

Week 5: R functions

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Example input vectors to start with

```
student1 <- c(100, 100, 100, 100, 100, 100, 100, 90) student2 <- c(100, NA, 90, 90, 90, 90, 97, 80) student3 <- c(90, NA, NA, NA, NA, NA, NA, NA)
```

#Q1. Write a grade() function to determine an overall grade from a vector

To find the position of the smallest value (i.e. min) value in our vector

```
student1[which.min(student1)]
```

```
mean(student1[-which.min(student1)])
```

#So lets map/change the NA values to zero. Use the "is.na()" function

```
is.na(student2)
```

```
x <- student2
```

```
x[is.na(x)] <- 0
```

#Combine our working snippets to find the average for figure 3

```
grade <- function(x) { x[is.na(x)] <- 0 mean(x[-which.min(x)]) }
```

```
grade(student3)
```

#Your final function should be adequately explained with code comments and be able to work on an example class gradebook such as this one in CSV format:

```
url <- "https://tinyurl.com/gradeinput" gradebook <- read.csv(url, row.names=1) gradebook
```

```
apply(gradebook, 1, grade)
```

#Q2. Who is the top scoring student overall in the grade book?

```
result <- apply(gradebook, 1, grade) sort(result, decreasing = TRUE)
```

```
which.max(result)
```

#Q3. Which homework was toughest on students?

```
hw.ave <- apply(gradebook, 2, mean, na.rm=TRUE) which.min(hw.ave)
```

```
hw.med <- apply(gradebook, 2, median, na.rm=TRUE) which.min(hw.med)
```

#There is a different result when using mean and median. Good idea to plot the data and see.

```
boxplot(gradebook)
```

#Q4. From your analysis of the gradebook, which homework was most predictive of overall score (i.e. highest correlation with average grade score)?

```
result <- apply(gradebook[,is.na(gradebook)] <- 0, cor(result, gradebook$hw5, )
```

```
apply(gradebook, 2, cor, x=result)
```

#Q5. Make sure you save your Rmarkdown document and can click the “Knit” button to generate a PDF for a report without errors. Finally, submit your PDF to gradescope. [1pt]