MTH210: Midsem Marks Analysis

Midsem Marks

Recall that there were 4 questions in the midsem exam. Below is my characterization of the four questions

1. Q1: Easy - Medium: Similar to Box-Muller transformation. (20 points)
2. Q2: Easy - Medium: Tests most of the continuous sampling skills. A little tedious, but not difficult. (30 points)
3. Q3: Hard: It's never easy to do a proof under time pressure, but it's important to be tested on it (I think). (20 points)
4. Q4: Medium: The question was a little tricky because of this pesky y^*. But any student who is ok with computing should get at least 50-70% on this question. (30 points)

With the above in mind, I would "expect" an average of 70, since I would "expect" 15 marks lost in Q3 and 15 marks lost in Q4. The class performed mostly similar to what I would expect. Let me load the data and show you the plots and summaries

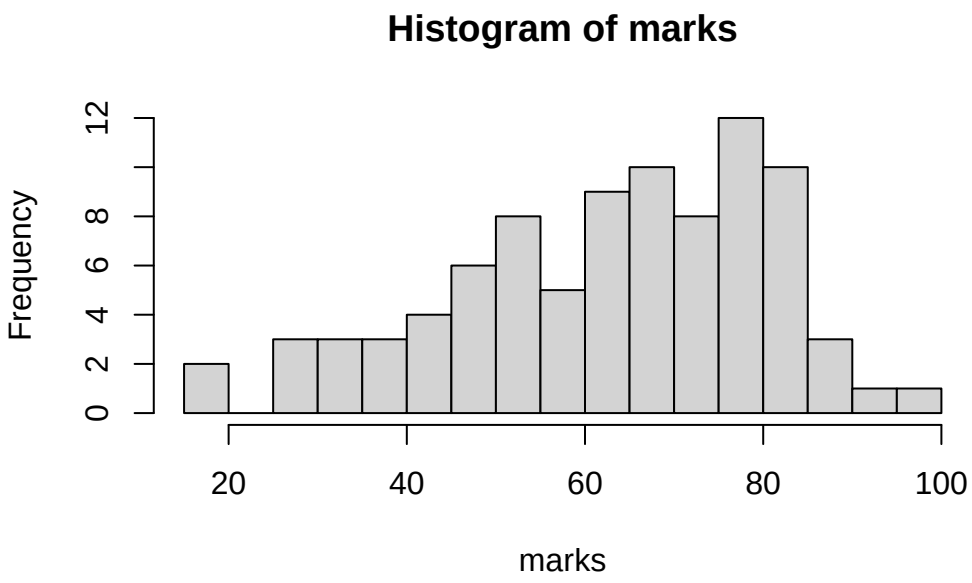
```
dat <- read.csv("midsem_analysis.csv")
marks <- dat$Total

# standardize to 100
q1 <- dat$Q1/20*100
q2 <- dat$Q2/30*100
q3 <- dat$Q3/20*100
q4 <- dat$Q4/30*100

# First, summary of overall marks
summary(marks)
```

```
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
  15.00   51.75   67.00   63.01   77.00   96.00 
```

```
hist(marks, breaks = 20)
```



Now, let us do question-wise analysis.

```
ques <- cbind(summary(q1), summary(q2), summary(q3), summary(q4))
colnames(ques) <- c("Q1", "Q2", "Q3", "Q4")
round(ques)
```

```
         Q1  Q2  Q3 Q4
Min.     15  17   0  0
1st Qu.  55  60  25 33
Median   70  80  50 53
Mean     73  74  53 52
3rd Qu.  95  90  75 81
Max.    100 100 100 97
```

It is clear from the above that indeed, Q3 was the most difficult, followed by Q4. I was surprised more by Q4, since I would have expected a slightly higher average score.

Finally, there is always a contention that grading of MSc students and UG students should be done differently, and us instructors keep saying that there is hardly any difference. Below

is some proof. The performance of UG and PG students is similar. Note that there are more PG students in this course, so naturally, the maximum and minimum marks of PG students will be expected to be more extreme than the UG students.

```
UG <- dat$Roll.No < 300000

hist(marks[!UG], xlim = c(0, 100), col = "pink",
     main = "Histogram of Marks by Program", xlab = "Marks")
hist(marks[UG], add = TRUE, col =
       adjustcolor("blue", alpha.f = .3))
legend("topleft", legend = c("PG", "UG"),
       fill = c("pink", "purple"))
```