HW4_Lian_Jiayi

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September 20, 2019

P4

Use pip lines to make your code easily understanded. Use explicit returns. Naming vars by connected words. Naming private functions by starting with a dot. File names should end in '.R'. Place spaces around all infix operaters. Limit the number of words in one line.

P5

```
lint(filename = "C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd")
```

```
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:27:1: style: lines should
## url_sensory <- "http://www2.isye.gatech.edu/~jeffwu/wuhamadabook/data/Sensory.dat"
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:28:1: style: lines should
## url_gold <- "http://www2.isye.gatech.edu/~jeffwu/wuhamadabook/data/LongJumpData.dat"
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:29:1: style: lines should
## url_brain <- "http://www2.isye.gatech.edu/~jeffwu/wuhamadabook/data/BrainandBodyWeight.dat"
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:34:1: style: lines should
## Sensory <-read.table(url_sensory, header=F, skip=1, fill=T, stringsAsFactors = F)
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:34:9: style: Put spaces ar
## Sensory <-read.table(url_sensory, header=F, skip=1, fill=T, stringsAsFactors = F)
##         ^~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:34:41: style: Put spaces a
## Sensory <-read.table(url_sensory, header=F, skip=1, fill=T, stringsAsFactors = F)
##                                         ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:34:49: style: Put spaces a
## Sensory <-read.table(url_sensory, header=F, skip=1, fill=T, stringsAsFactors = F)
##                                                 ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:34:57: style: Put spaces a
## Sensory <-read.table(url_sensory, header=F, skip=1, fill=T, stringsAsFactors = F)
##                                                         ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:39:32: style: Put spaces a
##                     rename(Item=V1, V1=V2, V2=V3, V3=V4, V4=V5, V5=V6)
##                                   ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:39:39: style: Put spaces a
##                     rename(Item=V1, V1=V2, V2=V3, V3=V4, V4=V5, V5=V6)
##                                         ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:39:46: style: Put spaces a
##                     rename(Item=V1, V1=V2, V2=V3, V3=V4, V4=V5, V5=V6)
##                                               ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:39:53: style: Put spaces a
##                     rename(Item=V1, V1=V2, V2=V3, V3=V4, V4=V5, V5=V6)
##                                                     ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:39:60: style: Put spaces a
```

```
##                     rename(Item=V1, V1=V2, V2=V3, V3=V4, V4=V5, V5=V6)
##                                                          ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:39:67: style: Put spaces a
##                     rename(Item=V1, V1=V2, V2=V3, V3=V4, V4=V5, V5=V6)
##                                                               ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:41:32: style: Put spaces a
##                     mutate(Item=rep(as.character(1:10), each=2)) %>%
##                                ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:41:61: style: Put spaces a
##                     mutate(Item=rep(as.character(1:10), each=2)) %>%
##                                                             ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:42:30: style: Put spaces a
##                     mutate(V1=as.numeric(V1)) %>%
##                              ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:43:43: style: Trailing whi
##                     select(c(Item, V1:V5))
##                                           ^
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:44:44: style: Trailing whi
## Sen_final <- Sen_2_a %>% full_join(Sen_2_b)
##                                            ^
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:53:57: style: Put spaces a
## gold <- read.table(url_gold, header =  F, skip = 1, fill=T)
##                                                         ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:55:1: style: lines should
## gold_a <- gold %>% select(c(V1, V2)) %>% mutate(Year = V1+1900, Performance = V2) %>% select(c(Year,
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:55:58: style: Put spaces a
## gold_a <- gold %>% select(c(V1, V2)) %>% mutate(Year = V1+1900, Performance = V2) %>% select(c(Year,
##                                                           ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:55:101: style: Commas shou
## gold_a <- gold %>% select(c(V1, V2)) %>% mutate(Year = V1+1900, Performance = V2) %>% select(c(Year,
##                                                                                                     ^
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:56:1: style: lines should
## gold_b <- gold %>% select(c(V3, V4)) %>% mutate(Year = V3+1900, Performance = V4) %>% select(c(Year,
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:56:58: style: Put spaces a
## gold_b <- gold %>% select(c(V3, V4)) %>% mutate(Year = V3+1900, Performance = V4) %>% select(c(Year,
##                                                           ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:56:101: style: Commas shou
## gold_b <- gold %>% select(c(V3, V4)) %>% mutate(Year = V3+1900, Performance = V4) %>% select(c(Year,
##                                                                                                     ^
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:57:1: style: lines should
## gold_c <- gold %>% select(c(V5, V6)) %>% mutate(Year = V5+1900, Performance = V6) %>% select(c(Year,
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:57:58: style: Put spaces a
## gold_c <- gold %>% select(c(V5, V6)) %>% mutate(Year = V5+1900, Performance = V6) %>% select(c(Year,
##                                                           ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:57:101: style: Commas shou
## gold_c <- gold %>% select(c(V5, V6)) %>% mutate(Year = V5+1900, Performance = V6) %>% select(c(Year,
##                                                                                                     ^
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:58:1: style: lines should
## gold_d <- gold %>% select(c(V7, V8)) %>% mutate(Year = V7+1900, Performance=V8) %>% select(c(Year, Pe
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:58:58: style: Put spaces a
```

```
## gold_d <- gold %>% select(c(V7, V8)) %>% mutate(Year = V7+1900, Performance=V8) %>% select(c(Year, Pe
##                                                    ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:58:76: style: Put spaces a
## gold_d <- gold %>% select(c(V7, V8)) %>% mutate(Year = V7+1900, Performance=V8) %>% select(c(Year, Pe
##                                                                                ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:59:1: style: lines should
## gold_final <- gold_a %>% full_join(gold_b) %>% full_join(gold_c) %>% full_join(gold_d)
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:68:31: style: Commas shoul
## brain <- read.table(url_brain,header = F, skip = 1,fill = T)
##                                ^
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:68:52: style: Commas shoul
## brain <- read.table(url_brain,header = F, skip = 1,fill = T)
##                                                    ^
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:70:1: style: lines should
## brain_a <- brain %>% select(V1, V2) %>% mutate(Brain_weight=V1, Body_weight=V2) %>% select(Brain_weig
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:70:60: style: Put spaces a
## brain_a <- brain %>% select(V1, V2) %>% mutate(Brain_weight=V1, Body_weight=V2) %>% select(Brain_weig
##                                                             ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:70:76: style: Put spaces a
## brain_a <- brain %>% select(V1, V2) %>% mutate(Brain_weight=V1, Body_weight=V2) %>% select(Brain_weig
##                                                                            ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:71:1: style: lines should
## brain_b <- brain %>% select(V3, V4) %>% mutate(Brain_weight=V3, Body_weight=V4) %>% select(Brain_weig
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:71:60: style: Put spaces a
## brain_b <- brain %>% select(V3, V4) %>% mutate(Brain_weight=V3, Body_weight=V4) %>% select(Brain_weig
##                                                             ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:71:76: style: Put spaces a
## brain_b <- brain %>% select(V3, V4) %>% mutate(Brain_weight=V3, Body_weight=V4) %>% select(Brain_weig
##                                                                            ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:72:1: style: lines should
## brain_c<-brain %>% select(V5, V6) %>% mutate(Brain_weight=V5, Body_weight=V6) %>% select(Brain_weigh
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:72:8: style: Put spaces ar
## brain_c<-brain %>% select(V5, V6) %>% mutate(Brain_weight=V5, Body_weight=V6) %>% select(Brain_weigh
##       ~^~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:72:58: style: Put spaces a
## brain_c<-brain %>% select(V5, V6) %>% mutate(Brain_weight=V5, Body_weight=V6) %>% select(Brain_weigh
##                                                             ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:72:74: style: Put spaces a
## brain_c<-brain %>% select(V5, V6) %>% mutate(Brain_weight=V5, Body_weight=V6) %>% select(Brain_weigh
##                                                                            ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:81:1: style: lines should
## tomato <- read.table(url_tomato,fill=T, skip=1, header = F, stringsAsFactors = F, comment.char="*")
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:81:33: style: Commas shoul
## tomato <- read.table(url_tomato,fill=T, skip=1, header = F, stringsAsFactors = F, comment.char="*")
##                                 ^
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:81:37: style: Put spaces a
## tomato <- read.table(url_tomato,fill=T, skip=1, header = F, stringsAsFactors = F, comment.char="*")
##                                     ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:81:45: style: Put spaces a
```

```
## tomato <- read.table(url_tomato,fill=T, skip=1, header = F, stringsAsFactors = F, comment.char="*")
##                                          ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:81:95: style: Put spaces a
## tomato <- read.table(url_tomato,fill=T, skip=1, header = F, stringsAsFactors = F, comment.char="*")
##                                                                                               ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:85:1: style: lines should
## t_meas <- t_meas %>% mutate(V2 = as.character(V2), S_20000 = as.character(V2), V3 = as.character(V3))
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:85:121: style: Put spaces
## t_meas <- t_meas %>% mutate(V2 = as.character(V2), S_20000 = as.character(V2), V3 = as.character(V3))
##
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:86:1: style: lines should
## t_meas <- t_meas %>% separate(V2, into = c('first_10000', 'Second_10000', "Thrid_10000"), sep=",", ex
## ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:86:44: style: Only use dou
## t_meas <- t_meas %>% separate(V2, into = c('first_10000', 'Second_10000', "Thrid_10000"), sep=",", ex
##                                            ^~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:86:59: style: Only use dou
## t_meas <- t_meas %>% separate(V2, into = c('first_10000', 'Second_10000', "Thrid_10000"), sep=",", ex
##                                                           ^~~~~~~~~~~~~~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:86:94: style: Put spaces a
## t_meas <- t_meas %>% separate(V2, into = c('first_10000', 'Second_10000', "Thrid_10000"), sep=",", ex
##                                                                                              ~^~
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:86:108: style: Only use do
## t_meas <- t_meas %>% separate(V2, into = c('first_10000', 'Second_10000', "Thrid_10000"), sep=",", ex
##
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:86:154: style: Only use do
## t_meas <- t_meas %>% separate(V2, into = c('first_10000', 'Second_10000', "Thrid_10000"), sep=",", ex
##
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:86:169: style: Only use do
## t_meas <- t_meas %>% separate(V2, into = c('first_10000', 'Second_10000', "Thrid_10000"), sep=",", ex
##
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:86:204: style: Put spaces
## t_meas <- t_meas %>% separate(V2, into = c('first_10000', 'Second_10000', "Thrid_10000"), sep=",", ex
##
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:86:218: style: Only use do
## t_meas <- t_meas %>% separate(V2, into = c('first_10000', 'Second_10000', "Thrid_10000"), sep=",", ex
##
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:86:264: style: Only use do
## t_meas <- t_meas %>% separate(V2, into = c('first_10000', 'Second_10000', "Thrid_10000"), sep=",", ex
##
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:86:279: style: Only use do
## t_meas <- t_meas %>% separate(V2, into = c('first_10000', 'Second_10000', "Thrid_10000"), sep=",", ex
##
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:86:314: style: Put spaces
## t_meas <- t_meas %>% separate(V2, into = c('first_10000', 'Second_10000', "Thrid_10000"), sep=",", ex
##
## C:/Users/lianjiayi/Documents/STAT_5014_2019_-906275604-/HW3_Lian_Jiayi.Rmd:86:328: style: Only use do
## t_meas <- t_meas %>% separate(V2, into = c('first_10000', 'Second_10000', "Thrid_10000"), sep=",", ex
##
```

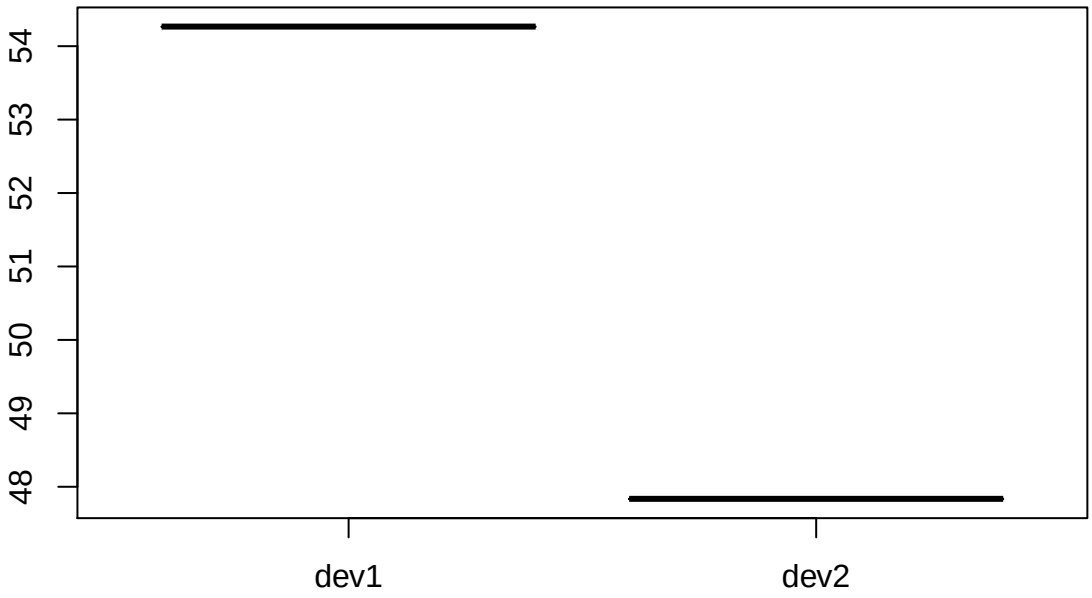
put spaces around all infix operators only yse double qy=uotes commas should always have a space after
lines should not be more than 80 characters

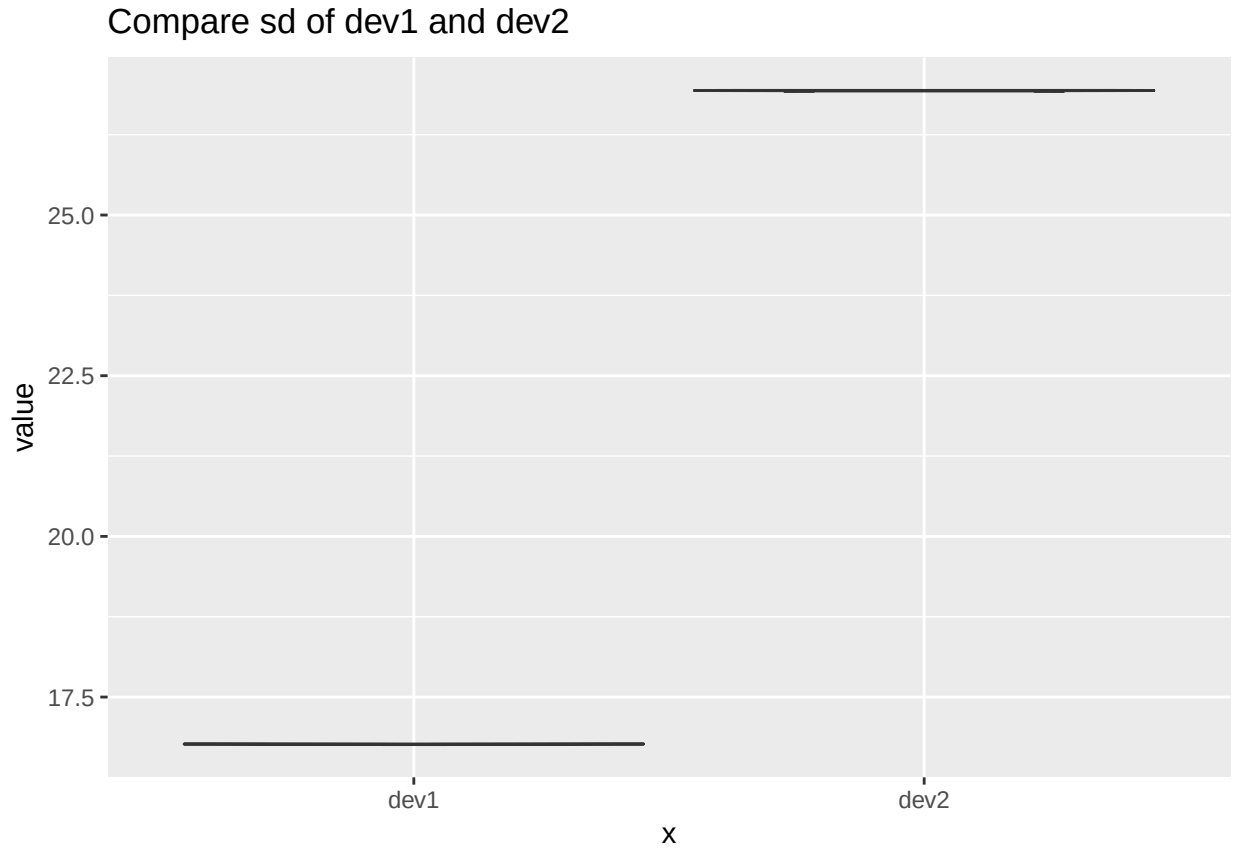
P6

```
device <- readRDS(file = "C:/Users/lianjiayi/Downloads/HW4_data.rds")
device %>% group_by(Observer) %>% mutate(dev1_mean = mean(dev1))
```

```
## # A tibble: 1,846 x 4
## # Groups:   Observer [13]
##    Observer  dev1  dev2 dev1_mean
##       <dbl> <dbl> <dbl>     <dbl>
##  1        4  55.4  97.2      54.3
##  2        4  51.5  96.0      54.3
##  3        4  46.2  94.5      54.3
##  4        4  42.8  91.4      54.3
##  5        4  40.8  88.3      54.3
##  6        4  38.7  84.9      54.3
##  7        4  35.6  79.9      54.3
##  8        4  33.1  77.6      54.3
##  9        4  29.0  74.5      54.3
## 10        4  26.2  71.4      54.3
## # ... with 1,836 more rows
```

```
# function plot single boxplot and violin plot
stat_device<-function(rd)
{
  level <- as.numeric(levels(factor(rd$Observer)))
  observer = rep(0,length(level))
  mean_dev1 = rep(0,length(level))
  mean_dev2 = rep(0,length(level))
  sd_dev1 = rep(0,length(level))
  sd_dev2 = rep(0,length(level))
  cor_dev = rep(0,length(level))
  for (i in 1:length(level)) {
    observer[i] = level[i]
    mean_dev1[i] = mean(rd$dev1[rd$Observer == level[i]])
    mean_dev2[i] = mean(rd$dev2[rd$Observer == level[i]])
    sd_dev1[i] = sd(rd$dev1[rd$Observer == level[i]])
    sd_dev2[i] = sd(rd$dev2[rd$Observer == level[i]])
    cor_dev[i] = cor(rd$dev2[rd$Observer == level[i]], rd$dev1[rd$Observer == level[i]])
  }
  stat <- data.frame(observer=as.factor(level), mean_dev1=mean_dev1, mean_dev2=mean_dev2, sd_dev1=sd_dev
    boxplot(stat$mean_dev1,stat$mean_dev2, names = c('dev1',"dev2"), main='compare means of dev1 and dev
    p <- stat %>% ggplot() + geom_violin(aes(x="dev1", y=sd_dev1),fill= 'red') + geom_violin(aes(x="dev1
    print(p)
  stat
}
stat_device(device)
```

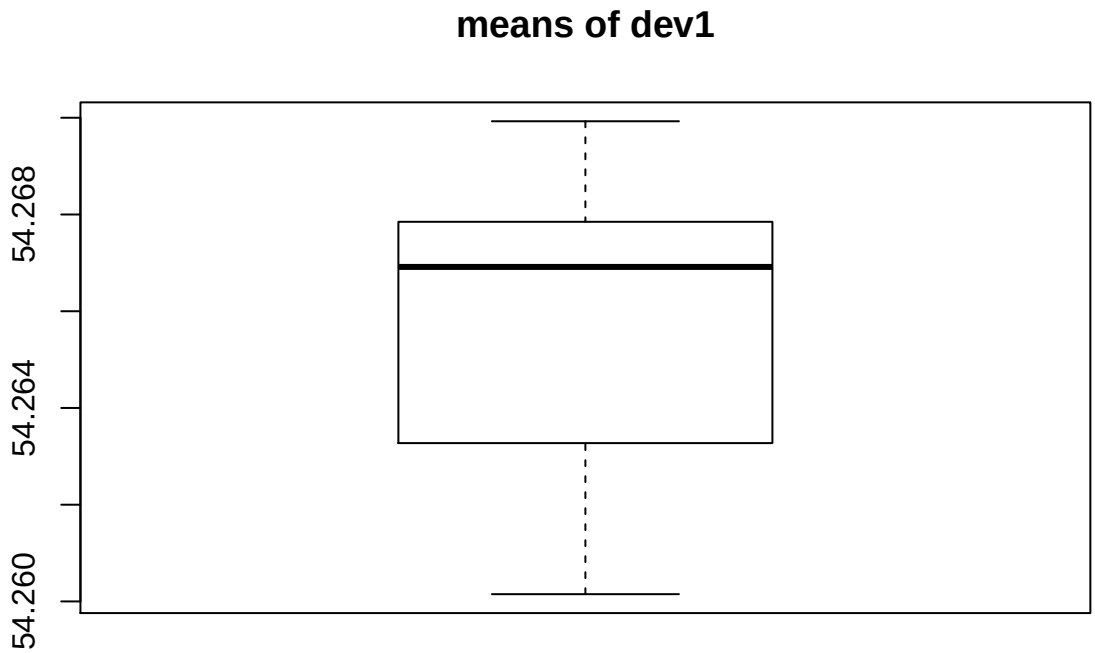

compare means of dev1 and dev2
54
53
52
51
50
49
48
dev1
dev2

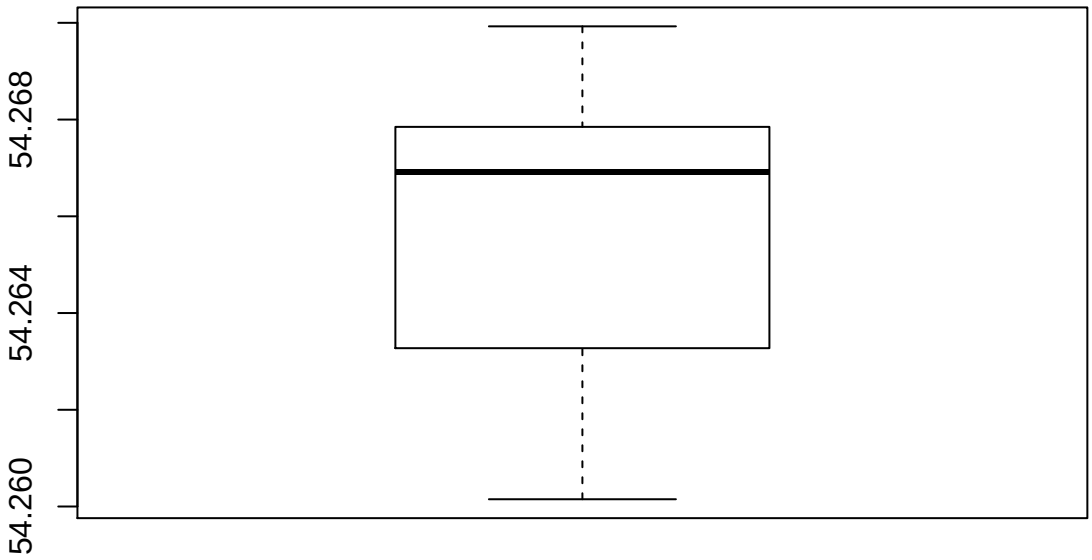


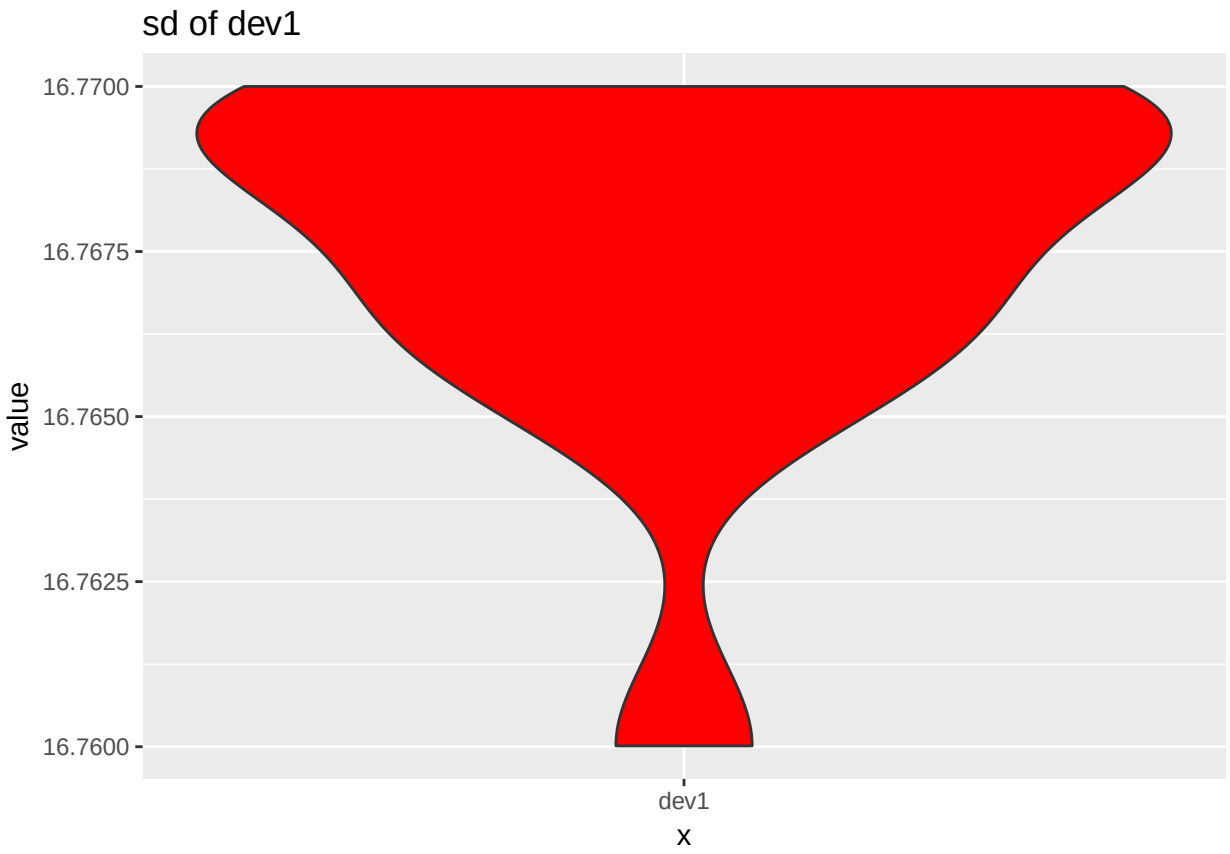

```
##    observer mean_dev1 mean_dev2  sd_dev1  sd_dev2     cor_dev
## 1         1  54.26610  47.83472 16.76982 26.93974 -0.06412835
## 2         2  54.26873  47.83082 16.76924 26.93573 -0.06858639
## 3         3  54.26732  47.83772 16.76001 26.93004 -0.06834336
## 4         4  54.26327  47.83225 16.76514 26.93540 -0.06447185
## 5         5  54.26030  47.83983 16.76774 26.93019 -0.06034144
## 6         6  54.26144  47.83025 16.76590 26.93988 -0.06171484
## 7         7  54.26881  47.83545 16.76670 26.94000 -0.06850422
## 8         8  54.26785  47.83590 16.76676 26.93610 -0.06897974
## 9         9  54.26588  47.83150 16.76885 26.93861 -0.06860921
## 10       10  54.26734  47.83955 16.76896 26.93027 -0.06296110
## 11       11  54.26993  47.83699 16.76996 26.93768 -0.06944557
## 12       12  54.26692  47.83160 16.77000 26.93790 -0.06657523
## 13       13  54.26015  47.83972 16.76996 26.93000 -0.06558334
```

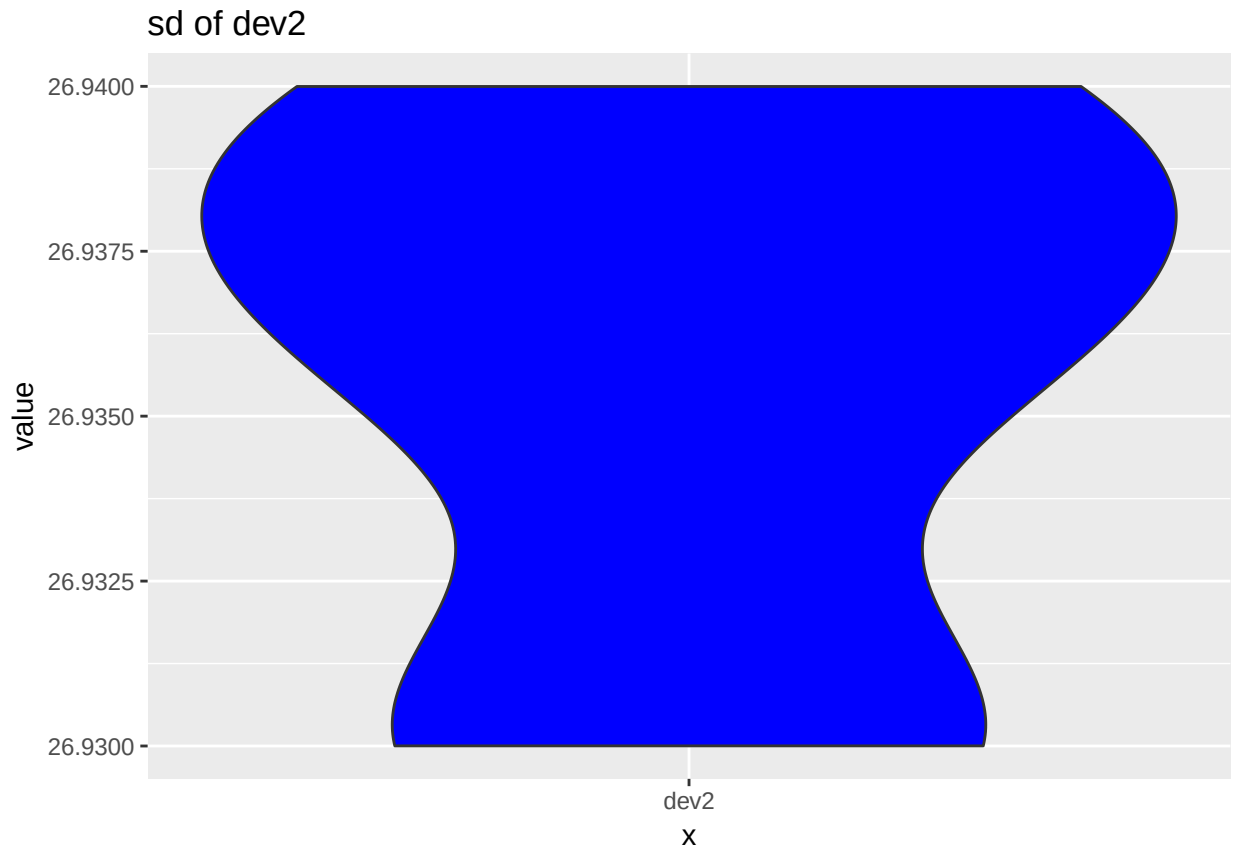
```
# produce two boxplots and two violin plots

stat_device<-function(rd)
{
  level <- as.numeric(levels(factor(rd$Observer)))
  observer = rep(0,length(level))
  mean_dev1 = rep(0,length(level))
  mean_dev2 = rep(0,length(level))
  sd_dev1 = rep(0,length(level))
  sd_dev2 = rep(0,length(level))
  cor_dev = rep(0,length(level))
  for (i in 1:length(level)) {
```

```
    observer[i] = level[i]
    mean_dev1[i] = mean(rd$dev1[rd$Observer == level[i]])
    mean_dev2[i] = mean(rd$dev2[rd$Observer == level[i]])
    sd_dev1[i] = sd(rd$dev1[rd$Observer == level[i]])
    sd_dev2[i] = sd(rd$dev2[rd$Observer == level[i]])
    cor_dev[i] = cor(rd$dev2[rd$Observer == level[i]], rd$dev1[rd$Observer == level[i]])
  }
  stat <- data.frame(observer=as.factor(level), mean_dev1=mean_dev1, mean_dev2=mean_dev2, sd_dev1=sd_dev
    boxplot(stat$mean_dev1, names = c('dev1'),  main='means of dev1')
    boxplot(stat$mean_dev1, names = c('dev2'),  main='means of dev2')
    p1 <- stat %>% ggplot() + geom_violin(aes(x="dev1", y=sd_dev1),fill= 'red') + ylab('value') +ggtitl
    print(p1)
    p2 <- stat %>% ggplot() + geom_violin(aes(x="dev2", y=sd_dev2),fill = 'blue')+ ylab('value') +ggtitl
    print(p2)
  return(stat)
}
stat_device(device)
```




means of dev2
54.268
54.264
54.260


sd of dev1
16.7700
16.7675
16.7650
16.7625
16.7600
value
dev1
x




```
##    observer mean_dev1 mean_dev2  sd_dev1  sd_dev2     cor_dev
## 1         1  54.26610  47.83472 16.76982 26.93974 -0.06412835
## 2         2  54.26873  47.83082 16.76924 26.93573 -0.06858639
## 3         3  54.26732  47.83772 16.76001 26.93004 -0.06834336
## 4         4  54.26327  47.83225 16.76514 26.93540 -0.06447185
## 5         5  54.26030  47.83983 16.76774 26.93019 -0.06034144
## 6         6  54.26144  47.83025 16.76590 26.93988 -0.06171484
## 7         7  54.26881  47.83545 16.76670 26.94000 -0.06850422
## 8         8  54.26785  47.83590 16.76676 26.93610 -0.06897974
## 9         9  54.26588  47.83150 16.76885 26.93861 -0.06860921
## 10       10  54.26734  47.83955 16.76896 26.93027 -0.06296110
## 11       11  54.26993  47.83699 16.76996 26.93768 -0.06944557
## 12       12  54.26692  47.83160 16.77000 26.93790 -0.06657523
## 13       13  54.26015  47.83972 16.76996 26.93000 -0.06558334
```

```
R_integral<-function(h)
{
  point<- seq(0,1,h)
  integral<- sum(exp(-point^2/2)*h)
  return(integral)
}

width=c(0.1,0.01,0.001,0.0001,0.00001,0.000001)
for (i in 1:length(width)) {
  cat('Width= ',width[i],' Integration= ',R_integral(width[i]),'\n')
}
```

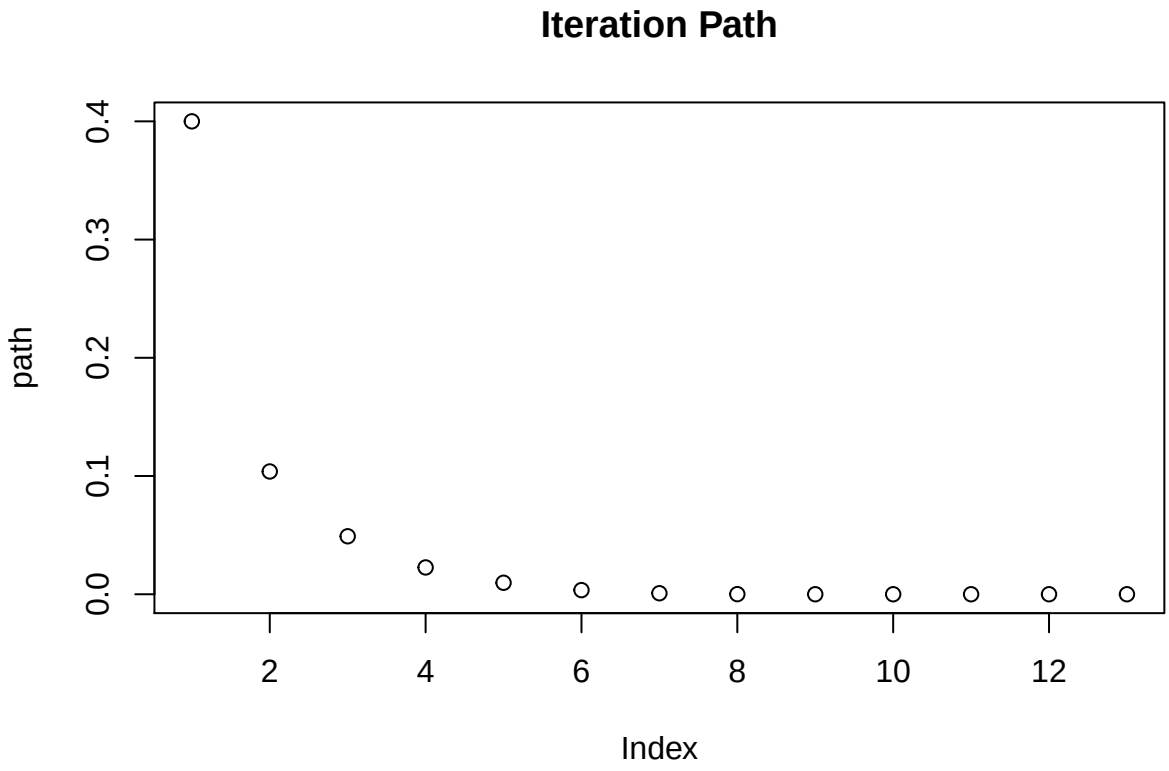
```
## Width=  0.1  Integration=  0.9354453
## Width=  0.01  Integration=  0.863652
## Width=  0.001  Integration=  0.8564276
## Width=  1e-04  Integration=  0.8557047
## Width=  1e-05  Integration=  0.8556324
## Width=  1e-06  Integration=  0.8556252
```

```
# Analytic solution is what showed below, but it seems way different from computation result.
sqrt(pi/2*(1-exp(-0.5)))
```

```
## [1] 0.786168
```

P8

```
target_fun<-function(x)
  {
  return(3^x-sin(x)-cos(5*x))
}
dif<-function(x)
{
  return(log(3)*3^x-cos(x)+5*sin(5*x))
}
newton<-function(interval, x)
{
  x0 = x
  path=c(x0)
  y=target_fun(x0)
  while (abs(y)>1e-16) {
    if(x0<interval[1]||x0>interval[2])
    {
      print("Out of the interval")
      break
    }
    x_new=x0-y/dif(x0)
    y=target_fun(x_new)
    x0=x_new
    path=c(path,x_new)
  }
  plot(path,main = "Iteration Path")
  return(path)
}
newton(c(-3,3),0.4)
```




```
##  [1]  4.000000e-01  1.038491e-01  4.902856e-02  2.266281e-02  9.709827e-03
##  [6]  3.498870e-03  8.429918e-04  7.714836e-05  7.749908e-07  7.979171e-11
## [11]  7.130819e-16 -1.538611e-15 -4.127646e-16
```

```
b=1
sprintf('c= %s',b)
```

```
## [1] "c= 1"
```

```
cat('c',b)
```

```
## c 1
```