This is a closed-note and closed-script quiz. That is, students are not allowed to reference their course notes or any previously developed R script while completing the quiz. However, students are permitted to use R Help Pages or any internet search engine (like Google). Failure to comply with these rules will result in a score of zero on the quiz and being reported to the program for an Honor Code Violation.

* Show ALL work! Partial credit will be given.
* Your submission file must be uploaded to your Sakai Drop Box no later than 1:15 pm in order to be considered for grading.
  + Name your submission file using the following format:
    - LastName\_FirstName\_Quiz7.R (.docx)
* By giving your name on your submission file, you are agreeing to abide by the Duke Honor Code.

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Consider the numeric matrix INFO shown below. The R script file YourNameHere\_Quiz7.R contains R commands to create this object. Please download this file from the course Sakai site to complete the quiz.

> INFO

[,1] [,2] [,3]

[1,] 1 2 0

[2,] 3 2 -5

[3,] NA 2 NA

[4,] 4 2 1

[5,] NA 2 4

1. Using a FOR loop, create a data object called MISSING that contains the number of missing observations in each column of the data object INFO. That is, after running the FOR loop the data object MISSING should look like [1] 2 0 1 when printed to the console. Please provide the R code in your submission file. (10 points)
   1. Hint: The is.na() function can be used to identify missing values.
2. Using the code developed in Question 1, update your program so that it will work on a numeric matrix of any size (i.e. make the code generalizable if you haven’t already). Run the updated code on the updated version of INFO shown below to create an updated version of MISSING and print it. Please provide the R code in your submission file. (5 points)

> INFO

[,1] [,2] [,3] [,4] [,5]

[1,] 1 2 NA 4 2

[2,] 3 2 1 NA 0

[3,] NA 2 4 2 -5

[4,] 4 2 1 2 NA

[5,] NA 0 3 2 1

[6,] 2 -5 NA 2 4

1. Using the code developed in Question 2, update your program so that if no missing values are found in the numeric matrix INFO, the program will print “No missing values in INFO” to the console; otherwise the program will print the value of the data object MISSING to the console. Test the code on the two versions of INFO shown below. Please provide the R code in your submission file. (5 points)

Note: The object [1] 2 0 1 should be printed when testing the code on this version of INFO.

> INFO

[,1] [,2] [,3]

[1,] 1 2 0

[2,] 3 2 -5

[3,] NA 2 NA

[4,] 4 2 1

[5,] NA 2 4

Note: The character string “No missing values in INFO” should be printed when testing the code on this version of INFO.

> INFO

[,1] [,2] [,3] [,4] [,5] [,6]

[1,] 1 3 5 7 9 11

[2,] 2 4 6 8 10 12