

Coding Challenge 6

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2025-03-27

Regarding reproducibility, what is the main point of writing your own functions and iterations?
the main point is to reduce copy and paste errors and to improve reproducibility. It also helps simplify

Question 1:

#In your own words, describe how to write a function and a for loop in R and how they work. Give me specific examples.
to create a function, you first have to name it. Similar to what we did for the homework, the function name should be descriptive.
for loop: your code will start out as 'for (i in x:X)'. What this means is that the i will be whatever value is in the vector x.

Question 2:

```
cities.data <- read.csv("C:/Users/katie/Downloads/Cities.csv")
library(tidyverse)
```

Question 3

```
## Warning: package 'tidyverse' was built under R version 4.4.2
```

```
## Warning: package 'dplyr' was built under R version 4.4.2
```

```
## -- Attaching core tidyverse packages ----- tidyverse 2.0.0 --
## v dplyr      1.1.4      v readr      2.1.5
## v forcats    1.0.0      v stringr    1.5.1
## v ggplot2    3.5.1      v tibble     3.2.1
## v lubridate  1.9.3      v tidyr      1.3.1
## v purrr      1.0.2
## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()     masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```

distance.bet <- function(lat1, lon1, lat2, lon2){
  rad.lat1 <- lat1 * pi/180
  rad.lon1 <- lon1 * pi/180
  rad.lat2 <- lat2 * pi/180
  rad.lon2 <- lon2 * pi/180
  #Haversine formula
  delta_lat <- rad.lat2 - rad.lat1
  delta_lon <- rad.lon2 - rad.lon1
  a <- sin(delta_lat / 2)^2 + cos(rad.lat1) * cos(rad.lat2) * sin(delta_lon / 2)^2
  c <- 2 * asin(sqrt(a))
  # Earth's radius in kilometers
  earth_radius <- 6378137
  # Calculate the distance
  distance_km <- (earth_radius * c)/1000
}

```

Question 4

```

lat.lon.data <- subset(cities.data, city %in% c("New York", "Auburn"), select =
c(long, lat))
print(lat.lon.data)

```

Question 5

```

##           long      lat
## 1  -73.9249 40.6943
## 40 -85.4903 32.6087

```

```

nyc_auburn <- distance.bet(40.6943, -73.9249, 32.6087, -85.4903)
print(nyc_auburn)

```

```

## [1] 1367.854

```

```

cities.df <- NULL

for (i in 1:nrow(cities.data)) {
  result <- distance.bet(cities.data$lat[i], cities.data$long[i], 32.6087, -85.4903)
  cities.df <- rbind.data.frame(cities.df, result)
  print(cities.df)
}

```

Question 6

```

##      X1367.85395084397

```

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## 22	2752.8142
## 23	1092.2595
## 24	796.7541
## 25	3479.5376
## 26	1290.5492
## 27	3301.9923
## 28	1191.6657
## 29	608.2035
## 30	2504.6312
## 31	3337.2781
## 32	800.1452
## 33	1001.0879
## 34	732.5906
## 35	1371.1633
## 36	1091.8970
## 37	1043.2727
##	X1367.85395084397
## 1	1367.8540
## 2	3051.8382
## 3	1045.5213
## 4	916.4138
## 5	993.0298
## 6	1056.0217
## 7	1239.9732
## 8	162.5121
## 9	1036.9900
## 10	1665.6985
## 11	2476.2552
## 12	1108.2288
## 13	3507.9589
## 14	3388.3656
## 15	2951.3816
## 16	1530.2000

## 17	591.1181
## 18	1363.2072
## 19	1909.7897
## 20	1380.1382
## 21	2961.1199
## 22	2752.8142
## 23	1092.2595
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## 31	3337.2781

## 32	800.1452
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## 34	732.5906
## 35	1371.1633
## 36	1091.8970
## 37	1043.2727
## 38	851.3423
## 39	1382.3721
##	X1367.85395084397
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## 2	3051.8382
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## 34	732.5906
## 35	1371.1633
## 36	1091.8970
## 37	1043.2727
## 38	851.3423
## 39	1382.3721
## 40	0.0000

Github account

```
library(tinytex)
```

```
## Warning: package 'tinytex' was built under R version 4.4.3
```

```
# My Github account(https://github.com/kgc0068/Coding-Challenge-6.git)
```