

In this assignment, you will design and implement a solution to the “Class Routine Management” problem satisfying some given constraints like preferred time schedule for each faculty member, list of courses, fixed number of slots per day, availability of classrooms in specific time-slots etc. These constraints will be provided as input (see Input section). Output of your program should be the proposed “Weekly Class Routine” for 4 batches (1st year - 4th year) in an easy to view/edit format (preferably in an excel/ text file).

Given below is a sample weekly class routine for 1st year students. Your program should generate 4 tables like this. Class time-slots and no. of working days are fixed. Hence, the dimension of routine table for every batch will be same. Also notice that the table contains theory courses only (availing one slot at a time). For simplicity, you may consider it for this task.

	8:30-10:00	10:00-11:30	11:30-1:00	2:00-3:30	3:30-5:00
Sun	CSE 1101 DSP R#413	EEE 1121 TAA R#413		MATH 1122 AAA R#413	
Mon		CSE 1102 HHJ R#413	PHY 1124 RIS R#413		
Tues	CSE 1101 DSP R#413	EEE 1121 TAA R#413		MATH 1122 AAA R#413	
Wed		CSE 1102 HHJ R#413	PHY 1124 RIS R#413		
Thurs					

Fig: Sample Class Routine

INPUT

Generate two separate text files for input.

File #1: Teachers' preferences

The first line contains an integer, T denoting the number of available teachers.

For each teacher, there will be some more line of input.

1. Name (A string containing multiple words in a single line)
2. Short form of name (A word with 3 or 4 letters)
3. Availability Matrix (A 5x5 matrix containing only 'A' and 'N' representing his/her preferred time-slots; A - Available, N - Not available)

Sample

```
2
Dr. Suraiya Parvin
DSP
AAANN
ANNNA
AAAAN
NNAAA
NNNNN
Dr. Shabbir Ahmed
DSA
AAAAA
ANNNA
AAAAN
NNNNN
NNNNN
```

The first line of each availability matrix represents Sunday and the five letters in each line represents each slot for that day.

File #2: Courses

The first line contains an integer, T denoting the number of offered courses.

There will be two more lines for each course.

1. Course Code (A string and an integer separated by a single whitespace)
Left-most digit of the integer represents the year which the course is offered for;
e.g. "CSE 1101" is a course for 1st year students and "CSE 3121" is for 3rd year.
2. Short form of name of the teacher assigned for this course.
(You can assume this name will appear in **File #1**)

Sample

```
3
CSE 1101
DSP
CSE 1102
HHJ
CSE 3121
DSA
```

Available Classrooms

By default, there are 3 classrooms available from sunday - thursday. These are: R#412, R#413 and R#320. You have to distribute all the classes among these rooms.

Tasks

Part 1: 50 marks

Inputs will be such that one or more valid solution(s) with no conflicts exist(s).

Any such solution will give you full marks for this part.

Part 2: 30 marks

Different types of conflicts may appear. Provide the one with least conflicts.

Points to note:

1. No two classes should be placed in the same room at the same time.
2. A batch won't have more than one class at the same time.

You can compromise 'Teachers' Preferences' (only if needed) to satisfy the above constraints.

Part 3: 20 marks

If multiple solution exists, provide the most preferred one.

1. Try to place the classes of a teacher in consecutive timeslots according to his/her preference (it should be the first priority).
2. Try to place all classes of a particular batch in least number of days.

Bonus:

Consider lab courses.

A lab course consists of two consecutive slots in the same room. Consider that, four lab rooms are available for all slots throughout the week. They will be named as Lab #1 - Lab #4.

You can identify a lab course from the given course code. It will contain '1' in the third digit from the left. For example, 'CSE 1111' is a lab course; 'CSE 3201' is not.

Submission Deadline

Friday, March 31, 2017 11:30 PM