MAP

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| --- | --- | --- |
| **Time Limit:** 1000MS |  | **Memory Limit:** 65536K |

## Description

People get information from search engines such as baidu, google, bing and so on. The all feel alike from a user perspective of view, but what if we want to do something serious where their performance really matters? Therefore, we raise a question: how do we evaluate their performance? The answer is simple, we can a carry out a test.

The test is based on an annotation file, which consists of some query. Every query has a query word and many reference url. For example，“MM xxoo.com ooxx.com xoxo.com”，“MM”is the query word and “xxoo.com ooxx.com xoxo.com”is the reference url. If we put these entries into the search engine, they will generate and return the result accordingly. Then we can do the analysis from here. You job is to calculate the MAP of the search performance. The definition of MAP is：

**Rank:**

position of an retrieved url in the list of retrieved list.

**Precision at a given cut-off rank r for a single query:**

P(r) = (number of relevant url of rank r or less) / r

**Average precision:** defined as follows

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where N is the number of retrieved url, R is the number of relevant url, and rel(r) = 1 if url at rank r is relevant, 0 otherwise.

**Mean average precision:** average precision for a set of queries is defined as follows:



where Q is the number of queries.

## Input

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

Each test case starts with a number n, the query number of annotation file. Followed by 2n lines, the first n lines are the annotation. Each line means a query begins with a word and the reference url following. The second n lines are the search result of the queries in annotation, each line means the search result of a query that begins with a word and the retrieved url followed.

n <= 100.

The length of a line <= 10000.

The length of a url and word <= 50.

## Output

Case number and the MAP value should be rounded to 6 digits after decimal point.

## SAMPLE INPUT

1

3

Banana banana.com

Apple iphone.com ipad.com

Software Microsoft.com IBM.com Google.com

Banana asd.com banana.com

Apple gdfgd.com iphone.com ipad.com

Software gdf.com wer.com tre.com

## SAMPLE OUTPUT

Case #1: 0.361111