Explore ACR

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Contents

Libraries

```
library(lubridate)
```

```
##
## Attaching package: 'lubridate'
```

```
## The following object is masked from 'package:base':
##
##     date
```

Data

Read Data In

The data is a CSV file that is created by saving the ACR tab of the FPA Excel Workbook.

```
ACR.raw <- read.csv(file = "./data/ACR.csv",
                    stringsAsFactors = FALSE)
name <- c("SQA",
          "Application",
          "CRNumber",
          "CRDate",
          "CRApproved",
          "IENumber",
          "IEDate",
          "IEApproved",
          "Reason",
          "Comments")
names(ACR.raw) <- name
rm(name)
ACR <- ACR.raw
```

Format the Data

Convert to Factor

```
ACR$SQA <- as.factor(ACR$SQA)
ACR$Application <- as.factor(ACR$Application)
ACR$CRApproved <- as.factor(ACR$CRApproved)
ACR$IEApproved <- as.factor(ACR$IEApproved)
levels(ACR$IEApproved)[1] <- NA
ACR$Reason <- as.factor(ACR$Reason)
levels(ACR$Reason)[1] <- NA
```

Convert to Dates

```
ACR$CRDate <- as.Date(ACR$CRDate, format = "%d-%b-%y")
ACR$IEDate<- as.Date(ACR$IEDate, format = "%d-%b-%y")
ACR$CRmonth <- lubridate::month(ACR$CRDate, label = TRUE)
ACR$CRyear <- lubridate::year(ACR$CRDate)
ACR$IEmonth <- lubridate::month(ACR$IEDate, label = TRUE)
ACR$IEyear <- lubridate::year(ACR$IEDate)
```

Structure of The Data

```
str(ACR)
```

```
## 'data.frame':    118 obs. of  14 variables:
##  $ SQA        : Factor w/ 4 levels "Beilah","Liz",..: 1 1 1 1 2 2 2 2 4 4 ...
##  $ Application: Factor w/ 11 levels "AFMS","ALMS",..: 9 11 11 9 5 5 5 7 2 2 ...
##  $ CRNumber   : chr  "18-33882" "18-34518" "18-36023" "18-38261" ...
##  $ CRDate     : Date, format: "2018-10-12" "2018-10-17" ...
##  $ CRApproved : Factor w/ 4 levels "","A","A-FP",..: 3 3 3 3 3 3 3 3 1 1 ...
##  $ IENumber   : chr  "18-33882" "" "" "" ...
##  $ IEDate     : Date, format: "2018-11-07" NA ...
##  $ IEApproved : Factor w/ 3 levels "A","A-FP","D": 2 NA NA NA NA NA NA NA 2 3 ...
##  $ Reason     : Factor w/ 3 levels "Inaccurate information",..: NA NA NA NA NA NA NA NA NA 1 ...
##  $ Comments   : chr  "" "" "" "" ...
##  $ CRmonth    : Ord.factor w/ 12 levels "Jan"<"Feb"<"Mar"<..: 10 10 10 11 11 11 11 11 10 10 ...
```

```
##  $ CRyear     : num  2018 2018 2018 2018 2018 ...
##  $ IEmonth    : Ord.factor w/ 12 levels "Jan"<"Feb"<"Mar"<..: 11 NA NA NA NA NA NA NA 10 10 ...
##  $ IEyear     : num  2018 NA NA NA NA ...
```

Metrics

Select Data

Data is selected first for the Month and Year of interest. The selection is based on boththe CR and I&E dates. This seleletion is used as a master dataframe. Two additional dataframes are prduced the first of the approval of the CR inthe month and the second for the approval of the I&E in the month.

```
#create master dataframe
work <- subset(ACR,
               subset = (CRmonth == "Nov" & CRyear == 2018) |
                    (subset = IEmonth == "Nov" & IEyear == 2018))
# Create the CR data fram
workCR <- subset(ACR,
               subset = CRmonth == "Nov" & CRyear == 2018)
# create the IE data frame.
workIE <- subset(ACR,
               subset = IEmonth == "Nov" & IEyear == 2018)
```

Counts

Data Changes (CR) Request Approved

```
nrow(subset(workCR,
            subset = (CRApproved == "A" | CRApproved == "A-FP")))
```

```
## [1] 50
```

Data Change Request Disapproved

```
nrow(subset(workCR,
            subset = (CRApproved == "D")))
```

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

Implementation and Effectivity (IE) Approved

```
nrow(subset(workIE,
            subset = (IEApproved == "A" | IEApproved == "A-FP")))
```

```
## [1] 20
```

IE Disapproved

```
nrow(subset(workIE,
            subset = (CRApproved == "D")))
```

```
## [1] 0
```

First pass acceptance

CR

```
nrow(subset(workCR,
            subset = CRApproved == "A-FP")) /
     nrow(workCR) * 100
```

```
## [1] 84.61538
```

IE

```
nrow(subset(workIE,
            subset = IEApproved == "A-FP")) /
     nrow(workIE) * 100
```

```
## [1] 85.71429
```

Total Process

This is the number of data changes that had both the CR and IE approved on first pass.

```
nrow(subset(work,
            subset = (CRApproved == "A-FP" & IEApproved == "A-FP"))) /
     nrow(work) * 100
```

```
## [1] 40.67797
```

Number by Application

Opened

```
table(subset(workCR,
             subset = CRApproved != "D")$Application)
```

```
##
##            AFMS            ALMS         CMSNext         DaVinci
##               1              11              28               0
##        eNovator        GDSN/GS1              iQ Metrics Library
##               5               0               1               3
##            PEAR             QPI           RSLMS
##               1               0               0
```

```
table(subset(workCR,
             subset = CRApproved != "D")$SQA)
```

```
##
## Beilah    Liz   Nick Suresh
##      1      4     34     11
```

Completed

```
table(subset(workIE,
             subset = IEApproved != "D")$Application)
```

```
##
##            AFMS            ALMS         CMSNext         DaVinci
```

```
##               0              11               5               0
##        eNovator        GDSN/GS1              iQ Metrics Library
##               0               0               0               3
##            PEAR             QPI           RSLMS
##               1               0               0
```

```
table(subset(workIE,
             subset = IEApproved != "D")$SQA)
```

```
##
## Beilah    Liz   Nick Suresh
##      1      0      8     11
```

Total

```
table(subset(workCR,
             subset = CRApproved != "D")$Application) +
     table(subset(workIE,
             subset = IEApproved != "D")$Application)
```

```
##
##             AFMS             ALMS         CMSNext         DaVinci
##                1               22              33               0
##        eNovator        GDSN/GS1              iQ Metrics Library
##                5               0               1               6
##            PEAR             QPI           RSLMS
##                2               0               0
```

```
table(subset(workCR,
             subset = CRApproved != "D")$SQA) +
     table(subset(workIE,
             subset = CRApproved != "D")$SQA)
```

```
##
## Beilah    Liz   Nick Suresh
##      2      4     43     22
```

Time to Complete A Data Change

This is the interval between CR approval and IE approval

```
# select records that have been approved (both CR adn IE)
work.all <- subset(ACR,
                   subset = ((CRApproved == "A" | CRApproved == "A-FP") &
                                (IEApproved == "A" | IEApproved == "A-FP")))
# now further select records from above that were completed in the correct month
work.all <- subset(work.all,
                   subset = (IEmonth == "Nov" & IEyear == 2018))
# compute interval
work.all$Interval <- as.numeric(work.all$IEDate - work.all$CRDate)
# results
nrow(work.all)
```

```
## [1] 20
```

```
summary(work.all$Interval)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    1.00    3.75   11.00   13.85   15.25   78.00
```

```
sd(work.all$Interval)
```

```
## [1] 16.77804
```

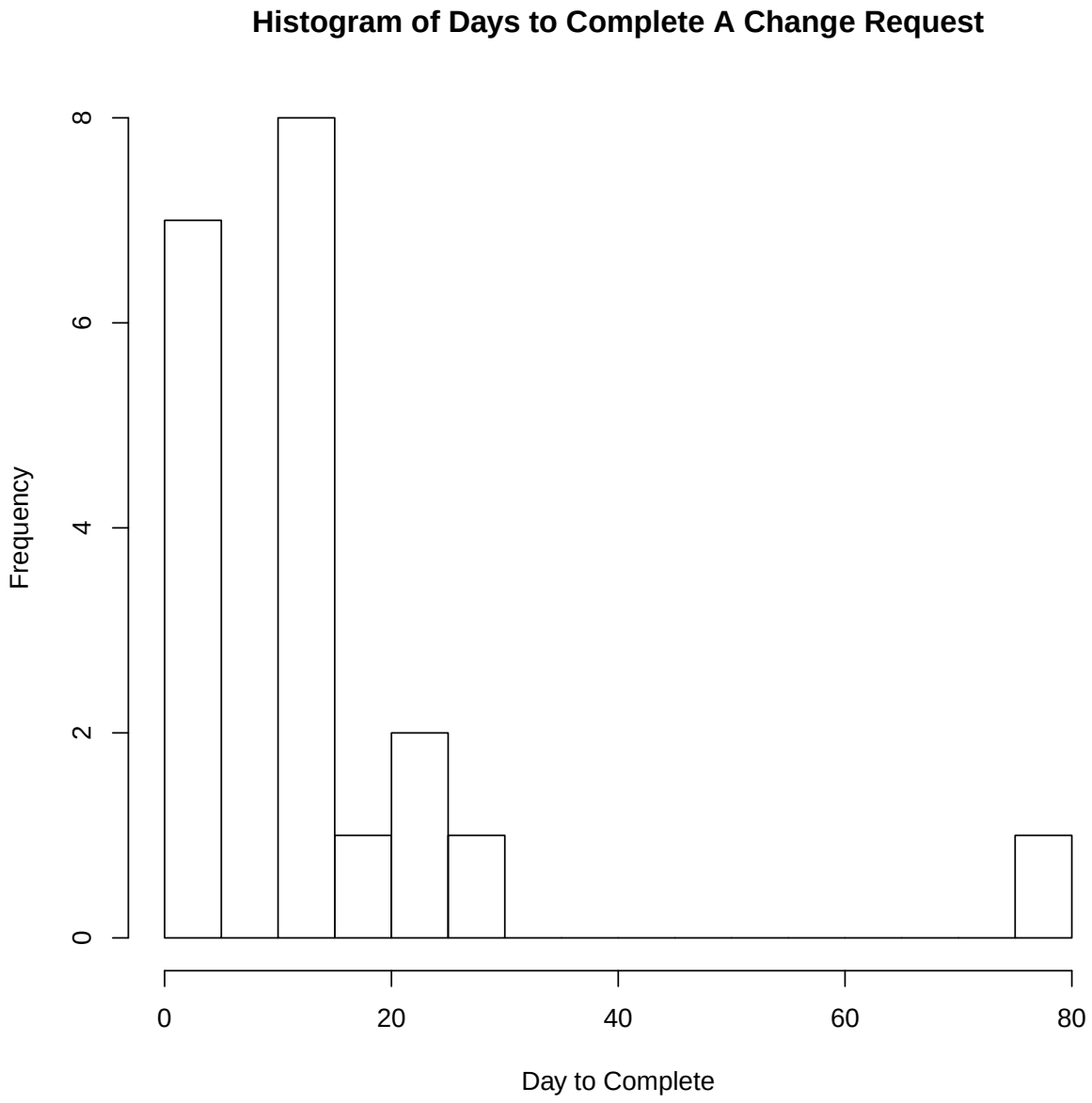
```
table(work.all$Interval)
```

```
##
##  1  3  4 11 12 13 15 16 21 22 26 78
##  3  2  2  4  1  2  1  1  1  1  1  1
```

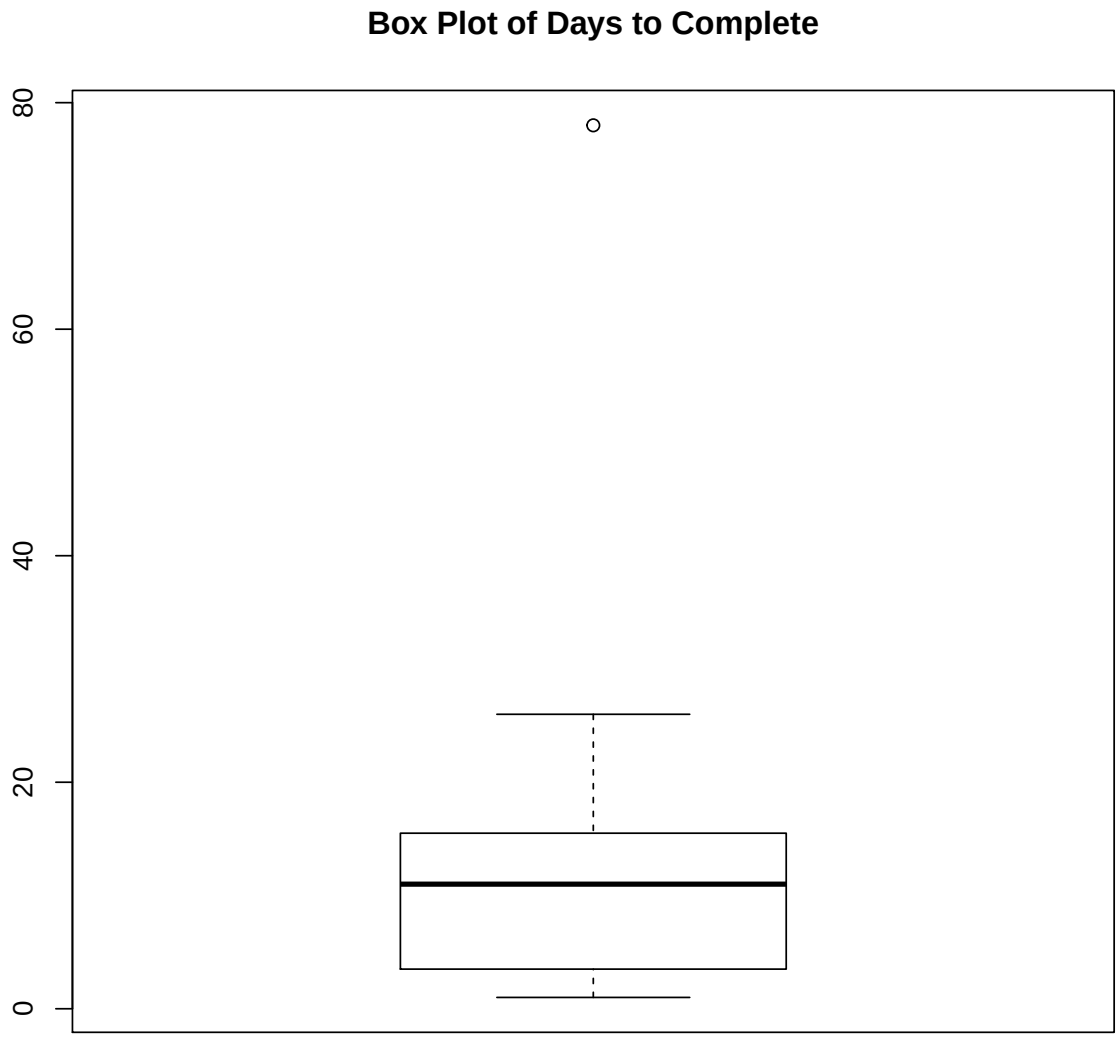
```
quantile(work.all$Interval)
```

```
##    0%   25%   50%   75%  100%
##  1.00  3.75 11.00 15.25 78.00
```

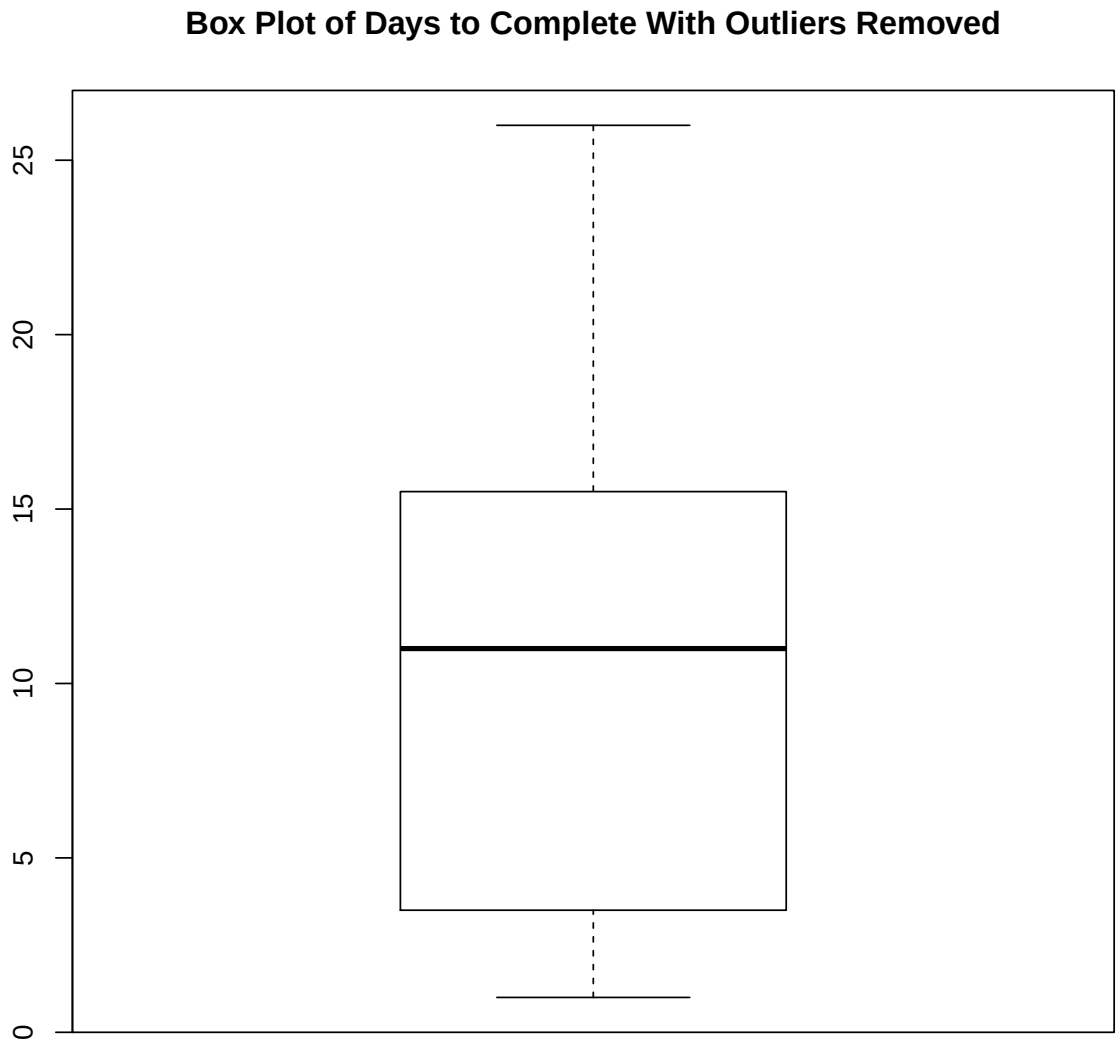
```
hist(work.all$Interval,
     breaks = 20,
     main = "Histogram of Days to Complete A Change Request",
     xlab = "Day to Complete")
```




```
boxplot(work.all$Interval,
        main = "Box Plot of Days to Complete")
```




```
boxplot(work.all$Interval,
        main = "Box Plot of Days to Complete With Outliers Removed",
        outline = FALSE)
```



Number of Days That Currently Open CR Have Been Pending

```
# selected records that have approved CR but no IE
work.open <- subset(ACR,
                    subset = (CRApproved == "A-FP" | CRApproved == "A") &
                         is.na(IEApproved))
# compute days open
work.open$daysOpen <- as.numeric(as.Date("1-Dec-18", format = "%d-%b-%y") -
                                      work.open$CRDate)
# Results
nrow(work.open)
```

```
## [1] 35
```

```r
summary(work.open$daysOpen)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    2.00    4.00   15.00   25.31   29.00  127.00
```

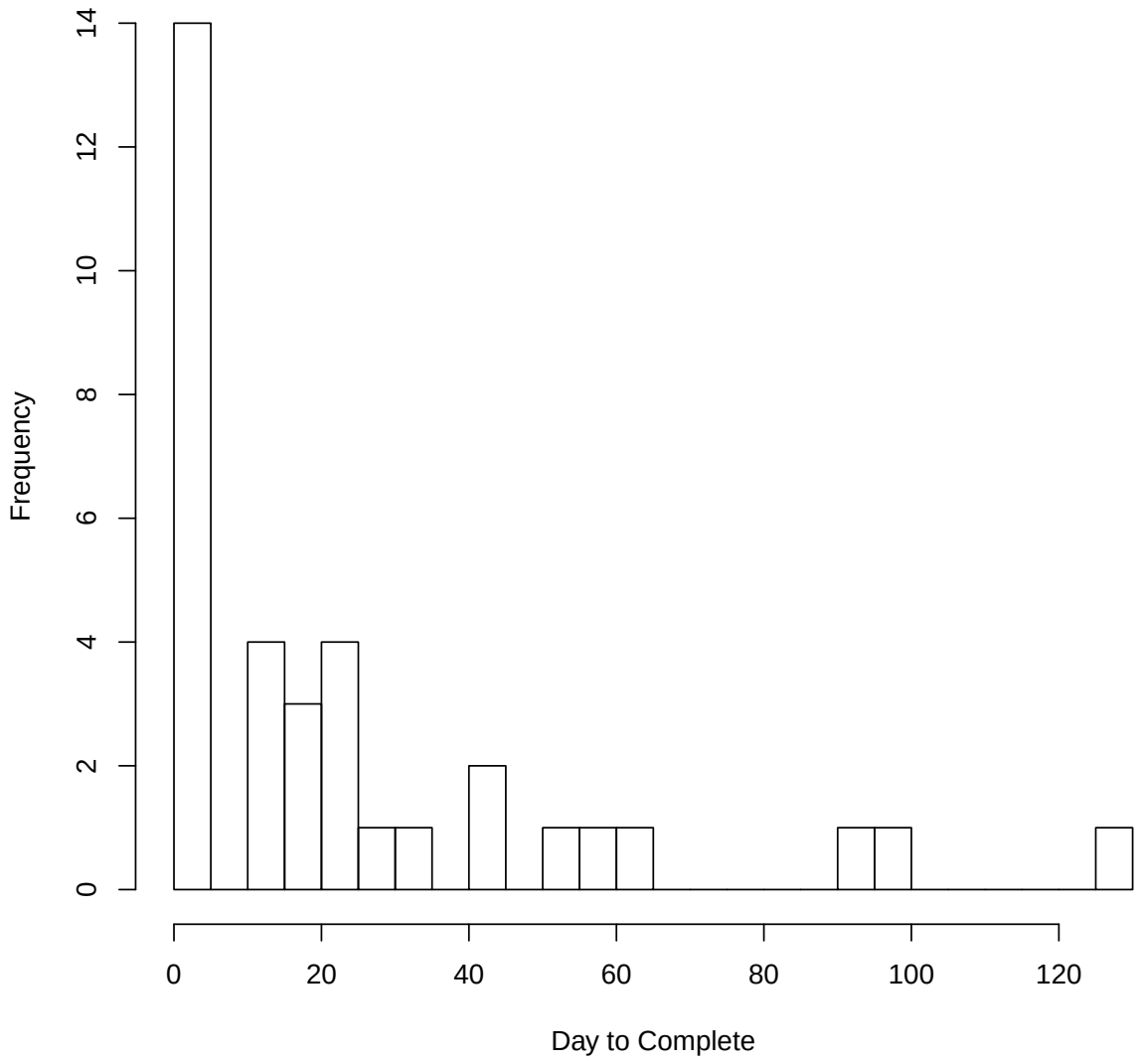
```r
sd(work.open$daysOpen)
```

```
## [1] 30.44839
```

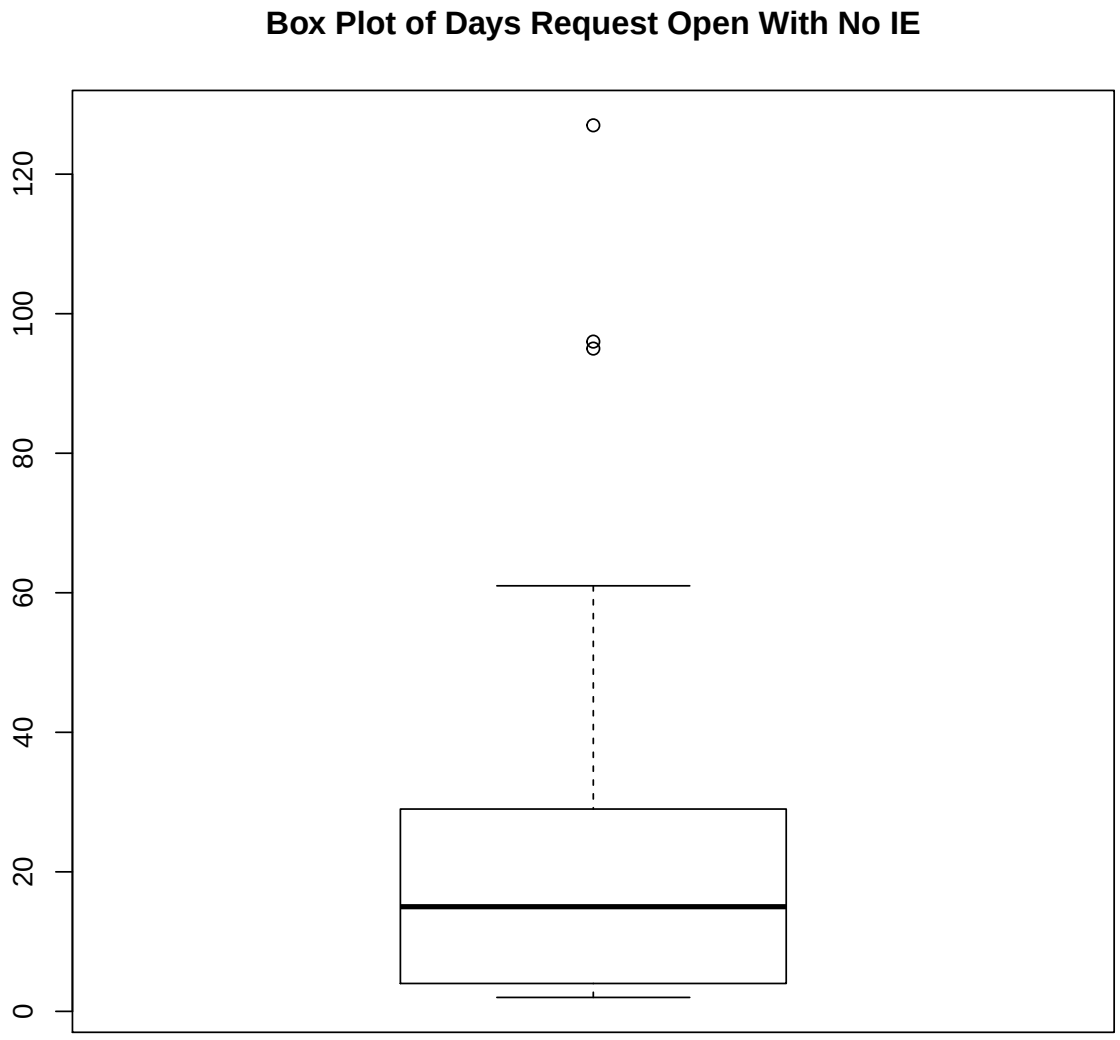
```r
quantile(work.open$daysOpen)
```

```
##   0%  25%  50%  75% 100%
##    2    4   15   29  127
```

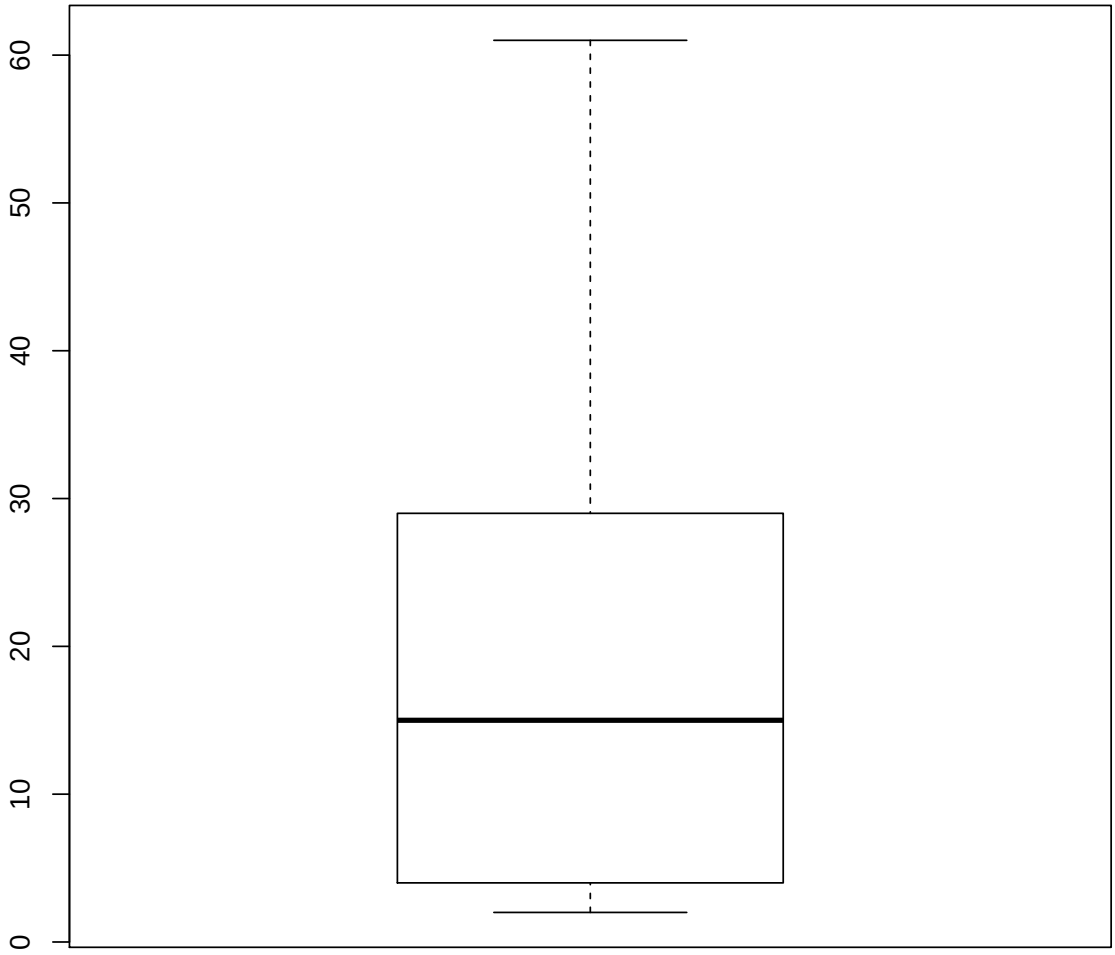
```r
hist(work.open$daysOpen,
     breaks = 20,
     main = "Histogram of Days Request Open With No IE",
     xlab = "Day to Complete")
```




```
boxplot(work.open$daysOpen,
        main = "Box Plot of Days Request Open With No IE")
```




```
boxplot(work.open$daysOpen,
        main = "Box Plot of Days Request Open With No IE With Outliers Removed",
        outline = FALSE)
```


Box Plot of Days Request Open With No IE With Outliers Removed
0
10
20
30
40
50
60