

Recitation 7b

Practiced on: 2/23

5:30 - 6:20 pm

Counting

Note: These problems are designed for practice during a 50 minute recitation.

- a) **Easy** problems: expected to be solved in *5 min*.
- b) **Medium** problems: expected to be solved in *30 min*.
- c) **Hard** problems: expected to be solved in *15 min*.

During the recitation, you may discuss the problems with your peers and the TA. Please control your volume and don't annoy others. An electronic copy of these problems and solutions will be posted on the following URL: <http://cs.utsa.edu/~btang/pages/teaching.html>.

Questions:

1. (Easy, 2 min) 1. Show that in any set of six classes, each meeting regularly once a week on a particular day of the week, there must be two that meet on the same day, assuming that no classes are held on weekends. (Textbook [KR] Page 353: 1)
2. (Easy, 3 min) Show that among any group of five (not necessarily consecutive) integers, there are two with the same remainder when divided by 4. (Textbook [KR] Page 353: 5)
3. (Medium, 15 min) Suppose that every student in a discrete mathematics class of 25 students is a freshman, a sophomore, or a junior.
 - a) Show that there are at least nine freshmen, at least nine sophomores, or at least nine juniors in the class.
 - b) Show that there are at least three freshmen, at least 19 sophomores, or at least five juniors in the class. (Textbook [KR] Page 353: 19)
4. (Medium, 15 min) There are 38 different time periods during which classes at a university can be scheduled. If there are 677 different classes, how many different rooms will be needed? (Textbook [KR] Page 354: 31)
5. (Hard, 15 min) Find the least number of cables required to connect 100 computers to 20 printers to guarantee that 20 computers can directly access 20 different printers. (Here, the assumptions about cables and computers are the same as in Textbook [KR] Page 350: Example 9.) Justify your answer. (Textbook [KR] Page 354: 35)

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