Lab6

Tony

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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)
```

```
vec = student1
vec
```

```
[1] 100 100 100 100 100 100 100  90
```

```
vec_rm = sort(vec, decreasing = T, na.last = T)[-length(vec)]
vec_rm
```

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

```
vec_rm[is.na(vec_rm)] = 0
vec_rm
```

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

```
mean(vec_rm)
```

```
[1] 100
```

```
grade = function(vec){
  vec_rm = sort(vec, decreasing = T, na.last = T)[-length(vec)]
  vec_rm[is.na(vec_rm)] = 0

  return(mean(vec_rm))
}
```

```
grade(student3)
```

```
[1] 12.85714
```

```
hw = read.csv('student_homework.csv', row.names = 1)
hw
```

```
           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
result = apply(hw, 1, grade)
result
```

```
 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

```r
result[which.max(result)]
```

```
student-18
      94.5
```

```r
sort(result, decreasing = T)[1]
```

```
student-18
      94.5
```

#Q3

```r
hw_avg = apply(hw, 2, mean, na.rm=T)
hw_avg
```

```
     hw1      hw2      hw3      hw4      hw5
89.00000 80.88889 80.80000 89.63158 83.42105
```

```r
hw_avg[which.min(hw_avg)]
```

```
 hw3
80.8
```

Q4

```
apply(hw, 2, cor, result, use='complete.obs')
```

```
       hw1         hw2         hw3         hw4         hw5
0.42502036  0.61142768  0.30425610 -0.09644108  0.60398041
```

```
cor(hw$hw1, result, use='complete.obs')
```

```
[1] 0.4250204
```

```
# another way to work around is assign NA to zero is easier
hw[is.na(hw)] = 0
```

```
apply(hw, 2, cor, result)
```

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

```
student3
```

```
[1] 90 NA NA NA NA NA NA NA
```

```
mean(na.omit(student3))
```

```
[1] 90
```

```
mean(student3, na.rm = T)
```

```
[1] 90
```