Schedule of teachers and subjects — X84909_en

The input of this exercise will have one or more lines, where each one of them specifies a class given by a teacher along the week. More specifically, each line has a name of a subject, a name of a teacher, a day of the week, a starting hour and an ending hour. For example:

```
algebra joel monday 8 10
physics guille thursday 10 14
programming guille thursday 11 13
programming nuria thursday 12 14
statistics silvia tuesday 9 10
deeplearning silvia tuesday 8 10
```

For the sake of simplicity, names of subjects and teachers are strings of lowercase letters. The days of the week are always in {`monday`,`tuesday`,`wednesday`,`thursday`,`friday`}. The two hours h_1, h_2 always hold $h_1 < h_2$ and are in the set $\{0, \ldots, 24\}$.
As you can see on former example, there may be repetitions of subjects and conflicts of teachers (a subject may be given simultaneously more than once, and a teacher may be assigned to more than one simultaneous class).
The first part of the output will have a description as a table of how many classes are being given at each hour of the week. The first column (`h`) has width 2 and is used to describe the starting time. The following 5 columns have width 10 each and are used for each day of the week. All columns are right-justified. Each row shows the information of a concrete hour. The hours shown are only those in the interval starting from the first one where a class is given until the last one where a class is still being given. This would be the result corresponding to former example:

```
number of subjects per slot:
 h    monday   tuesday wednesday  thursday    friday
 8         1         1         0         0         0
 9         1         2         0         0         0
10         0         0         0         1         0
11         0         0         0         2         0
12         0         0         0         3         0
13         0         0         0         2         0
```

In a second part of the output we have a table with the same format, but this time each cell shows the number of `different` teachers giving class at that particular hour and day (that is, the number of teachers giving class that hour and day after having removed repetitions). This would be the result corresponding to former example:

```
number of teachers per slot:
 h    monday   tuesday wednesday  thursday    friday
 8         1         1         0         0         0
 9         1         1         0         0         0
10         0         0         0         1         0
11         0         0         0         1         0
12         0         0         0         2         0
13         0         0         0         2         0
```

Finally, the output has a natural, which is the minimum number of hours of class where we need to replace current professor with a new one in order to avoid conflicts, that is, in order to prevent any teacher from being giving two classes simultaneously. This would be the result corresponding to former example:

```
number of replacements needed to avoid conflicts:
3
```

In order to solve this exercise, it is compulsory to conveniently use the following data structures. Otherwise, the delivery will be invalidated.

```
struct Slot {
vector<string> listsubjects;
vector<string> listteachers;
};

typedef vector<vector<Slot> > TableSlots;
```

Input

The input has already been described in the statement of the exercise. Take a look at the public data tests in order to get the hang of it.

Output

The output has already been described in the statement of the exercise. Take a look at the public data tests in order to get the hang of it.

Sample input 1

```
algebra joel monday 8 10
physics guille thursday 10 14
programming guille thursday 11 13
programming nuria thursday 12 14
statistics silvia tuesday 9 10
deeplearning silvia tuesday 8 10
```

Sample output 1

```
number of subjects per slot:
 h    monday   tuesday wednesday  thursday    friday
 8         1         1         0         0         0
 9         1         2         0         0         0
10         0         0         0         1         0
11         0         0         0         2         0
12         0         0         0         3         0
13         0         0         0         2         0
number of teachers per slot:
 h    monday   tuesday wednesday  thursday    friday
 8         1         1         0         0         0
 9         1         1         0         0         0
10         0         0         0         1         0
11         0         0         0         1         0
12         0         0         0         2         0
13         0         0         0         2         0
number of replacements needed to avoid conflicts:
3
```

Sample input 2

```
algebra jose wednesday 19 23
analysis jose wednesday 9 11
history sonia monday 19 23
analysis nuria tuesday 4 6
programming merce wednesday 21 24
biology guille thursday 19 20
physics jordi wednesday 18 23
music laia tuesday 19 22
analysis manel tuesday 23 24
biology merce friday 11 12
analysis jose tuesday 20 22
geometry guille monday 4 6
```

philosphy nuria friday 15 17
music jose friday 1 4
pedagogy nuria wednesday 9 14
biology angels friday 3 4
history manel tuesday 2 6
geometry manel tuesday 2 7
philosphy nuria tuesday 0 5
biology jose tuesday 6 11
analysis oscar friday 10 13
physics guille wednesday 21 24
physics ferran tuesday 8 10
botanics nuria friday 4 9
pedagogy serge tuesday 13 16
analysis sandra monday 21 24
algebra jose wednesday 9 11
pedagogy jose thursday 11 16
algebra sandra wednesday 5 9
music nuria thursday 4 5
biology serge tuesday 11 15
computers ferran tuesday 1 2
analysis laia friday 20 22
physics laia monday 2 7
history joel wednesday 8 12
pedagogy guille monday 3 5
pedagogy ferran wednesday 4 5
physics serge tuesday 2 3
philosphy sonia monday 1 5
computers manel tuesday 0 5
algebra joel thursday 19 23
philosphy ferran monday 16 20
analysis manel friday 21 24
analysis angels thursday 6 10
physics angels wednesday 5 10
botanics laura friday 2 4
computers guille wednesday 8 11
geometry nuria friday 20 22
music manel friday 15 17
history oscar wednesday 23 24
music jose tuesday 18 22
computers nuria tuesday 4 6
biology laura thursday 16 19
pedagogy angels wednesday 6 11
botanics sandra wednesday 11 16
arts merce tuesday 21 23
arts oscar thursday 14 15
history joel tuesday 11 13
analysis manel thursday 12 13
geometry ferran tuesday 20 21
programming angels tuesday 6 8
geometry nuria tuesday 19 23
botanics guille thursday 4 9
programming ferran monday 6 9
physics sandra thursday 12 14
philosphy angels friday 9 14
philosphy jose monday 11 12
geometry guille monday 0 4
algebra joel wednesday 5 7
physics nuria friday 4 7
history laura monday 9 12
analysis oscar wednesday 2 6
pedagogy laura friday 14 19
geometry serge tuesday 12 13
computers joel friday 17 21
analysis nuria monday 4 7
biology joel thursday 13 15
computers angels thursday 1 6
programming serge friday 10 13
analysis angels tuesday 18 22
programming joel wednesday 12 16
pedagogy sandra thursday 1 5
programming laia thursday 8 9
history sonia tuesday 8 13
botanics sandra thursday 5 10
computers laia thursday 3 6
pedagogy sonia tuesday 21 24
pedagogy oscar thursday 21 24
arts nuria friday 9 10
analysis merce wednesday 2 6
analysis guille friday 9 14
history angels wednesday 12 16
physics ferran wednesday 18 23
physics laura friday 19 22
programming jordi friday 5 10
physics laura friday 23 24
analysis oscar thursday 11 16
history guille thursday 12 13
algebra serge friday 22 24
botanics sandra friday 2 5

Sample output 2

```
number of subjects per slot:
 h    monday   tuesday wednesday  thursday    friday
 0         1         2         0         0         0
 1         2         3         0         2         1
 2         3         5         2         2         3
 3         4         4         2         3         4
 4         5         6         3         5         2
 5         3         4         5         4         2
 6         3         3         4         3         2
 7         1         2         3         3         2
 8         1         3         5         4         2
 9         1         3         7         2         4
10         1         2         6         0         4
11         2         3         3         2         5
12         0         4         4         5         4
13         0         2         4         4         2
14         0         2         3         3         1
15         0         1         3         2         3
16         1         0         0         1         3
17         1         0         0         1         2
18         1         2         2         1         2
19         2         4         3         2         2
20         1         6         3         1         4
21         2         7         5         2         4
22         2         3         5         2         2
23         1         2         3         1         3
number of teachers per slot:
 h    monday   tuesday wednesday  thursday    friday
 0         1         2         0         0         0
 1         2         3         0         2         1
 2         3         3         2         2         3
 3         3         2         2         3         4
 4         4         2         3         5         2
 5         3         2         5         4         2
 6         3         3         3         3         2
 7         1         2         2         3         2
 8         1         3         4         4         2
 9         1         3         5         2         4
10         1         2         5         0         4
11         2         3         3         2         5
12         0         3         4         5         4
13         0         1         4         4         2
14         0         1         3         3         1
15         0         1         3         2         3
16         1         0         0         1         3
17         1         0         0         1         2
18         1         2         2         1         2
19         2         4         3         2         2
20         1         5         3         1         4
21         2         6         5         2         4
22         2         3         5         2         2
23         1         2         3         1         3
number of replacements needed to avoid conflicts:
```

Observation

Grading up to 10 points:

- Slow solution: 5 points.
- Fast solution: 10 points.

We understand as a fast solution one which is correct, with $n \log(n)$ cost and which passes the public and private tests. We understand as slow solution one which is not fast, but it is correct and passes the public tests.

Problem information

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