

Week05_lab

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Write a function to grade homework

```
# 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 function grade() to determine an overall grade from a vector of student homework assignment scores dropping the lowest single score. If a student misses a homework (i.e. has an NA value) this can be used as a score to be potentially dropped.

```
# grade() takes one parameter, a numeric vector x.
# grade() excludes

#' Calculates average score for a vector of homework scores, dropping lowest single score. NAs are treated as 0
#'
#' @param x is a numeric vector of scores
#'
#' @return Average score
#' @export
#'
#' @examples
#' student <-c(100,NA,90,80)
#' grade(student)
#'
grade<- function(x){

  #Convert NA scores to 0
  x[is.na(x)]<-0

  #return mean of x with lowest value excluded
  return(mean(x[-which.min(x)]))
}
```

Run Test Cases on individual students:

```
#run Test Cases
grade(student1)
```

```
## [1] 100
```

```
grade(student2)
```

```
## [1] 91
```

```
grade(student3)
```

```
## [1] 12.85714
```

Now to grade the entire gradebook:

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

```
## student-1 student-2 student-3 student-4 student-5 student-6 student-7
##      91.75      82.50      84.25      84.25      88.25      89.00      94.00
## student-8 student-9 student-10 student-11 student-12 student-13 student-14
##      93.75      87.75      79.00      86.00      91.75      92.25      87.75
## student-15 student-16 student-17 student-18 student-19 student-20
##      78.75      89.50      88.00      94.50      82.75      82.75
```

Q2. Using your grade() function and the supplied gradebook, who is the top scoring student overall in the gradebook? [3pts]

```
which.max(results)
```

```
## student-18
##           18
```

Student 18 is the top scorer.

Q3. From your analysis of the gradebook, which homework was toughest on students (i.e. obtained the lowest scores overall? [2pts]

```
#Let's try the median score
#Convert NAs to zero
gradebook[is.na(gradebook)]<-0
by_assignment_score<- apply(gradebook,2,median, na.rm=TRUE)
by_assignment_score
```

```
## hw1 hw2 hw3 hw4 hw5
## 89.0 71.0 76.5 88.0 78.0
```

```
which.min(by_assignment_score)
```

```
## hw2
##    2
```

HW 2 had the lowest median score.

```
#Let's try the median score
#Convert NAs to zero
gradebook[is.na(gradebook)]<-0
by_assignment_score<- apply(gradebook,2,mean, na.rm=TRUE)
by_assignment_score
```

```
##   hw1   hw2   hw3   hw4   hw5
## 89.00 72.80 80.80 85.15 79.25
```

```
which.min(by_assignment_score)
```

```
## hw2
##   2
```

HW 2 also had the lowest mean score!

Q4. Optional Extension: From your analysis of the gradebook, which homework was most predictive of overall score (i.e. highest correlation with average grade score)? [1pt]

```
gradebook[is.na(gradebook)]<-0
correlations<- apply(gradebook, 2,cor, x=results)
correlations
```

```
##           hw1           hw2           hw3           hw4           hw5
## 0.4250204 0.1767780 0.3042561 0.3810884 0.6325982
```

```
which.min(correlations)
```

```
## hw2
##   2
```

HW2 is least correlated to overall score.

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