

CS 420 Observation Analysis Report for Spring 2011 Semester

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Abstract

In this paper, we examine the issues uncovered in the CS 420 class for the Spring 2011 semester. These observations come from the author of this paper and the author alone. While we do raise some concerns about the class, we hope that the feedback provided will help improve the quality of this class and other classes within the department.

1 Introduction

In this paper, we report several observations from the Spring 2011 section of CS 420: Advanced Algorithms. The purpose of this report is to identify issues and provide suggestions on how to prevent these issues from recurring. Specifically, we will examine the following issues:

- (a) Prerequisites and background information,
- (b) Class participation, and
- (c) Class attendance.

The remarks from this paper are based on the opinion of the author and the author alone.

2 Prerequisites and Background Information

As stated in the course catalog, the prerequisite of CS 420 is CS 221 (Analysis of Algorithms). While most of the students have taken CS 221, there were two students who were taking the prerequisite simultaneously with this course. As a result, these two students did not possess the background information in order to cover as much material as desired.

This struggle was reflected early in the course, as there were some issues understanding recurrence relations, which was a fundamental concept in CS 221. While the students claimed to have understood how to do recurrence relations, when asked to complete a few exercises, they had trouble answering the exercises.

The problems related to background information went beyond CS 221. As we delve into probabilistic analysis, permutations, and combinations, most of the students initially struggled with the concepts. This was rather surprising, considering that this material was discussed in CS 220 (Discrete Mathematics), which was a prerequisite for CS 221. In fact, in a course review conducted on January 13, 2011, the majority of the students were only familiar with the first principle of mathematical induction, somewhat familiar with contradiction, contraposition, and direct proof techniques, somewhat familiar with first-order and divide-and-conquer recurrences, and either somewhat familiar or unfamiliar with divide-and-conquer, dynamic programming, and greedy algorithm techniques. All of these topics were covered in either CS 220 or CS 221.

Before we were able to go into the content intended for the course, the instructor had to go over material covered in CS 221 to make sure everyone had adequate background knowledge. However, because we had to allocate more time reviewing material that should have already been covered in previous classes, less time was spent going over supplemental material that would be both beneficial and interesting to the students. We are not implying that the material actually covered in class was not beneficial or interesting, but going over new concepts would have been nice.

The question that remains is how to prevent this issue from happening again. If the students have taken the prerequisite courses, then the only things that can be addressed are:

- (a) Make sure the necessary material is covered in the prerequisite courses, and
- (b) Make sure the students retain the knowledge acquired from the prerequisite courses.

However, considering that two of the students were concurrently taking CS 221 along with CS 420, there must be a problem with the course registration system. A student should not be able to register for a course without completing the prerequisite courses, unless permission is given to the student by the instructor. It is our understanding that the instructor did not give permission to any student regarding taking CS 420 without completing the prerequisite courses. Therefore, it appears there exists a flaw in the online course registration system regarding prerequisite courses.

3 Participation

We now address the issue of class participation in the course. At the beginning of the course, the students struggled with answering the questions provided by the instructor. There were two major indicators that the students were struggling with understanding the material:

- (1) When the instructor asked if there were any questions, the students did not ask for clarification.
- (2) When the instructor asked the students if the material was clear, the students confirmed that the material was clear.

However, even when the students stated that they understood the content, if the instructor gave them in-class exercises, only a small handful of students were able to complete the exercises correctly. Further, if the students

were asked to explain the material, they initially struggled to do so, even though they claimed to have understood what was discussed. A contributing factor originated from the fact that several students did not have the necessary background knowledge, as we discussed in the previous section.

Another contributing factor is the amount of time spent reviewing the material prior to class. In two separate reviews conducted, one on February 17, 2011 and another on March 29, 2011, the vast majority of the students admitted to spending only 1-2 hours per week studying the material outside of the class. If the students had spent more time reading the subject, they may have been able to participate more in class.

Fortunately, class participation improved as the semester progressed. By the middle and the end of the semester, the students were able to answer more questions and explain the material. Whether this is because they prepared for the lectures ahead of time or they knew what to expect in class remains unknown.

One interesting observation we noticed was how rare some students capitalized on bonus point opportunities. While some of the bonus point questions offered in class were more difficult than other questions, bonus points were also offered for going over homework assignment solutions. Since the solutions were provided before discussing the solutions, the students who would want bonus points would have a great opportunity by attending the class and presenting one of the homework questions. However, it appeared that the only students who took advantage of this offer were the students who actually did not need bonus points. In fact, out of the three homework sessions, meaning a total of 15 questions to discuss, the students went over 7 of them, and the instructor went over the remaining 8. This is surprising since we would believe that students would want to take advantage of bonus point opportunities, but it appears this was not the case.

Unfortunately, there does not appear to be a clear-cut solution to promote participation. While the students in CS 420 improved their class participation, this does not happen in all classes. From personal experience, one good approach is to provide various in-class activities to encourage the students to be involved and make sure they're understanding the material. From this perspective, the instructor did everything correctly to promote discussion and participation.

4 Attendance

Attendance throughout the whole semester was much lower than expected, especially for a 400-level course. Two students rarely attended any of the classes, yet one of them did admit that he was not a good student with respect to attendance. Besides the first day of class, there may have been one other day where all the students were present for class. For all the other classes, there was at least one student absence. Further, it appeared that attendance became worse as the semester progressed. While 2 to 3 students would be absent at the beginning of the semester, there were about 3 to 4 students absent at the end of the semester. This is also confirmed in the two course reviews that were conducted on February 17, 2011 and March 29, 2011. In the first review, only one student admitted to missing more than 3 classes, but in the second review, at least two students admitted to missing more than 3 classes. If another course review were given near the end of the semester, the hypothesis would be that even more students would admit to missing more than 3 classes. One reason that was provided by the students was the fact that several students were also taking the senior design class and chose to skip this class

to spend more time working on their projects.

On the days that the instructor had someone else present to lecture or go over the homework, attendance was even worse. In these situations, there were 2 to 4 students present. It is speculated that the reason behind this was that the students did not believe it was necessary to be in class since the instructor was not there either or because we were only going over the homework solutions in class.

An even more surprising observation was the number of times at least one student was late for class. In most cases, the students were late by no more than 5 minutes. However, considering that the class start at 9 : 30 AM, it should not be a problem for the student to attend class on time.

To resolve this issue, changes would need to be made with the course. If attendance is a concern, there is no way to expect the students to attend class because they necessarily want to. Although there exist some students who have those characteristics, many students at all colleges and universities end up skipping classes. If the instructor wants all the students to be present at all classes, then the instructor will need to either introduce an incentive to come to class, such as bonus points, or require attendance by enforcing penalties for missing class, such as deductions in the students' grades. While this may appear unnecessary since students taking 400-level courses should be expected to attend class on their own, unlike freshmen who have a higher tendency to skip class, changes must be made to get the desired results.

5 Conclusion

In this paper, we discussed several issues that occurred in the CS 420 class for the Spring 2011 semester. Specifically, we found that several students did not have the necessary background information to understand all the topics, the students initially struggled with participating in the lectures when asked to do exercises or answer questions, and overall attendance declined as the semester progressed. We also identified a few potential causes and some suggestions to help alleviate the issues found here.