Quiz 3

Zeshi Feng

2025-10-07

Question 1

a. Use the `cat()` function in R to write two lines of lyrics from your favorite song into a text file named "lyrics.txt"

```
cat("Three, two, one, you are pinned\nUncle right back in the pen\nTell me how auntie be
    file = "lyrics.txt")
```

b. Use `readLines()` to read the contents of "lyrics.txt" into R

```
lyrics <- readLines("lyrics.txt")
lyrics
```

```
## [1] "Three, two, one, you are pinned" "Uncle right back in the pen"
## [3] "Tell me how auntie been"
```

c. Use an appropriate function to find all white spaces in each line

```
spaces <- gregexpr("\\s", lyrics)
spaces
```

```
## [[1]]
## [1]  7 12 17 21 25
## attr(,"match.length")
## [1] 1 1 1 1 1
## attr(,"index.type")
## [1] "chars"
## attr(,"useBytes")
## [1] TRUE
##
## [[2]]
## [1]  6 12 17 20 24
## attr(,"match.length")
## [1] 1 1 1 1 1
## attr(,"index.type")
## [1] "chars"
```

```
## attr(,"useBytes")
## [1] TRUE
##
## [[3]]
## [1]  5  8 12 19
## attr(,"match.length")
## [1] 1 1 1 1
## attr(,"index.type")
## [1] "chars"
## attr(,"useBytes")
## [1] TRUE
```

    d. Replace all white spaces with the character "|"

```r
lyrics_pipe <- gsub("\\s", "|", lyrics)
lyrics_pipe
```

```
## [1] "Three,|two,|one,|you|are|pinned" "Uncle|right|back|in|the|pen"
## [3] "Tell|me|how|auntie|been"
```

    e. Write both the original and modified lines (a total of four lines) back into the same text file

```r
combined <- c(lyrics, lyrics_pipe)
writeLines(combined, "lyrics.txt")
```

Question 2 (Using the `apply` family with user-written functions)

    a. Explain what the following code does, and what `out` contains:

```r
set.seed(1234) # Sets the random number seed, ensures reproducibility of results.
mu <- c(-2,-1,0,1,2)# Creates a numeric vector of 5 mean values
out <- lapply(mu, function(x) rnorm(100, mean=x))# Generate 5 samples, each 100 N(x,1)
```

    b. Get the 30% and 70% quantiles of each sample contained in `out` using only one line of code.

```r
sapply(out, quantile, probs = c(0.3, 0.7))
```

```
##          [,1]       [,2]       [,3]      [,4]     [,5]
## 30% -2.738513 -1.3974148 -0.3046460 0.4832785 1.280877
## 70% -1.735988 -0.5083214  0.6387391 1.5317714 2.518705
```

Question 3

Get the 30% and 70% quantiles of each column of the `airquality` data. Notice that there are NAs in `Ozone` and `Solar.R`:

```r
summary(airquality)
```

```
##      Ozone           Solar.R           Wind             Temp
##  Min.   :  1.00   Min.   :  7.0   Min.   : 1.700   Min.   :56.00
##  1st Qu.: 18.00   1st Qu.:115.8   1st Qu.: 7.400   1st Qu.:72.00
##  Median : 31.50   Median :205.0   Median : 9.700   Median :79.00
##  Mean   : 42.13   Mean   :185.9   Mean   : 9.958   Mean   :77.88
##  3rd Qu.: 63.25   3rd Qu.:258.8   3rd Qu.:11.500   3rd Qu.:85.00
##  Max.   :168.00   Max.   :334.0   Max.   :20.700   Max.   :97.00
##  NA's   :37       NA's   :7
##      Month            Day
##  Min.   :5.000   Min.   : 1.0
##  1st Qu.:6.000   1st Qu.: 8.0
##  Median :7.000   Median :16.0
##  Mean   :6.993   Mean   :15.8
##  3rd Qu.:8.000   3rd Qu.:23.0
##  Max.   :9.000   Max.   :31.0
##
```

```r
sapply(airquality, quantile, probs = c(0.3, 0.7), na.rm = TRUE)
```

```
##     Ozone Solar.R Wind Temp Month Day
## 30%  20.0     137  8.0   74     6  10
## 70%  49.5     252 11.5   83     8  22
```