The Problem

Webhosting company provide customer support via emil. They record reply waiting time, type of question, category and service. To improve customer satisfaction, they need analytical tool to evaluate these data.

Input

Company provide 10 different service, each with 3 variations. Questions are divided into 10 types, each can belong to 20 categories, a category can have 5 sub categories.

First line contains count S (<= 100.000) of all lines.
Every line starts with character C (waiting time line) or D (query)

`C service_id[.variation_id] question_type_id[.category_id.[sub-category_id]] P/N date time`

Values in square brackets are optional. Service 9.1 represent service 9 of variation 1. Question type 7.14.4 represent question type 7 category 14 and sub-category 4. Response type 'P' (first answer) or 'N' (next answer). Response date format is DD.MM.RRRR, for example 27.11.2012 (27.november 2012). Time in minutes represent waiting time.

Similarly query line:

`D service_id[.variation_id] question_type_id[.category_id.[sub-category_id]] P/N date_from[-date_to]`

Represent query, it print out average waiting time of all records matching specific criterias. service_id and question_type can have special value "*", it means query match all services/question types. In case of value "*", no service variation nor service category/sub-category can be specified.

Output

Query line of type 'D' print out average waiting time rounded to minutes. Only matching lines defined before query line are counted. It print out "-" if output is not defined.

Example

Input:
7
C 1.1 8.15.1 P 15.10.2012 83
C 1 10.1 P 01.12.2012 65

C 1.1 5.5.1 P 01.11.2012 117
D 1.1 8 P 01.01.2012-01.12.2012
C 3 10.2 N 02.10.2012 100
D 1 * P 8.10.2012-20.11.2012
D 3 10 P 01.12.2012

Output:
83
100
-

Explanation

1.query at line 5, is valid only for 1. data line, because others has different question type. First data line has question type 8.15.1 which match with query of question type 8.

2.queryis valid only for 1. and 3. data lines, 2. data line not matching date filter., and 4.data line has different response type (D). Result is 83+117/2

3.query doesn't match any data line, therefore result is "-"

Solution

Solution must be optimized for readability, flexibility and good maintenance of source code. You can choose PHP or Java language, without external libraries.