Problem I. Champions League

Every year, 32 top football clubs from different European countries get together to compete for the best of best football club. This is the famous UEFA (Union of European Football Associations) Champions League.

During the group stage of this tournament, the 32 teams will be assigned into 8 groups, marked from `A` to `H`, and each group contains 4 teams. The teams within each group will compete with each other and only 2 of them will advance to the knockout phase. UEFA don't want the top teams to compete with each other too early, so they have divided the teams into 4 levels (from level 1 to level 4) with 8 teams each. The teams in the same level will be assigned to different groups, thus each group will have exactly one team from each level. The group assignment is done by levels: UEFA will first assign the 8 teams from level 1 into different groups, then the teams from level 2, and so on. For each level, the teams are assigned one by one: each time an unassigned team is randomly picked and it will be assigned into a random group which it can be assigned based on all the requirements below.

Since each country has at most 5 teams advanced to the Champions League, UEFA don't want the teams from the same country to fight with each other too early, teams from the same country should not be assigned to the same group.

Each round of the games will be played on two different days: groups `A-D` play on the first day and groups `E-H` play on the second day. To make the broadcast schedule more friendly, the matches that involve teams from the same country should be distributed as evenly as possible. To meet this requirement, when a specific team T is about to be assigned, UEFA will first check the teams that have already been assigned from T's country. If the country has the same number of assigned teams in groups `A-D` as groups E-H, they can assign team T to either day; otherwise they have to assign team T to a group from the day with fewer teams.

As there are so many rules, you know what we want to ask: how many different ways can UEFA assign these teams? Two assignments are considered different if one or more teams are assigned to different groups.

Input

The first line of the input gives the number of test cases, T. T test cases follow.

Each case contains four lines which represents level 1 to level 4. Each line contains 8 teams in the corresponding level. Each team is represented as "`X`", where `X` is the country where this team comes from.

Output

For each test case, output one line containing "`Case #x: y`", where `x` is the test case number (starting from 1) and `y` is the number of ways UEFA could assign teams.

Limits

- $1 \leq T \leq 20$.
- `X` only contains three upper-case letters.

Sample input and output

Sample Input	Sample Output
1 ESP GER ENG ITA POR FRA RUS NED ESP ESP POR ENG ENG ESP ENG GER UKR ESP FRA UKR GRE RUS TUR ITA BLS GER GER CRO ISR BEL SWE KAZ	Case #1: 1370850443919360

Note

Sample is the real data of Champion League 2015.