

Assignment 1 - CT5102 Exploring Vectors - Synthetic Weather Data

Chin Zhe Jing 22221970

r1615473

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```
set.seed(100)

# rnorm works similar as rpois, but to generate random numbers from a Normal distribution with mean and
temps <- rnorm(100, 7, 4)

# rounding random numbers generated to 1 decimal point
temps <- round(temps, 1)

temps

##      [1]  5.0  7.5  6.7 10.5  7.5  8.3  4.7  9.9  3.7  5.6  7.4  7.4  6.2 10.0  7.5
##     [16]  6.9  5.4  9.0  3.3 16.2  5.2 10.1  8.0 10.1  3.7  5.2  4.1  7.9  2.4  8.0
##     [31]  6.6 14.0  6.4  6.6  4.2  6.1  7.7  8.7 11.3 10.9  6.6 12.6 -0.1  9.5  4.9
##     [46] 12.3  5.5 12.3  7.2 -0.5  5.2  0.0  7.7 14.6 -2.1 10.9  1.4 14.3 12.5  3.6
##     [61]  6.0  6.7  5.5 17.3  7.5  4.1  9.6  7.8  6.7  6.6  8.8  2.7  2.4 13.6 -1.2
##     [76]  7.1  2.6  8.1 11.0 -1.3 10.6  6.8  1.6 -0.7  9.8  6.4  7.9 10.3 13.9  6.6
##     [91]  4.8 12.7  3.4  2.4  4.9 16.8  3.7  8.7  2.3  2.3

#concatenate "D-" with 1 to 100 as the name of temps
names(temps) <- paste0("D-",1:100)

(head(temps))

## D-1 D-2 D-3 D-4 D-5 D-6
## 5.0 7.5 6.7 10.5 7.5 8.3

(tail(temps))

## D-95 D-96 D-97 D-98 D-99 D-100
## 4.9 16.8 3.7 8.7 2.3 2.3

#find and sum number of temps that are greater than the mean
gt_mean <- sum(temps > mean(temps))
gt_mean

## [1] 48

#retrieve name only from vector that match the condition
cat("The max temp was on day", names(temps)[temps == max(temps)], "with a value of", max(temps))

## The max temp was on day D-64 with a value of 17.3
```

```
cat("The max temp was on day", names(temps)[temps == min(temps)], "with a value of", min(temps))
```

```
## The max temp was on day D-55 with a value of -2.1
```

```
#create a characterized vector with size and names same as temps
```

```
warnings <- vector(mode="character",length(temps))
```

```
names(warnings) <- paste0("D-",1:100)
```

```
#replace elements in warnings by looping through temps and checking condition
```

```
for(i in seq_along(temps)){
  if(temps[i] <= 4.0)
    warnings[i] <- "Warning"
  else
    warnings[i] <- "Normal"
}
```

```
(temps[40:44])
```

```
## D-40 D-41 D-42 D-43 D-44
```

```
## 10.9 6.6 12.6 -0.1 9.5
```

```
(warnings[40:44])
```

```
##      D-40      D-41      D-42      D-43      D-44
```

```
## "Normal" "Normal" "Normal" "Warning" "Normal"
```

```
cat("The number of days the warnings were in operation =", sum(warnings == "Warning"))
```

```
## The number of days the warnings were in operation = 22
```

```
ww <- names(warnings)[warnings == "Warning"]
```

```
(ww)
```

```
## [1] "D-9" "D-19" "D-25" "D-29" "D-43" "D-50" "D-52" "D-55" "D-57"
```

```
## [10] "D-60" "D-72" "D-73" "D-75" "D-77" "D-80" "D-83" "D-84" "D-93"
```

```
## [19] "D-94" "D-97" "D-99" "D-100"
```

```
tw <- table(warnings)
```

```
(tw)
```

```
## warnings
```

```
## Normal Warning
```

```
##      78      22
```

```
rle_warnings <- rle(warnings)
```

```
str(rle_warnings))
```

```
## List of 2
```

```
## $ lengths: Named int [1:36] 8 1 9 1 5 1 3 1 13 1 ...
```

```
## .. attr(*, "names")= chr [1:36] "D-9" "D-10" "D-19" "D-20" ...
```

```
## $ values : Named chr [1:36] "Normal" "Warning" "Normal" "Warning" ...
```

```
## .. attr(*, "names")= chr [1:36] "D-8" "D-9" "D-18" "D-19" ...
```

```
## - attr(*, "class")= chr "rle"
```

```
#use tapply to find the max value from rle_warnings$lengths of each rle_warnings$values ("Warning" / "Normal")
```

```
maxSeq_warnings <- tapply(rle_warnings$lengths, rle_warnings$values, max)
```

```
cat("The maximum run of days with warnings was", maxSeq_warnings[['Warning']])  
  
## The maximum run of days with warnings was 2  
cat("The maximum run of days without warnings was", maxSeq_warnings[['Normal']])  
  
## The maximum run of days without warnings was 13
```