CS101_WORKSHEET_2

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2022-10-07

Worksheet for R Programming

Instructions:

- Use RStudio or the RStudio Cloud accomplish this worksheet. + Save the R script asR-Worksheet_lastname#2.R.
- Create your own GitHub repository and push the R script as well as this pdf worksheet to your own repo. Accomplish this worksheet by answering the questions being asked and writing the code manually.

Using Vectors

1. Create a vector using : operator

a. Sequence from -5 to 5. Write the R code and its output. Describe its output.

R Code:

```
seqVector <- c(-5:5)
seqVector
```

```
##  [1] -5 -4 -3 -2 -1  0  1  2  3  4  5
```

It print out the numbers from -5 to 5 with 0 in between.

b. x <- 1:7. What will be the value of x?

```
x <- 1:7
x
```

```
## [1] 1 2 3 4 5 6 7
```

2. Create a vector using seq() function

a. seq(1, 3, by=0.2) # specify step size

```
one <- seq(1, 3, by=0.2)
one
```

```
##  [1] 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0
```

Write the R code and its output. Describe the output.

[1] 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0

The output became decimal because it jump by o.2.

3. A factory has a census of its workers. There are 50 workers in total. The following list shows their ages: 34, 28, 22, 36, 27, 18, 52, 39, 42, 29, 35, 31, 27, 22, 37, 34, 19, 20, 57, 49, 50, 37, 46, 25, 17, 37, 43, 53, 41, 51, 35 24,33, 41, 53, 40, 18, 44, 38, 41, 48, 27, 39, 19, 30, 61, 54, 58, 26, 18.

```
workers_age <- c(34, 28, 22, 36, 27, 18, 52, 39, 42, 29, 35, 31, 27,
                 22, 37, 34, 19, 20, 57, 49, 50, 37, 46, 25, 17, 37, 43, 53, 41, 51, 35,
                 24,33, 41, 53, 40, 18, 44, 38, 41, 48, 27, 39, 19, 30, 61, 54, 58, 26,
                 18)
workers_age
```

```
##  [1] 34 28 22 36 27 18 52 39 42 29 35 31 27 22 37 34 19 20 57 49 50 37 46 25 17
## [26] 37 43 53 41 51 35 24 33 41 53 40 18 44 38 41 48 27 39 19 30 61 54 58 26 18
```

a. Access 3rd element, what is the value?

```
workers_age[3]
```

```
## [1] 22
```

b. Access 2nd and 4th element, what are the values?

```
workers_age[c(2,4)]
```

```
## [1] 28 36
```

c. Access all but the 1st element is not included.

```
workers_age[-1]
```

```
##  [1] 28 22 36 27 18 52 39 42 29 35 31 27 22 37 34 19 20 57 49 50 37 46 25 17 37
## [26] 43 53 41 51 35 24 33 41 53 40 18 44 38 41 48 27 39 19 30 61 54 58 26 18
```

or

```
workers_age[2:50]
```

```
##  [1] 28 22 36 27 18 52 39 42 29 35 31 27 22 37 34 19 20 57 49 50 37 46 25 17 37
## [26] 43 53 41 51 35 24 33 41 53 40 18 44 38 41 48 27 39 19 30 61 54 58 26 18
```

Write the R code and its output.

workers_age[-1]

or

workers_age[2:50]

Output:

28 22 36 27 18 52 39 42 29 35 31 27 22 37 34 19 20 57 49 50 37 46 25 17 37 43 53 41 51 35 24 33 41 53 40 18 44 38 41 48 27 39 19 30 61 54 58 26 18

4. Create a vector x <- c("first"=3, "second"=0, "third"=9). Then named the vector,names(x).

```
x <- c("first"=3, "second"=0, "third"=9)
names(x)
```

```
## [1] "first"  "second" "third"
```

a. Print the results. Then access x[c("first", "third")].

```
x <- c("first"=3, "second"=0, "third"=9)
names(x)
```

```
## [1] "first"  "second" "third"
```

```
x[c("first", "third")]
```

```
## first third
##     3     9
```

Describe the output.

It prints the first and third string with it's value (3 and 9) under it.

b. Write the code and its output.

x[c("first", "third")]

Output:

first third 3 9

5. Create a sequence x from -3:2.

```
x <- c(-3:2)
x
```

```
## [1] -3 -2 -1  0  1  2
```

a. Modify 2nd element and change it to 0;

```
x[2] <- 0
x
```

```
## [1] -3  0 -1  0  1  2
```

Describe the output.

The output print numbers from negative three(-3) to positive two (2) but since the 2nd element was modified to zero (0) then the value of second element is zero.

6. The following data shows the diesel fuel purchased by Mr. Cruz.

Month Jan Feb March Apr May June Price per liter (PhP) 52.50 57.25 60.00 65.00 74.25 54.00 Purchase–quantity(Liters) 25 30 40 50 10 45

a. Create a data frame for month, price per liter (php) and purchase-quantity (liter).

Write the codes.

```
month <- c("Jan", "Feb", "March", "Apr", "May", "June")
Price_per_liter_Php <- c(52.50, 57.25, 60.00, 65.00, 74.25, 54.00)
Purchase_Quantity_liter <- c( 25, 30, 40, 50, 10, 45)

data <- data.frame(month,Price_per_liter_Php,Purchase_Quantity_liter)

data
```

```
##   month Price_per_liter_Php Purchase_Quantity_liter
## 1   Jan               52.50                      25
## 2   Feb               57.25                      30
## 3 March               60.00                      40
## 4   Apr               65.00                      50
## 5   May               74.25                      10
## 6  June               54.00                      45
```

b. What is the average fuel expenditure of Mr. Cruz from Jan to June? Note: Use weighted.mean(liter, purchase)

```
weighted.mean(Price_per_liter_Php,Purchase_Quantity_liter)
```

```
## [1] 59.2625
```

7.R has actually lots of built-in datasets. For example, the rivers data "gives the lengths (in miles) of 141 "major" rivers in North America, as compiled by the US Geological Survey".

a.Type "rivers" in your R console. Create a vector data with 7 elements, containing the number of elements (length) in rivers, their sum (sum), mean (mean), median (median), variance (var) standard deviation (sd), minimum (min) and maximum (max). data <- c(length(rivers), sum(rivers), mean(rivers), median(rivers), var(rivers), sd(rivers), min(rivers), max(rivers))

```
data <- c(length(rivers), sum(rivers), mean(rivers), median(rivers), var(rivers),
          sd(rivers), min(rivers), max(rivers))
data
```

```
## [1]    141.0000  83357.0000    591.1844    425.0000 243908.4086    493.8708
## [7]    135.0000   3710.0000
```

```
rivers
```

```
##   [1]  735  320  325  392  524  450 1459  135  465  600  330  336  280  315  870
##  [16]  906  202  329  290 1000  600  505 1450  840 1243  890  350  407  286  280
##  [31]  525  720  390  250  327  230  265  850  210  630  260  230  360  730  600
##  [46]  306  390  420  291  710  340  217  281  352  259  250  470  680  570  350
##  [61]  300  560  900  625  332 2348 1171 3710 2315 2533  780  280  410  460  260
##  [76]  255  431  350  760  618  338  981 1306  500  696  605  250  411 1054  735
##  [91]  233  435  490  310  460  383  375 1270  545  445 1885  380  300  380  377
## [106]  425  276  210  800  420  350  360  538 1100 1205  314  237  610  360  540
## [121] 1038  424  310  300  444  301  268  620  215  652  900  525  246  360  529
## [136]  500  720  270  430  671 1770
```

b.What are the results?

For the data it prints the length, sum, mean, median, var, sd, min and max of the river.

For the rivers it's output show random and many numbers.

c. Write the code and its outputs.

data <- c(length(rivers), sum(rivers), mean(rivers), median(rivers), var(rivers), sd(rivers), min(rivers), max(rivers)) data

rivers

[1] 141.0000 83357.0000 591.1844 425.0000 243908.4086 493.8708

[7] 135.0000 3710.0000

[1] 735 320 325 392 524 450 1459 135 465 600 330 336 280 315 870

[16] 906 202 329 290 1000 600 505 1450 840 1243 890 350 407 286 280

[31] 525 720 390 250 327 230 265 850 210 630 260 230 360 730 600

[46] 306 390 420 291 710 340 217 281 352 259 250 470 680 570 350

[61] 300 560 900 625 332 2348 1171 3710 2315 2533 780 280 410 460 260

[76] 255 431 350 760 618 338 981 1306 500 696 605 250 411 1054 735

[91] 233 435 490 310 460 383 375 1270 545 445 1885 380 300 380 377

[106] 425 276 210 800 420 350 360 538 1100 1205 314 237 610 360 540

[121] 1038 424 310 300 444 301 268 620 215 652 900 525 246 360 529

[136] 500 720 270 430 671 1770

8. The table below gives the 25 most powerful celebrities and their annual pay as ranked by the editions of Forbes magazine and as listed on the Forbes.com website.

a. Create vectors according to the above table. Write the codes.

```
 Power_Ranking <- c(1:25)
  Celebrity_Name <- c("Tom Cruise", "Rolling Stones","Oprah Winfrey","U2","Tiger woods",
                      "Steven Speilberg","Howard Stern","50 Cent", "Cast of the Sopranos",
                      "Dan Brown","Bruce Springsteen","Donald Trumph","Muhammad Ali",
                      "Paul McCartney","Goerge Lucas","Elton John","David Letterman",
                     "Phil Mickelson","J.K Rowling","BRADd Pitt", "Peter Jackson",
                     "Dr. Phil McGraw","Jay Lenon","Celine Dion","Kobe Bryant")
  Pay <- c(67,90,225,110,90,332,302,41,52,88,55,44,55,40,233,34,40,47,75,25,39,45,32,40,31)

data <- data.frame(Power_Ranking, Celebrity_Name, Pay)
 data
```

```
##    Power_Ranking       Celebrity_Name Pay
## 1              1           Tom Cruise  67
## 2              2       Rolling Stones  90
## 3              3        Oprah Winfrey 225
## 4              4                   U2 110
## 5              5          Tiger woods  90
## 6              6     Steven Speilberg 332
## 7              7         Howard Stern 302
## 8              8              50 Cent  41
## 9              9 Cast of the Sopranos  52
## 10            10            Dan Brown  88
```

```
## 11            11    Bruce Springsteen  55
## 12            12        Donald Trumph  44
## 13            13         Muhammad Ali  55
## 14            14       Paul McCartney  40
## 15            15         Goerge Lucas 233
## 16            16           Elton John  34
## 17            17      David Letterman  40
## 18            18       Phil Mickelson  47
## 19            19          J.K Rowling  75
## 20            20           BRADd Pitt  25
## 21            21        Peter Jackson  39
## 22            22      Dr. Phil McGraw  45
## 23            23            Jay Lenon  32
## 24            24          Celine Dion  40
## 25            25          Kobe Bryant  31
```

b. Modify the power ranking and pay of J.K. Rowling. Change power ranking to 15 and pay to 90. Write the codes and its output.

```
Power_Ranking [19] <- 15
Power_Ranking
```

```
##  [1]  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 15 20 21 22 23 24 25
```

```
Pay[75] <- 90
Pay
```

```
##  [1]  67  90 225 110  90 332 302  41  52  88  55  44  55  40 233  34  40  47  75
## [20]  25  39  45  32  40  31  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA
## [39]  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA
## [58]  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  NA  90
```

c. Interpret the data

The data shows the ranking of the most powerful celebrity and their annual pay that is also rank by the edition of Forbes Magazine. By modifying the power ranking of J.K Rowling, it's rank changed from 19 to 15 and it's pay from 75 to 90.