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## 4. Emergency Room

**Program Name:** Emergency.java

**Input File:** emergency.dat

A particular hospital emergency room operates as follows:

1. When patients arrive they are immediately evaluated and given a severity score, 1 through 10, with the higher numbers being more severe. Assume the evaluation doesn't take any time.
2. Then the patient is asked to fill out paperwork that takes 5 minutes. Patients with severity 8 or higher can be seen before the paperwork is complete, and will finish the paperwork after the doctor is done. Paperwork completed after seeing the doctor does not count toward the wait time.
3. When a doctor is ready for a new patient, he grabs the highest severity person that has also been waiting the longest.
4. The wait time starts when the patient arrives at the ER, includes the time spent completing the paperwork (as described in item #2 above) before seeing the doctor, and ends when the doctor starts seeing the patient.
5. Assume that for any given severity, the doctor will spend the severity number times 8 minutes with the patient.
6. The hospital will always have a minimum of 3 doctors on duty during the 24 hour period.

You have been hired by the hospital to create a simulation to help them determine the optimal number of doctors that need to be on duty during a given 24 hour period so that the average wait time for all patients that enter the ER during that period is less than or equal to a given target wait time. You are to use the ER operations listed above to create the simulation. The hospital has given you several scenarios (described in the Input section below) to test your simulation.

### Input

The first line will contain a single integer  $n$  that indicates the number of simulation scenarios to follow. For each scenario:

- The first line contains two integers  $e$  and  $a$ , separated by a space, where  $e$  is the number of entries in the simulation and  $a$  ( $a \geq 5$ ) is the target maximum wait time for a patient to be seen by a doctor, in minutes..
- The next  $e$  lines contain a time in 24 hour format, followed by a space and an integer  $s$  ( $1 \leq s \leq 10$ ) denoting the severity of the patient.
- The entries in a scenario will be in the order patients arrive to the ER for a 24 hour period starting at 00:00 and ending at 23:59.

### Output

For each scenario, you will print the minimum number of doctors that need to be on duty so the average wait time for the patients is less than or equal to the target wait time goal, followed by a space and the word `doctors`.

### Example Input File

```
1
8 5
00:01 9
00:01 9
00:01 3
00:06 8
11:01 3
11:15 8
11:30 8
23:10 1
```

### Example Output to Screen

```
4 doctors
```