

## Arkaraj Mukherjee: H.W. 1

### Solution 1:

```
a. instasee = c(8,8,3,12,13,10,1,8,7)
differences = diff(instasee)
differences

## [1] 0 -5  9  1 -3 -9  7 -1
```

The `diff` function gives us a vector that has the differences between adjacent terms in the input vector as output. Adding 24 to every entry in this `differences` vector gives us the vector `x` with the number of hours between consecutive logins as we are working with the 24-hour format.

```
x = differences + 24
x

## [1] 24 19 33 25 21 15 31 23
```

```
b. max(x)

## [1] 33

mean(x)

## [1] 23.875

min(x)

## [1] 15
```

### Solution 2:

```
a. scoreSS = c(7,6,10,8,7,9,9,6,4,10,8,6,9,10)
max(scoreSS)

## [1] 10

mean(scoreSS)
```

```
## [1] 7.785714

min(scoreSS)

## [1] 4
```

- b. I can fix this by updating the 4-th value in the vector `scoreSS` as follows

```
scoreSS[4] = 5
scoreSS

## [1] 7 6 10 5 7 9 9 6 4 10 8 6 9 10

mean(scoreSS)

## [1] 7.571429
```

- c. `sum(scoreSS >= 9)`

```
## [1] 6
```

- d. `scoreSS >= 9`

```
## [1] FALSE FALSE TRUE FALSE FALSE TRUE TRUE FALSE FALSE TRUE FALSE FALSE
## [13] TRUE TRUE
```

As we can see, `ScoresSS >= 9` is a vector of TRUE and FALSE values, which seem to be treated as 1's and 0's respectively when performing arithmetic operations so the sum of all the entries in this vector is just the number of scores which are atleast 9. We can use this technique to find the number of entries in a vector which satisfy some condition and hence we use it here to find the percentage of scores which are less than 17

```
100*sum(scoreSS<17)/length(scoreSS)

## [1] 100
```

### Solution 3

```
a. Shreelakshmibill = c(460,330,390,370,460,300,480,320,490,350,300,480)
Shreelakshmibill

## [1] 460 330 390 370 460 300 480 320 490 350 300 480

sum(Shreelakshmibill)

## [1] 4730
```

b. `min`(Shreelakshmibill)

```
## [1] 300

max(Shreelakshmibill)

## [1] 490
```

These are the minimum and maximum amounts spent in some month respectively.

c. The number of months with the amount being greater than 400 can be found as follows:

```
length(Shreelakshmibill[Shreelakshmibill>400])

## [1] 5
```

The percentage too can be found from this like this:

```
100*length(Shreelakshmibill[Shreelakshmibill>400])/length(Shreelakshmibill)

## [1] 41.66667
```

d. `freemoney = 3000 - Shreelakshmibill`  
`freemoney`

```
## [1] 2540 2670 2610 2630 2540 2700 2520 2680 2510 2650 2700 2520
```

The average money available each month after paying the phone bill is the aveerage of entries in the vector `freemoney`

```
mean(freemoney)

## [1] 2605.833
```