HW2

October 21, 2017

0.1 HW 2.1

0.1.1 Make an R quantlet to solve HW #1 from unit 1 with R and show it on Github (GH)

```
In [1]: library(readr)
```
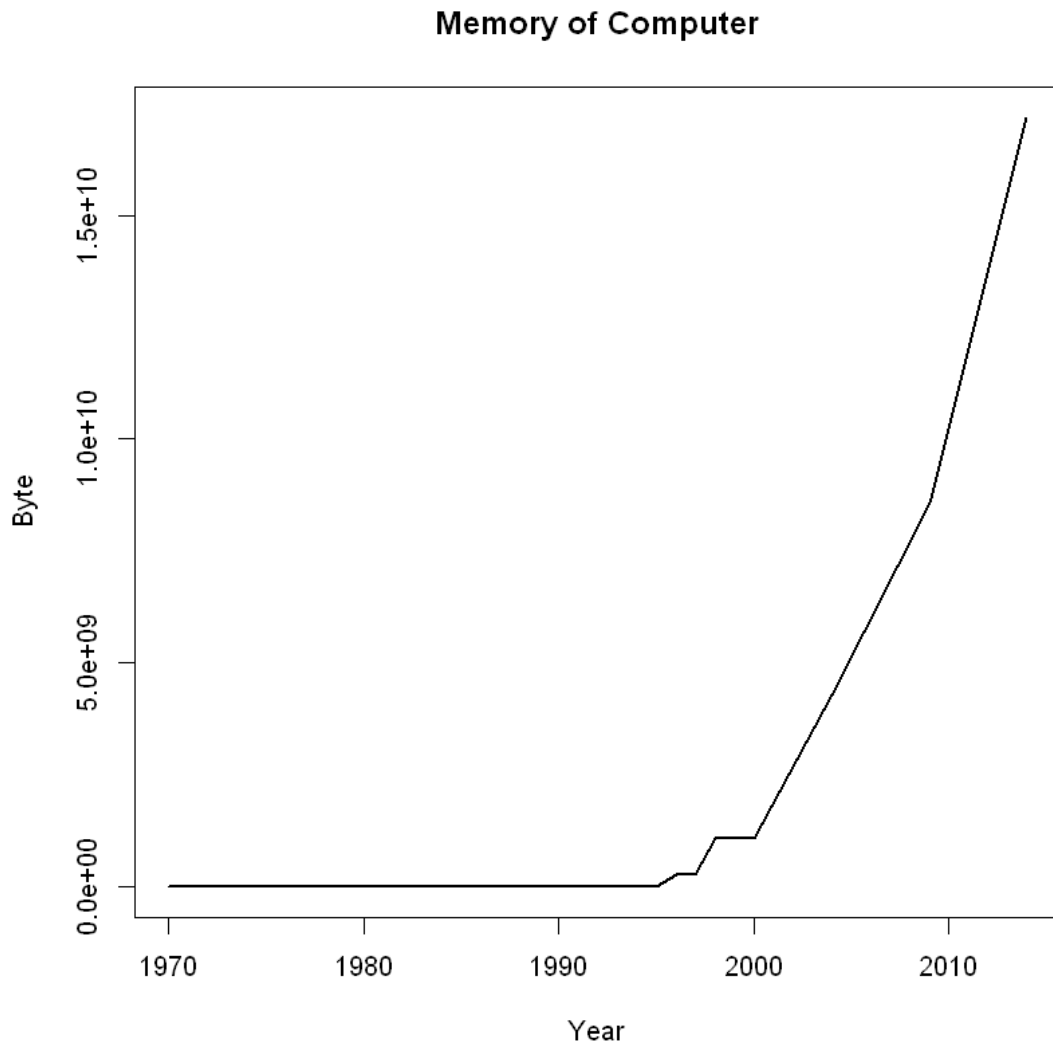
```
Warning message:
"package 'readr' was built under R version 3.3.3"
```

```
In [2]: cpum <- read_csv("cpum.csv",col_names = TRUE)
```

```
Parsed with column specification:
cols(
  Year = col_integer(),
  Byte = col_character()
)
```
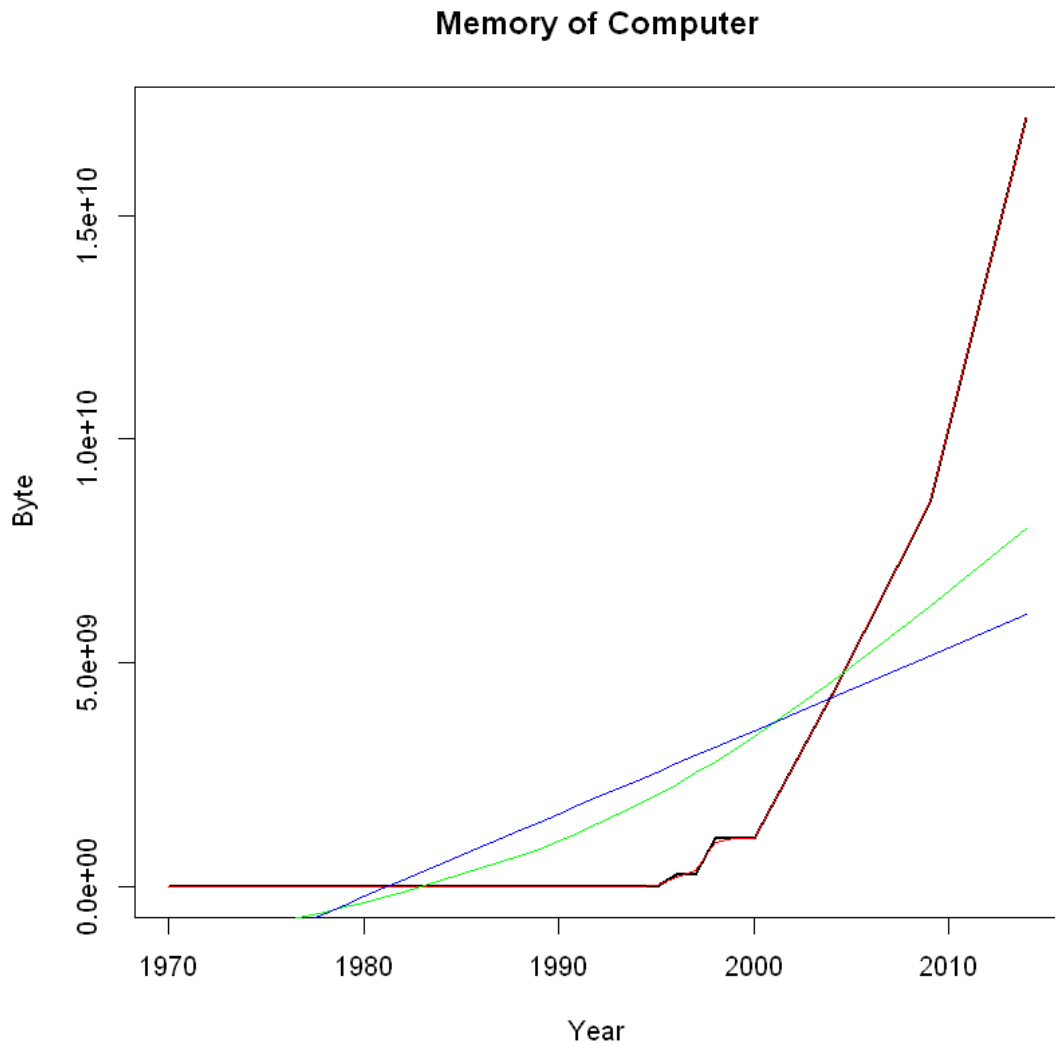
```
In [3]: par(mfrow = c(1, 1))
        plot(cpum,type="l",xlab = "Year",ylab = "Byte",lwd=2,main = "Memory of Computer")
```

Memory of Computer

0.2 HW 2.2

0.2.1 Use R with B-spline code to solve HW#1, any comments?

```
In [4]: plot(cpum,type="l",xlab = "Year",ylab = "Byte",lwd=2,main = "Memory of Computer")
        splines.reg.l1 = smooth.spline(x = cpum$Year, y = cpum$Byte, spar =0.2) # lambda = 0.2
        splines.reg.l2 = smooth.spline(x = cpum$Year, y = cpum$Byte, spar =1) # lambda = 1
        splines.reg.l3 = smooth.spline(x = cpum$Year, y = cpum$Byte, spar =2) # lambda = 2
        lines(splines.reg.l1, col = "red", lwd = 1) # regression line with lambda = 0.2
        lines(splines.reg.l2, col = "green", lwd = 1) # regression line with lambda = 1
        lines(splines.reg.l3, col = "blue", lwd = 1) # regression line with lambda = 2
```

2

Memory of Computer

(Y-axis: Byte — values: 0.0e+00, 5.0e+09, 1.0e+10, 1.5e+10)
(X-axis: Year — values: 1970, 1980, 1990, 2000, 2010)

0.3 HW 2.3

0.3.1 Suppose you observe that in n=1000 mails (in 1 week) you have about 2 scams. Use theLvB /Poisson cdf to calculate that you have 6 scam emails in 2 weeks. In Scammyland you have 5 scams on average, what is the probability to have no scam mail

```
In [5]: lambda=4
        x=6
        P1=exp(-lambda)*lambda^x/factorial(x)
        P1
```

0.104195634567021

```
In [6]: lambda=5
        x=0
        P2=exp(-lambda)*lambda^x/factorial(x)
        P2
```

0.00673794699908547