

module2.R

Parth

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```
#1. print "Plotting Basics:Lastname"
print("Plotting Basics: Sawant")

## [1] "Plotting Basics: Sawant"

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

#2.Installing and importing required packages
install.packages('FSA')

## Installing package into 'C:/Users/Parth/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\Parth\AppData\Local\Temp\RtmpCga5nf\downloaded_packages

install.packages('FSAdat')

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

## package 'FSAdat' successfully unpacked and MD5 sums checked
##
## The downloaded binary packages are in
## C:\Users\Parth\AppData\Local\Temp\RtmpCga5nf\downloaded_packages

install.packages('magrittr')

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

##
## There is a binary version available but the source version is later:
##      binary source needs_compilation
## magrittr 2.0.1 2.0.2 TRUE
##
## Binaries will be installed
## 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\Parth\Documents\R\win-
library\4.1\00LOCK\magrittr\libs\x64\magrittr.dll
## to C:\Users\Parth\Documents\R\win-
library\4.1\magrittr\libs\x64\magrittr.dll:
## Permission denied

## Warning: restored 'magrittr'

##
## The downloaded binary packages are in
## C:\Users\Parth\AppData\Local\Temp\RtmpCga5nf\downloaded_packages

install.packages('dplyr')

## Installing package into 'C:/Users/Parth/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\Parth\Documents\R\win-library\4.1\00LOCK\dplyr\libs\x64\dplyr.dll
to C:
## \Users\Parth\Documents\R\win-library\4.1\dplyr\libs\x64\dplyr.dll:
Permission
## denied

## Warning: restored 'dplyr'

##
## The downloaded binary packages are in
## C:\Users\Parth\AppData\Local\Temp\RtmpCga5nf\downloaded_packages

install.packages('plotrix')

## Installing package into 'C:/Users/Parth/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\Parth\AppData\Local\Temp\RtmpCga5nf\downloaded_packages

install.packages('ggplot2')

## Installing package into 'C:/Users/Parth/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\Parth\AppData\Local\Temp\RtmpCga5nf\downloaded_packages

install.packages('moments')

## Installing package into 'C:/Users/Parth/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\Parth\AppData\Local\Temp\RtmpCga5nf\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.

library(FSAdata)

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

library(magrittr)
library(dplyr)

##
## Attaching package: 'dplyr'

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

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

library(plotrix)
library(ggplot2)
library(moments)

#3.Loading the data
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
```

```
head(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
```

#4. Print the first and last 3 records from the BullTroutRML2 dataset
head(BullTroutRML2,n=3)

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

tail(BullTroutRML2,n=3)

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

#5.Remove all records except those from Harisson Lake
df <- filter(BullTroutRML2, lake=="Harrison")
df

```
##   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 the first and last 5 records from the filtered BullTroutRML2 Dataset

```
head(df,n=3)
```

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

```
tail(df,n=3)
```

```
##   age  fl    lake    era
## 59  7 245 Harrison 1997-01
## 60  7 279 Harrison 1997-01
## 61  5 245 Harrison 1997-01
```

#7. Display the structure of the filtered BullTroutRML2 Dataset

```
str(df)
```

```
## 'data.frame':    61 obs. of  4 variables:
## $ age : int  14 12 10 10 9 9 9 8 8 7 ...
## $ fl  : int  459 449 471 446 400 440 462 480 449 437 ...
## $ lake: Factor w/ 2 levels "Harrison","Osprey": 1 1 1 1 1 1 1 1 1 1 ...
## $ era : Factor w/ 2 levels "1977-80","1997-01": 1 1 1 1 1 1 1 1 1 1 ...
```

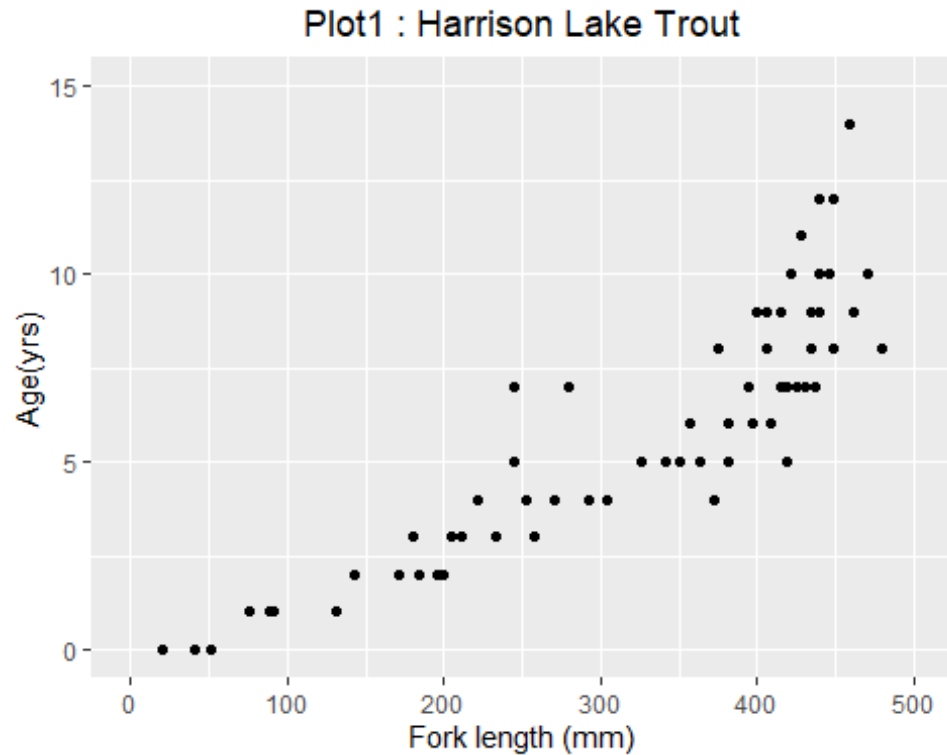
#8. Display the summary of the filtered BullTroutRML2 Dataset
summary(df)

```
##      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 for "age" (y variable) and "fl"(x variable) with the following specifications

```
# limit of x axix is (0,500)
# limit of y axix is (0,15)
# Title of graph is "plot 1: Harrison Lake Trout
# Y axis label is "Age(yrs)"
# X axis label is "Fork length (mm)"
# use a small filled circle for the plotted data points
```

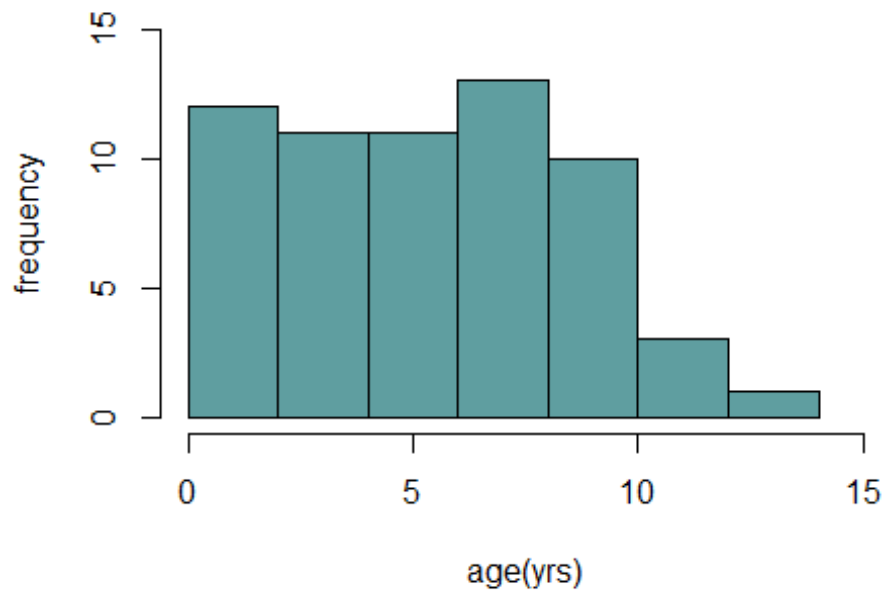
```
scatterplot <- ggplot(df,
aes(x=fl,y=age))+geom_point()+xlim(0,500)+ylim(0,15)+
labs(title="Plot1 : Harrison Lake Trout", x="Fork length (mm)",
y="Age(yrs)")+
theme(plot.title = element_text(hjust=0.5))
scatterplot
```

```
#10. Plot an "Age histogram with the following specifications
# y axis label is "frequency"
# x axis label is "age (yrs)"
# title of the histogram is "plot 2: Harrison Fish Age Distribution"
# X and Y limits is 0,15
# The color of the frequency plots is "cadetblue"
# The color of the title is "cadetblue"
```

```
hist(df$age,xlab = "age(yrs)", 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. create an overdense plot using the same specifications as the previous scatterplot. But,

Title the plot "plot 3:Harrison Density shaded by Era"

y axis label is "Age(yrs)"

y axis limits are 0 to 15

x axis label is "Fork length (mm)"

x axis limits are 0 to 500

include two levels of shading for the "green" data points

plot solid circles as data points

```
f1 <- df$f1
```

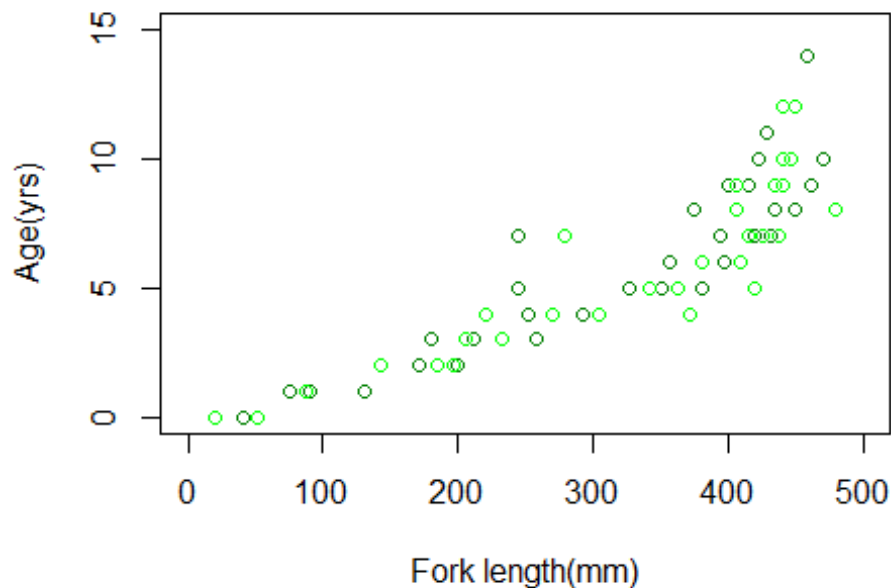
```
age <- df$age
```

```
overdense_plot <- plot(age~f1, main = "plot 3:Harrison Density shaded by Era",
```

```
xlab="Fork length(mm)", ylab="Age(yrs)", xlim=c(0,500), ylim=c(0,15),
```

```
col=rgb(0,(1:2)/2,0))
```

plot 3:Harrison Density shaded by Era



#12. create a new object called "temp" that includes the first 3 and last 3 records of the BulltroutRML2 data set

```
temp <- headtail(BullTroutRML2,n=3)
temp
```

```
##   age  fl   lake   era
## 1   14 459 Harrison 1977-80
## 2   12 449 Harrison 1977-80
## 3   10 471 Harrison 1977-80
## 94    4 298  Osprey 1997-01
## 95    3 279  Osprey 1997-01
## 96    3 273  Osprey 1997-01
```

#13. Display the "era" column (variable) in the new "temp" object
temp\$era

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

#14. create a pchs vector with the argument values for + and x
pchs <- c(3,4)

#15. create a cols vector with the two elements "red" and "gray60"
cols <- c("red","grey60")
cols

```
## [1] "red"      "grey60"

#16. convert the temp era values to numeric values
converted_temp <- as.numeric(temp$era)
converted_temp

## [1] 1 1 1 2 2 2

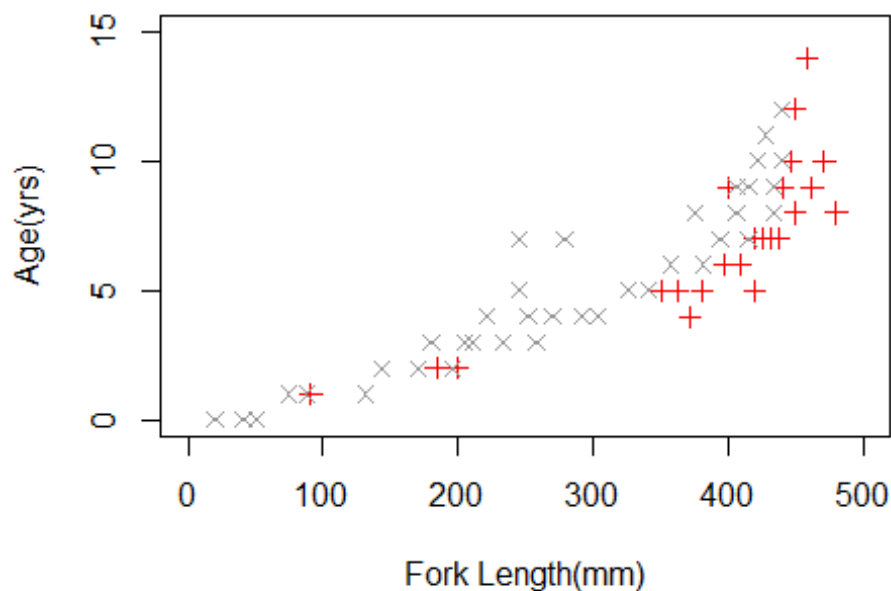
#17. Initialize the cols vector with the temp era values
cols[temp$era]

## [1] "red"      "red"      "red"      "grey60" "grey60" "grey60"

#18. Create a plot of "Age (yrs)" (y variable) versus "Fork Length (mm)" (x
variable) with the following specifications:
# Title of graph is "Plot 4: Symbol & Color by Era"
# Limit of x axis is (0,500)
# Limit of y axis is (0,15)
# X axis label is "Age (yrs)"
# Y axis label is "Fork Length (mm)"
# Set pch equal to pchs era values
# Set col equal to cols era values

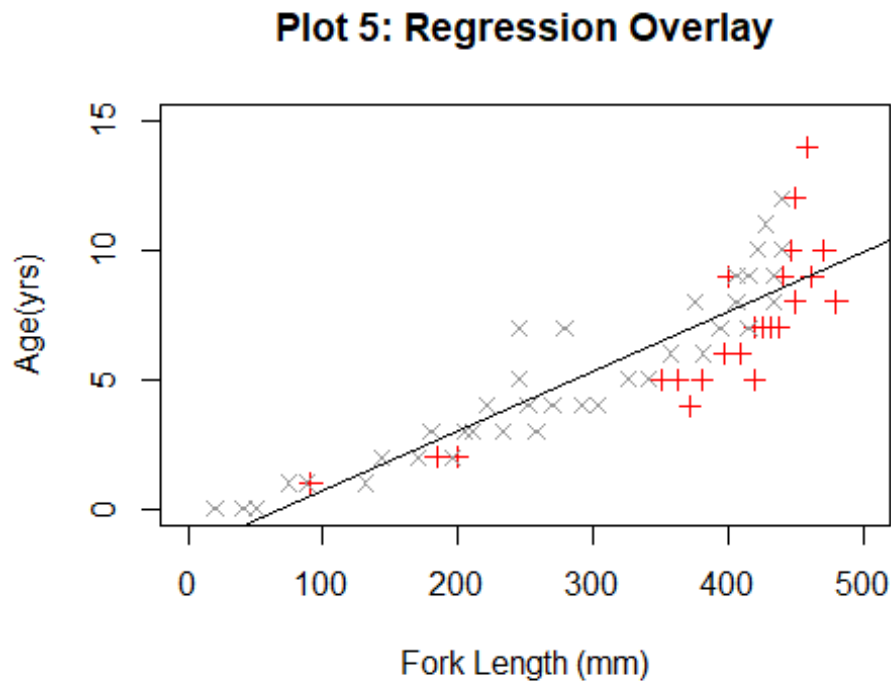
plot(age~fl,data=df, main="Plot 4: Symbol & Color by Era",xlim = c(0,500),
ylim=c(0,15),xlab="Fork Length(mm)", ylab="Age(yrs)",
pch=pchs[df$era], col=cols[df$era])
```

Plot 4: Symbol & Color by Era



#19. Plot a regression line overlay on Plot 4 and title the new graph "Plot 5: Regression Overlay".

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



#20. Place a Legend of on Plot 5 and call the new graph "Plot 6: :Legend Overlay"

```
df$era
```

```
## [1] 1977-80 1977-80 1977-80 1977-80 1977-80 1977-80 1977-80 1977-80 1977-80 1977-80
## [10] 1977-80 1977-80 1977-80 1977-80 1977-80 1977-80 1977-80 1977-80 1977-80 1977-80
## [19] 1977-80 1977-80 1977-80 1977-80 1977-80 1997-01 1997-01 1997-01 1997-01 1997-01
## [28] 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01
## [37] 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01
## [46] 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01
## [55] 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01 1997-01
## Levels: 1977-80 1997-01
```

```

plot(age~fl,data=df, main="Plot 6: Legend Overlay",xlim = c(0,500),
ylim=c(0,15), xlab="Fork Length(mm)", ylab="Age(yrs)",
pch=pchs[df$era], col=cols[df$era])
abline(lm(age~fl,data=df))
legend("topleft", legend=c("1977-80","1997-01"),pch = pchs,col = cols)

```

