THE SURPRISE EXAM PARADOX*:
Students should be surprised
on Wednesday or Tuesday.

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Abstract

The students in the surprise exam story reasoned that no surprise exam could take place on any day of the week. Actually, however, the students were surprised on Wednesday by the teacher's surprise exam. In this paper, we show where the students' reasoning went wrong and that students should be surprised on Wednesday or Tuesday.

1   Introduction

Many researchers have been interested in the "Surprise Exam Paradox". For example, Ken Levy considered a solution in 2009 (see [4]). Also, Mohammad Ardeshir and Rasoul Ramezanian considered a solution in 2012 (see [1]). Moreover, Tahl Nowik considered a resolution in 2014 (see [5]). Furthermore, Terence Rajivan Edward considered a solution in 2017 (see [3]).

What does the "surprise exam" mean? It does not mean that the contents surprise students. An exam is usually designated in advance its date. In the surprise exam story, however, the teacher did not designate the date exactly. According to the teacher's announcement (see [1] Introduction), the "surprise exam" means an exam such that students will not know in advance its date. The students in the story also consider so in the no Friday argument (see [1] Introduction again). Therefore, even if students will know that the next day is the day of exam, the exam is not called a surprise exam in the story. Hence, the teacher's surprise exam may be difficult to take place on Friday indeed.

However, the students' reasoning such that no surprise exam can take place on any day of the week may be wrong since actually the students were surprised on Wednesday by the teacher's surprise exam.

In this paper, we show where the students' reasoning went wrong and that students should be surprised on Wednesday or Tuesday.

2   Where did the students' reasoning go wrong?

Let us consider where the students' reasoning went wrong.

Suppose that there was no exam before Friday. On Thursday night, the students usually think that the exam will be given on Friday since Friday is the last day by the teacher's announcement. Therefore, it is difficult that the students do not know the day of exam before Friday.

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*See [2].

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Suppose that there was no exam before Thursday. On Wednesday night, the students may think that the exam will be given on Thursday since it is difficult to give the exam on Friday as mentioned above. Here, if to give the exam on Thursday is as difficult as to give the exam on Friday, then the students cannot reason which day the exam will be given by exact logic. However, to give the exam on Friday is more difficult than to give the exam on Thursday since Friday is the last day. Therefore, it is still difficult that the students do not know the day of exam before Thursday.

Suppose that there was no exam before Wednesday. In the story, the students reasoned that the exam would be given on Wednesday in this case before the week. However, to give the exam on Thursday is not more difficult than to give the exam on Wednesday. Here, it is not the reason of difficulty that to give the exam on Wednesday leaves one day more than to give the exam on Thursday since to give the exam on Tuesday left one day more than to give the exam on Wednesday and the exam was not given on Tuesday. Therefore, the students cannot reason that the exam will be given on Wednesday by exact logic. Similarly, the students cannot reason that the exam will be given on Tuesday by exact logic, either. Hence, the students' reasoning is wrong for this part.

Thus, the students will not know in advance the day of exam on Wednesday or Tuesday exactly i.e., the teacher's surprise exam can take place on Wednesday or Tuesday. At least for this part, the students should be surprised on Wednesday or Tuesday.

References

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