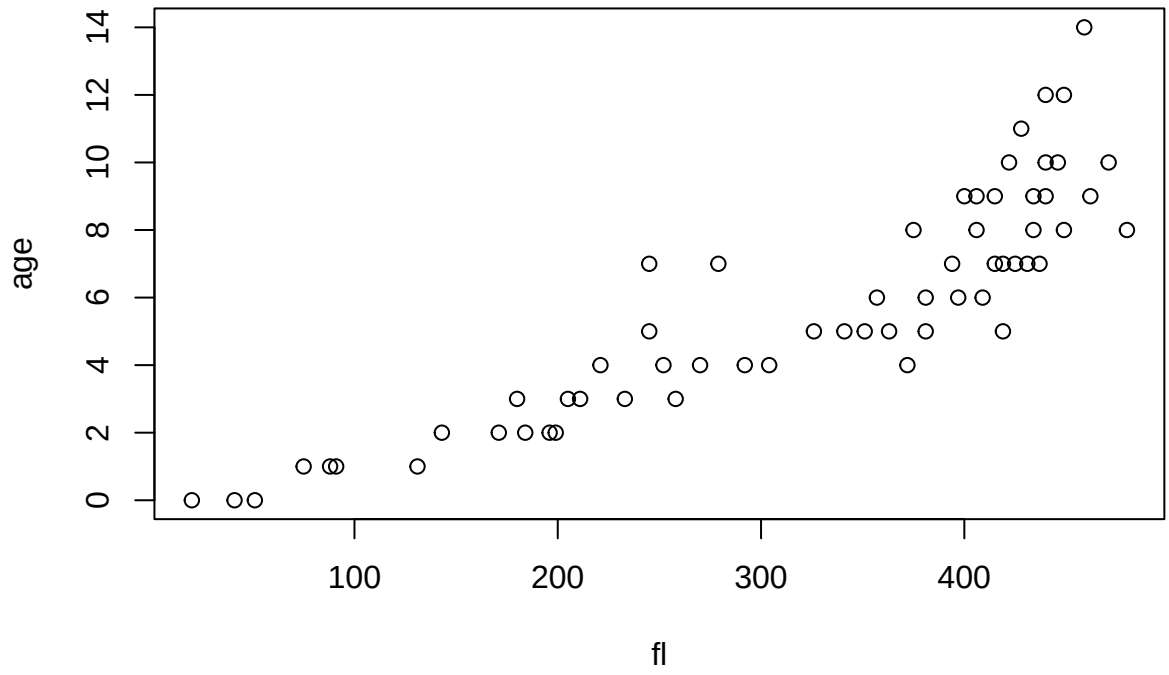
```
#8. Summary of a dataset
summary(Harrisonlake)
```

```
##       age               fl            lake         era
##  Min.   : 0.000   Min.   : 20   Harrison:61   1977-80:23
##  1st Qu.: 3.000   1st Qu.:221   Osprey  : 0   1997-01:38
##  Median : 6.000   Median :372
##  Mean   : 5.754   Mean   :319
##  3rd Qu.: 8.000   3rd Qu.:425
##  Max.   :14.000   Max.   :480
```

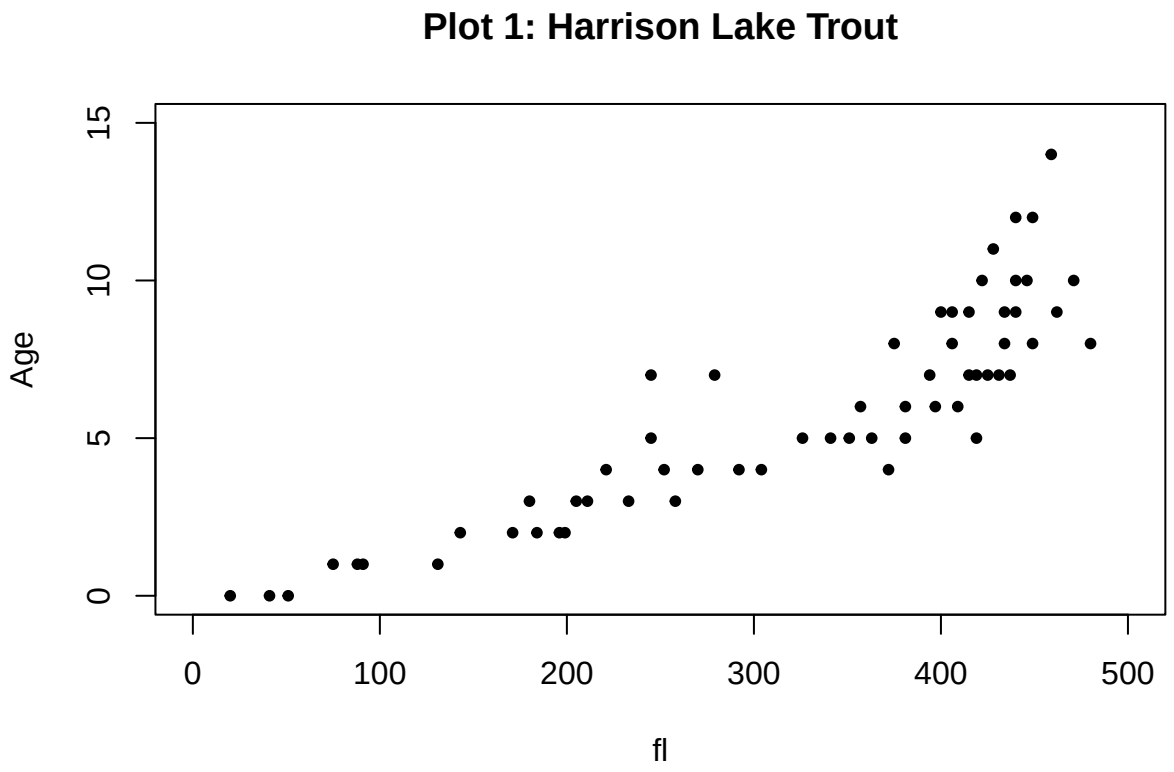
```
#9. Create a scatterplot with specifications
#assign values
fl<-Harrisonlake$fl
age<-Harrisonlake$age
#plot the data
par("mar")
```

```
## [1] 5.1 4.1 4.1 2.1
```

```
par(mar=c(5.1,4.1,4.1,2.1))
plot(age~fl)
```

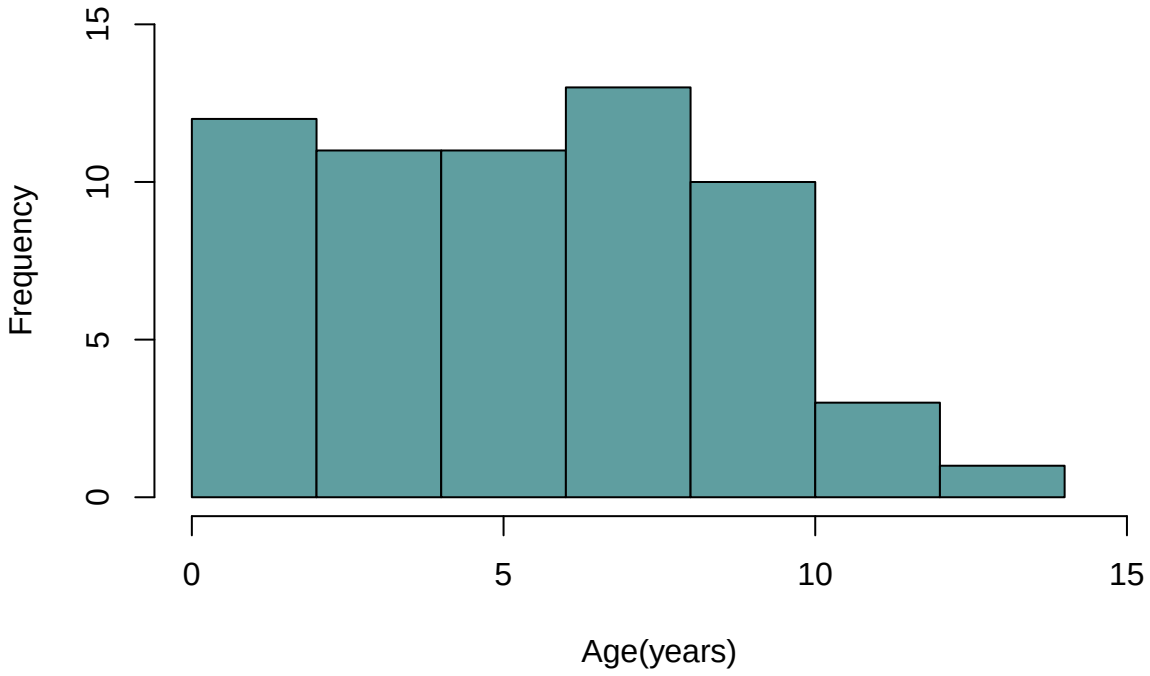


```r
#plot with specifications
plot(age~fl,
     data = Harrisonlake,
     xlim=c(0,500), ylim=c(0,15),
     main="Plot 1: Harrison Lake Trout",
     xlab="fl", ylab="Age",
     pch=20)
```

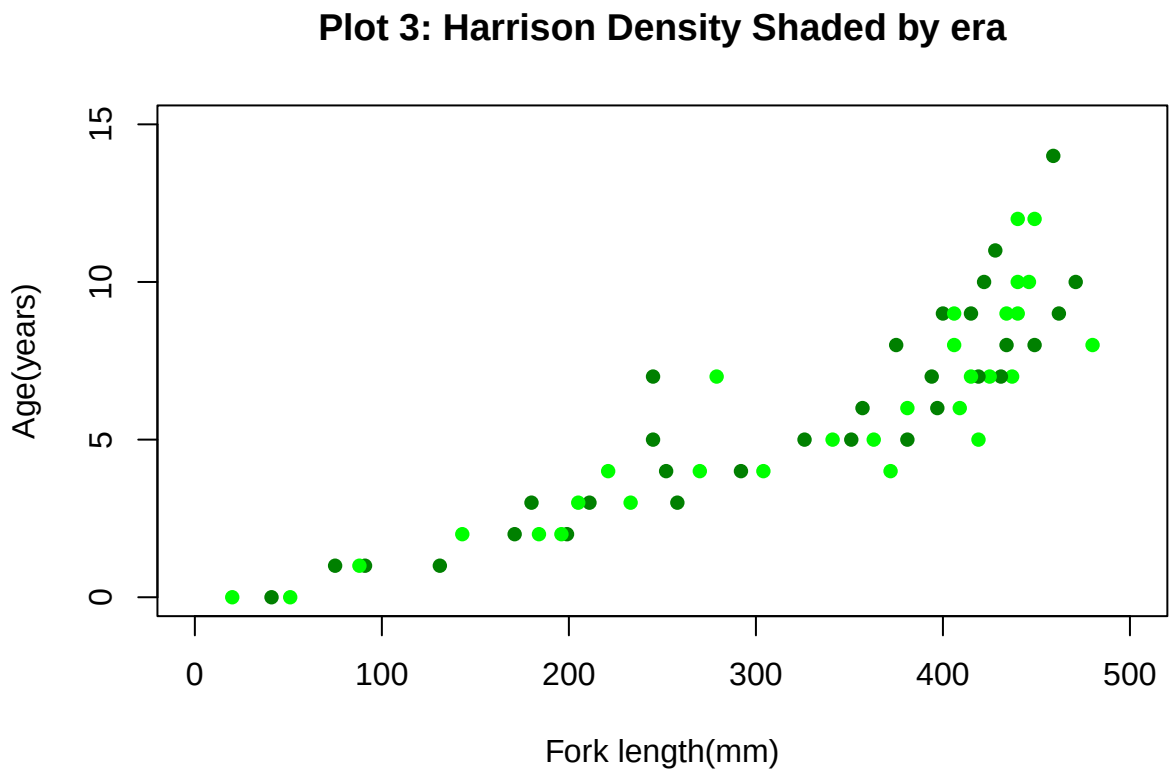



```r
#10. Plot a Histogram
hist(Harrisonlake$age,
     xlab = "Age(years)",
     ylab = "Frequency",
     main = "Plot 2: Harrison Fish Age Distribution",
     xlim=c(0,15),
     ylim=c(0,15),
     col = "cadetblue",
     col.main="cadetblue")
```

Plot 2: Harrison Fish Age Distribution




```
#11. Overdense plot with specifications
plot(age~fl,
     main="Plot 3: Harrison Density Shaded by era",
     ylab = "Age(years)",
     ylim=c(0,15),
     xlab="Fork length(mm)",
     xlim=c(0,500),
     pch = 16,
     col=rgb(0,(1:2)/2,0))
```




```
#12. New object tmp for first and last 3 records
tmp <- headtail(Harrisonlake,3)
tmp
```

```
##    age  fl     lake     era
## 1   14 459 Harrison 1977-80
## 2   12 449 Harrison 1977-80
## 3   10 471 Harrison 1977-80
## 59   7 245 Harrison 1997-01
## 60   7 279 Harrison 1997-01
## 61   5 245 Harrison 1997-01
```

```
#13. Display era column from tmp
tmp$era
```

```
## [1] 1977-80 1977-80 1977-80 1997-01 1997-01 1997-01
## Levels: 1977-80 1997-01
```

```
#14. Create pchs vector
pchs <- c("+","x")
pchs
```

```
## [1] "+" "x"
```

```r
#15. Create cols vector
cols<-c("red", "gray60")
cols
```

```
## [1] "red"    "gray60"
```

```r
#16. Convert era to numeric
tmp$era <- as.numeric(tmp$era)
tmp$era
```

```
## [1] 1 1 1 2 2 2
```

```r
is.numeric(tmp$era)
```

```
## [1] TRUE
```

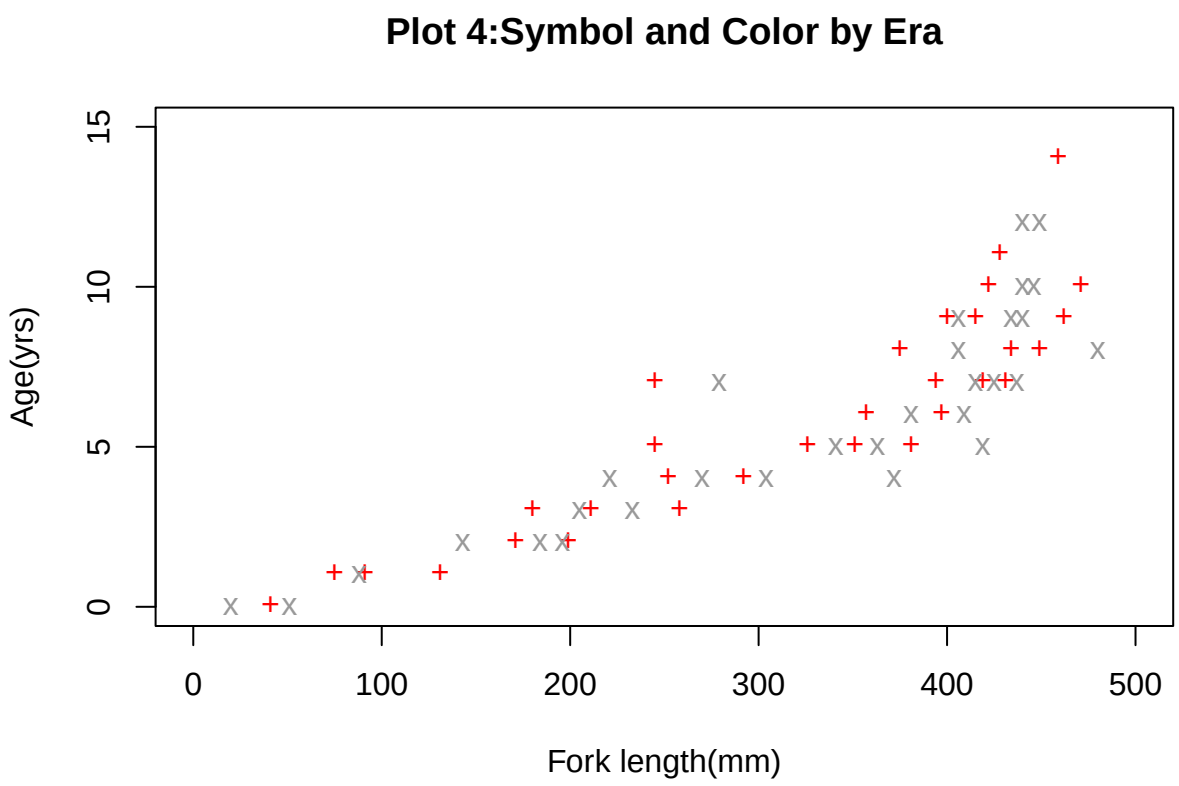
```r
#17. Combine cols vector to tmp era values
cols[tmp$era]
```

```
## [1] "red"    "red"    "red"    "gray60" "gray60" "gray60"
```

```r
#18. Create plot with specifications
par("mar")
```

```
## [1] 5.1 4.1 4.1 2.1
```

```r
par(mar=c(5,4,4,2))
plot(age~fl,
     data = Harrisonlake,
     main="Plot 4:Symbol and Color by Era",
     xlim=c(0,500),
     ylim=c(0,15),
     ylab="Age(yrs)",
     xlab = "Fork length(mm)",
     pch=pchs,
     col=cols)
```

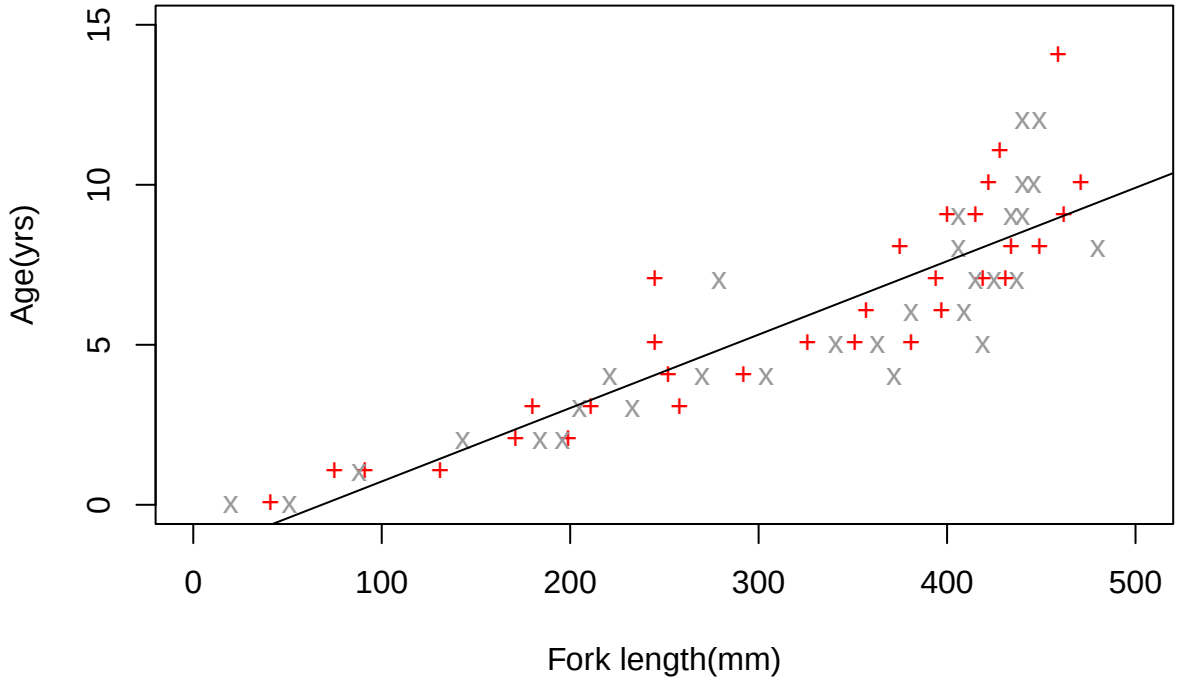



```
#19. Plot regression line
lm(age~fl, data = Harrisonlake)
```

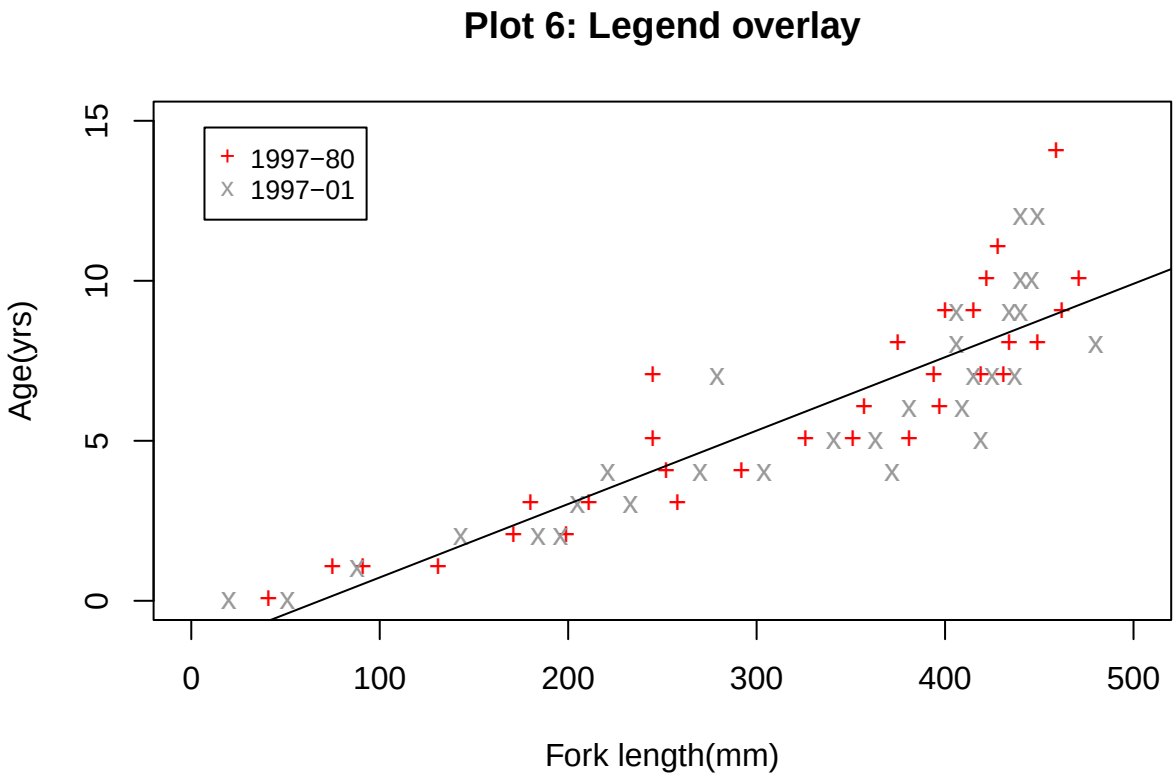
```
##
## Call:
## lm(formula = age ~ fl, data = Harrisonlake)
##
## Coefficients:
## (Intercept)           fl
##    -1.56505      0.02294
```

```
plot(age~fl,
     data = Harrisonlake,
     main="Plot 5: Regression Overlay",
     xlim=c(0,500),
     ylim=c(0,15),
     ylab="Age(yrs)",
     xlab = "Fork length(mm)",
     pch=pchs,
     col=cols)
abline(lm(age~fl, data = Harrisonlake))
```

Plot 5: Regression Overlay




```
#20. Placing a legend
plot(age~fl,
     data = Harrisonlake,
     main="Plot 6: Legend overlay",
     xlim=c(0,500),
     ylim=c(0,15),
     ylab="Age(yrs)",
     xlab = "Fork length(mm)",
     pch=pchs,
     col=cols)
abline(lm(age~fl, data = Harrisonlake))
legend("topleft", inset = 0.05,
       legend = c("1997-80","1997-01"),
       bty = "1",
       cex = 0.8,
       pch = pchs,
       col = cols)
```


Plot 6: Legend overlay
1997−80
1997−01
Age(yrs)
0
5
10
15
0
100
200
300
400
500
Fork length(mm)