# Class06

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```r
# 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)

gradebook <- read.csv("student_homework.csv", row.names = 1)
gradebook
```

```
           hw1 hw2 hw3 hw4 hw5
student-1  100   73 100   88   79
student-2   85   64   78   89   78
student-3   83   69   77 100   77
student-4   88   NA   73 100   76
student-5   88 100   75   86   79
student-6   89   78 100   89   77
student-7   89 100   74   87 100
student-8   89 100   76   86 100
student-9   86 100   77   88   77
student-10  89   72   79   NA   76
student-11  82   66   78   84 100
student-12 100   70   75   92 100
student-13  89 100   76 100   80
student-14  85 100   77   89   76
student-15  85   65   76   89   NA
student-16  92 100   74   89   77
student-17  88   63 100   86   78
student-18  91   NA 100   87 100
student-19  91   68   75   86   79
student-20  91   68   76   88   76
```

```r
mean(student1)
```

[1] 98.75

```r
min(student1)
```

[1] 90

```r
# Q1
grade <- function(scores){
  # convert NA to 0
  scores[is.na(scores)] <- 0
  # dropping the lowest
  scores_lowest_dropped <- scores[-which.min(scores)]
  # calculate average score dropping the lowest
  average <- sum(scores_lowest_dropped)/length(scores_lowest_dropped)
  # return grade
  print(average)
}

grade(student1)
```

[1] 100

```r
grade(student2)
```

[1] 91

```r
grade(student3)
```

[1] 12.85714

```r
# Q2
ans <- apply(gradebook, 1, grade)
```

```
[1] 91.75
[1] 82.5
[1] 84.25
[1] 84.25
[1] 88.25
[1] 89
[1] 94
[1] 93.75
[1] 87.75
[1] 79
[1] 86
[1] 91.75
[1] 92.25
[1] 87.75
[1] 78.75
[1] 89.5
[1] 88
[1] 94.5
[1] 82.75
[1] 82.75
```

```
which.max(ans)
```

```
student-18
        18
```

## student 18 is the top-scoring.

```
# Q2 alternative
for (i in 1:20){
  grade(gradebook[i,])
}
```

```
[1] 91.75
[1] 82.5
[1] 84.25
[1] 84.25
[1] 88.25
[1] 89
```

```
[1] 94
[1] 93.75
[1] 87.75
[1] 79
[1] 86
[1] 91.75
[1] 92.25
[1] 87.75
[1] 78.75
[1] 89.5
[1] 88
[1] 94.5
[1] 82.75
[1] 82.75
```

```r
# Q3
mask <- gradebook
mask[is.na(mask)] <- 0
which.min(apply(mask, 2, mean))
```

```
hw2
  2
```

```r
# hw2 has the lowest average.
```

**hw2 has the lowest average, thus considered to be the toughest homework.**

```r
# Q4
cor(mask$hw2, ans)
```

```
[1] 0.176778
```

```r
which.max(apply(mask, 2, cor, ans))
```

```
hw5
  5
```

**hw5 is considered to be the most predictive.**