

# Homework 1

*Max Ryoo (hr2ee)*

## Problem 1

### Part a

```
vector_1 <- c('a', 'a', 'a', 'a')
print(vector_1)
## [1] "a" "a" "a" "a"
```

I've concatenated 'a' four times.

### Part b

```
vector_2 <- seq(2,50,2)
vector_2b <- seq(55,100,5)
vector_2f <- c(vector_2, vector_2b)
print(vector_2f)
## [1] 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34
## [18] 36 38 40 42 44 46 48 50 55 60 65 70 75 80 85 90 95
## [35] 100
```

I made a sequence from 2 to 50 incrementing by 2. I also made a vector from 55 to 100 incrementing by 5. I concated the two vectors and printed it.

### Part c

```
vector_3 <- rep(1:4, c(4,4,3,2))
print(vector_3)
## [1] 1 1 1 1 2 2 2 2 3 3 3 4 4
```

I used the rep function to make '1' output four times, '2' output 4 times, '3' output 3 times, '4' output 2 times

### Part d

```
vector_4 <- rep(7:4, each=3)
print(vector_4)
```

```
## [1] 7 7 7 6 6 6 5 5 5 4 4 4
```

I used the rep function and made each element repeat 3 times to get the output.

### Part e

```
vector_5 <- c(1:5, 4:1)
print(vector_5)
```

```
## [1] 1 2 3 4 5 4 3 2 1
```

I concatenated 1-5 and then 4-1 into one vector using the c() function ### Part f

```
vector_6 <- seq(1:10)
print(vector_6)
```

```
## [1] 1 2 3 4 5 6 7 8 9 10
```

I used the sequence from 1 to 10 and stored it in vector 5

### Part g

```
vector_6 <- 1/(1:10)
print(vector_6)
```

```
## [1] 1.0000000 0.5000000 0.3333333 0.2500000 0.2000000 0.1666667 0.1428571
## [8] 0.1250000 0.1111111 0.1000000
```

I made a vector containing the sequence of  $1/(1:10)$ . I made each number in the sequence of 1:10 a denominator for division of 1.

### Part h

```
vector_7 <- (1:6)^3
print(vector_7)
```

```
## [1] 1 8 27 64 125 216
```

While making vector 7, I cubed ( $^3$ ) each element in the sequence 1-6. I stored all the values in the vector

### Part i

```
vector_8 <- seq(1964,2003, 3)
print(vector_8)
```

```
## [1] 1964 1967 1970 1973 1976 1979 1982 1985 1988 1991 1994 1997 2000 2003
```

Made a sequence from 1964 - 2003 with spacing of 3. I set this sequence as vector\_8

## Part j

```
vector_9 <- seq(1000,0,-25)
print(vector_9)

## [1] 1000 975 950 925 900 875 850 825 800 775 750 725 700 675
## [15] 650 625 600 575 550 525 500 475 450 425 400 375 350 325
## [29] 300 275 250 225 200 175 150 125 100 75 50 25 0
```

Made a sequence from 1000 - 0 with increment of (-25). This sequence is set as vector\_9

## Problem 2

### Part a

```
depart_800 <- c(26, 35, 24, 31, 34)
depart_830 <- c(22, 23, 36, 32, 25)
print(depart_800)

## [1] 26 35 24 31 34

print(depart_830)

## [1] 22 23 36 32 25
```

I made a vector for 800 and 830 starting with Monday going to Friday.

### Part b

```
names(depart_800) <- c("Monday", "Tuesday", "Wednesday", "Thursday", "Friday")
names(depart_830) <- c("Monday", "Tuesday", "Wednesday", "Thursday", "Friday")
print(depart_800)

## Monday Tuesday Wednesday Thursday Friday
##      26      35      24      31      34

print(depart_830)

## Monday Tuesday Wednesday Thursday Friday
##      22      23      36      32      25
```

Added names of each index with the names function from the first reference in References.

### Part c

```
diffoftimes <- depart_830 < depart_800
print(diffoftimes)

##    Monday    Tuesday Wednesday  Thursday    Friday
##      TRUE      TRUE      FALSE      FALSE      TRUE
```

I made a vector called `diffoftimes` that compared whether departing at 830 took less time than 800. The truth values of this equality was stored in `diffoftimes`.

### Part d

```
diff_800 <- depart_800 - 27
diff_830 <- depart_830 - 27
print(diff_800)

##    Monday    Tuesday Wednesday  Thursday    Friday
##      -1         8         -3         4         7

print(diff_830)

##    Monday    Tuesday Wednesday  Thursday    Friday
##      -5        -4         9         5        -2
```

I made a vector called `diff_800` that took the difference of time it actually took and 27 minutes (Budget time). This was stored in for Monday - Friday. The same process took place in constructing `diff_830`. Actual - Budget = value for Monday - Friday.

### Part e

```
avg_diff_800 <- mean(diff_800)
avg_diff_830 <- mean(diff_830)
print(avg_diff_800)

## [1] 3

print(avg_diff_830)

## [1] 0.6
```

The average for difference in time for 8:00 Departure was 3 minutes. The average of for difference in time for 8:30 Departure was 0.6 minutes. I did this by getting the mean of the difference of time vector for 800 and 830, and stored them in `avg_diff_800` and `avg_diff_830` respectively.

### Part f

```
max_delay_800 <- max(diff_800)
max_delay_830 <- max(diff_830)
print(max_delay_800)

## [1] 8

print(max_delay_830)

## [1] 9
```

The max delay for 8:00 was 8 minutes, while the max delay for 8:30 was 9 minutes. I calculated this by getting the max of diff\_800 and diff\_830 vector and storing it in a variable.

### Part g

```
fastest_800 <- min(depart_800)
fastest_day_800 <- names(which(depart_800 == fastest_800))
print(fastest_day_800)

## [1] "Wednesday"
```

In the first week she arrived the fastest on Wednesday. I found this by getting the minimum of depart\_800 and getting the name of the entry that was the minimum of depart\_800 through the name function.

### Part h

```
dayslessthan30 <- names(which(depart_830 <= 30))
print(dayslessthan30)

## [1] "Monday" "Tuesday" "Friday"
```

The days that took less than 30 minutes to commute for the second week were “Monday”, “Tuesday”, and “Friday”. I found this by getting which indices were less than or equal to 30 minutes. I then proceeded to only take the names of the indices.

### Part i

```
dayslessthan30_depart830 <- depart_830[which(depart_830 <= 30)]
diffofearly <- 27 - dayslessthan30_depart830
print(diffofearly)

## Monday Tuesday Friday
##      5      4      2
```

On the days she arrived less than 30 minutes for the second week. She arrived 5 minutes earlier on monday, 4 minutes earlier on tuesday, and 2 minutes earlier on friday. I found this by first getting the indices that were less than 30 from depart 830. then I subtracted the budget time of 27 to see how much less time it took.

## Part j

```
above27_800 <- depart_800 <= 27
above27_830 <- depart_830 <= 27
similar <- above27_800 == above27_830
dayssimilar <- names(similar[which(similar == 'TRUE')])
print(dayssimilar)

## [1] "Monday"    "Thursday"
```

I first took the truth values of whether each entry for depart 800 was faster than 27min. I did this for depart\_830 as well. I then went through both list and for each day I found which days were similar. If the two days were similar I put the names of the days into a vector called dayssimiliar, which yeilded “Monday” and “Thursday”

## References:

Introduction to R (in class file)