Subject Allocation (Scheduling) of Faculty Members

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In

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School of Engineering and Sciences

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[Dec/2022]

Certificate

Date: 12/07/2022

This is to certify that the work present in this Project entitled "**Subject Allocation (Scheduling) of Faculty Members**" has been carried out by **Jahnavi Kota** under my/our supervision. The work is genuine, original, and suitable for submission to the SRM University – AP for the award of Bachelor of Technology/Master of Technology in the **School of Engineering and Sciences**.

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Abstract

A constraint satisfaction problem (CSP) is a general framework that can formalize various application problems in artificial intelligence (AI). A CSP is typically shown by the problem n-queens. The goal is to arrange the n chess queens on a board with n × n squares in such a way that they do not pose a threat to one another. Because the goal is to identify a configuration that satisfies the specified conditions, a problem of this type is known as a constraint satisfaction problem.

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1. Introduction

Subject scheduling used to be done manually, which requires a lot of time and patience. Additionally, it produces more paperwork, which is challenging to manage. A single person or a group of people who were interested in properly managing time came up with the subject management plan. But these days by using different algorithms we are able to overcome this problem and save time. This application is mainly used in colleges which it takes less time to maintain. In case the faculty is absent they should fill that empty slot immediately, in such cases application can work by itself with little or no direct human control. Hence, the system builds a practical approach for constructing lecture course timetabling for every subject system. Details about the user are visible to the administrator. Users with permission can only log in. The database can be accessed by the administrator with no restrictions. Only the administrator has access to the staff information. Only the administrator has the ability to create or modify the personnel. Subject-wise allotments will be made by staff, and users will then need to schedule their subject times with their section.

In this project, we did use constraint satisfaction problem. A constraint satisfaction problem means solving a problem under certain constraints or rules. All the conditions given must be satisfied in order to produce the final result. For example, in a crossword puzzle, it is only required that words that cross each other have the same letter in the location where they cross. It would be a general search problem if we require, say, that we use at most 15 vowels. Another example is the n-queens problem, the local condition is that no two queens attack each other, i.e. are on the same row, column, or diagonal.

The following are traits of a Constraint Satisfaction Problem:

- A set of variables
- A set of domains in which the variables are located. Each variable has a distinct domain.
- A set of constraints which are followed by a set of variables.

T: faculty

X: section

Y: subject

T(Y)==X(Y)

T(Y)<3

1.1 Objective

In this project, we allocate faculty with a set of subjects to different sections based on their preferences/interests, availability etc. by using a constraint satisfaction problem.

The goal of the constraint satisfaction problem is to locate a value in D_i for x_i such that all requirements are satisfied for any i between 1 and n.

2. Methodology

In our project 'subject allocation of faculty members we have considered the following constraints:

1. The faculty's requirements should be consistently addressed.

2. Different faculty members may teach the same subject, but there should not be any conflicts with their classes.

3. There must not be a collision in the classroom designated for each teaching member.

4. The algorithm must process a subject if it has any lab, subject to constraint 3.

2.1. Proposed model

We have taken two input files named 'faculty.txt' and 'section.txt'.

The faculty text file contains faculty names with respective subjects.

The section text file contains the semester number, sections, and their respective subjects.

If we find any faculty with first preference, we allocate that subject to the faculty. Else, we search for the faculty having that subject as a second preference. We follow every constraint which are required for the allocation.

2.2. Flow chart

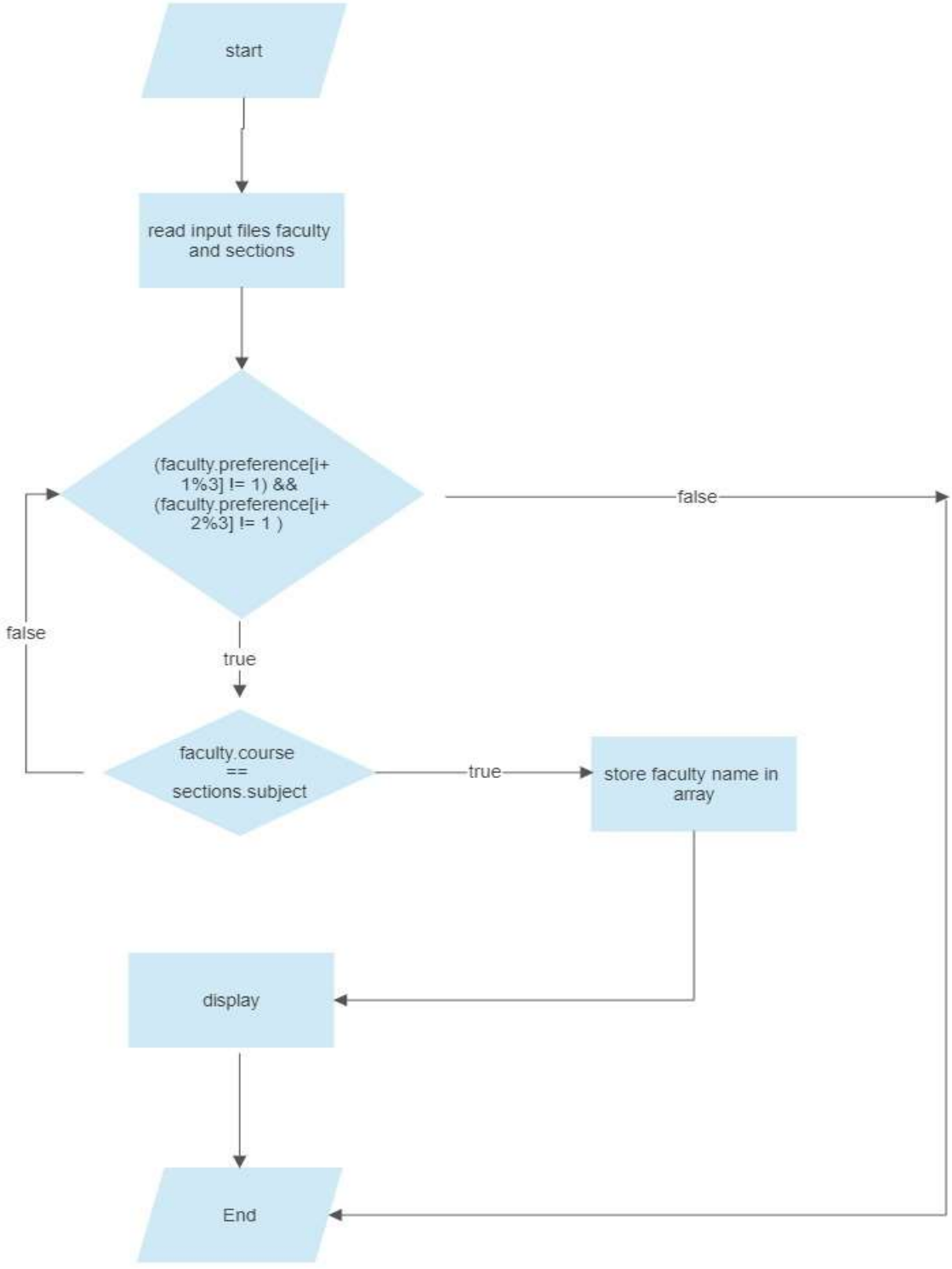


Fig.1 Flowchart of Subject Allocation (Scheduling) of Faculty Members

2.3. Inputs

We take two databases as input, “sections” and “faculty”. The sections database contains the semester number, followed by branch and section, which is followed by a subject.

The faculty database contains faculty names followed by their subject preferences.

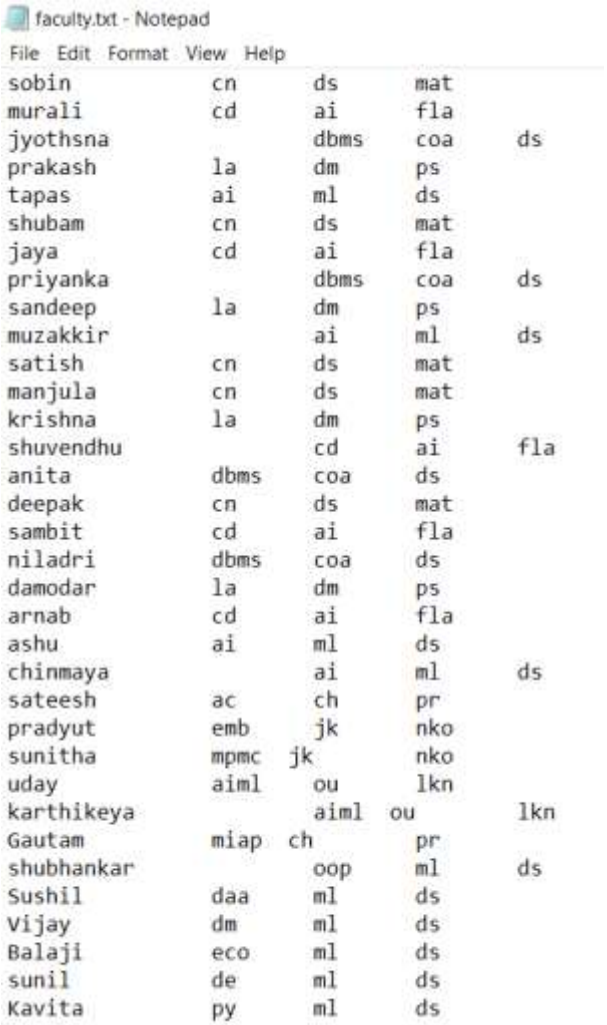


Fig.2 faculty information

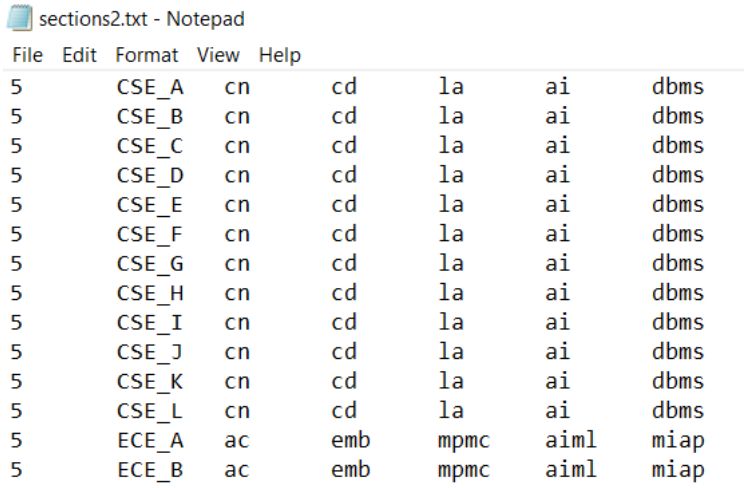
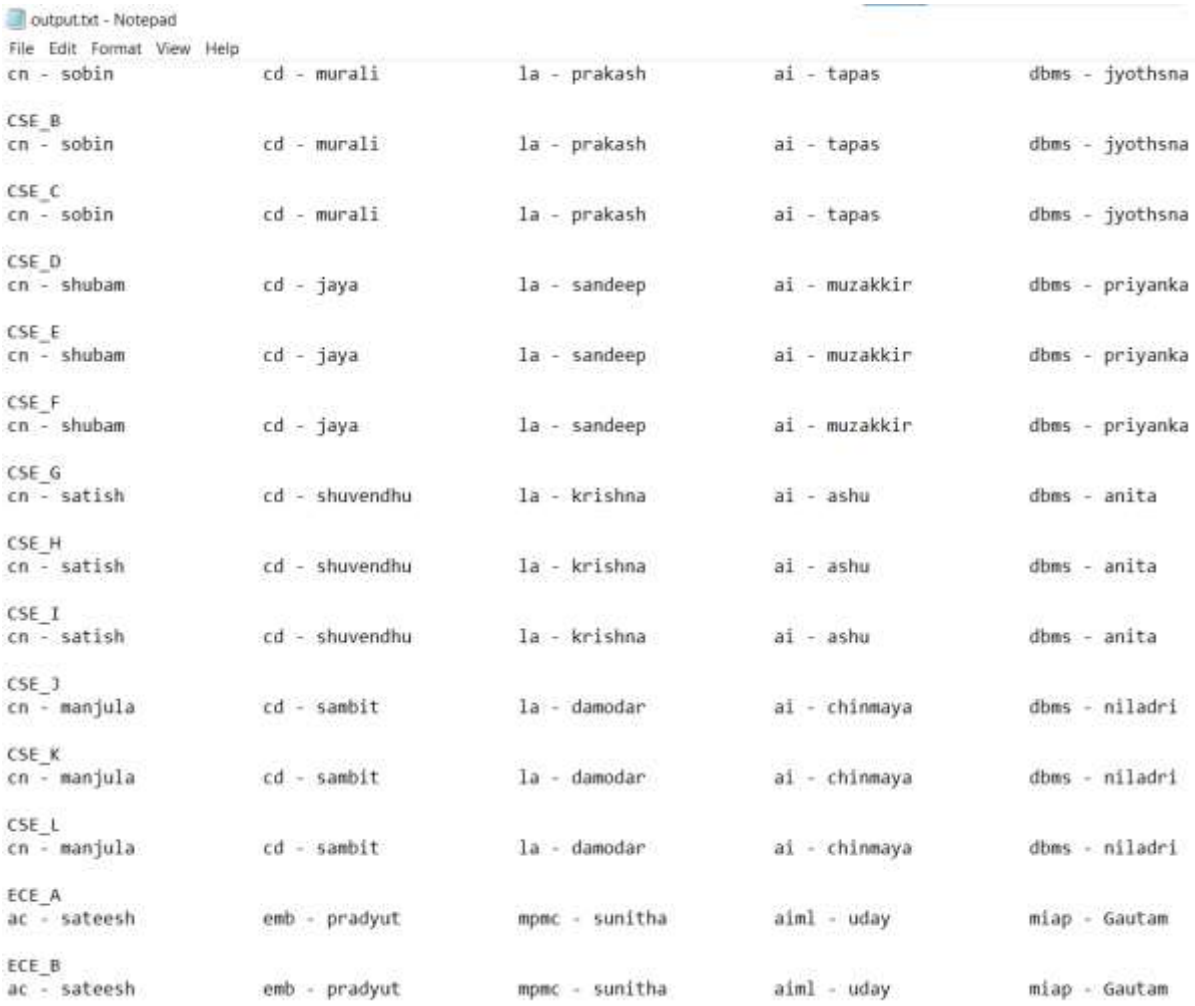


Fig.3 sections information

2.4. Output

The output will be the subject name followed by the allocated faculty for that subject for each section.


output.txt - Notepad

File Edit Format View Help

```
cn - sobin              cd - murali          la - prakash          ai - tapas          dbms - jyothsna

CSE_B
cn - sobin              cd - murali          la - prakash          ai - tapas          dbms - jyothsna

CSE_C
cn - sobin              cd - murali          la - prakash          ai - tapas          dbms - jyothsna

CSE_D
cn - shubam             cd - jaya            la - sandeep          ai - muzakkir       dbms - priyanka

CSE_E
cn - shubam             cd - jaya            la - sandeep          ai - muzakkir       dbms - priyanka

CSE_F
cn - shubam             cd - jaya            la - sandeep          ai - muzakkir       dbms - priyanka

CSE_G
cn - satish             cd - shuvendhu       la - krishna          ai - ashu           dbms - anita

CSE_H
cn - satish             cd - shuvendhu       la - krishna          ai - ashu           dbms - anita

CSE_I
cn - satish             cd - shuvendhu       la - krishna          ai - ashu           dbms - anita

CSE_J
cn - manjula            cd - sambit          la - damodar          ai - chinmaya       dbms - niladri

CSE_K
cn - manjula            cd - sambit          la - damodar          ai - chinmaya       dbms - niladri

CSE_L
cn - manjula            cd - sambit          la - damodar          ai - chinmaya       dbms - niladri

ECE_A
ac - sateesh            emb - pradyut        mpmc - sunitha        aiml - uday         miap - Gautam

ECE_B
ac - sateesh            emb - pradyut        mpmc - sunitha        aiml - uday         miap - Gautam
```

Fig.4 Output

Concluding Remarks

Many institutions assign subjects to faculty through physical or manual work, which takes a long time to complete and places a tremendous burden on the person conducting it. There could be a risk of constantly making mistakes. Therefore, we developed the method described above to address the issues encountered while allocating the subjects to faculty, which enables the institutions to complete the task more quickly and with fewer errors.

References

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