Solve Time-Tabling Problem as CSP

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Model

We can use *backtracking algorithm* to solve the problem.

Constrains

- Variables should be assigned only with one element from the domain.
- Two compulsory subjects cannot be in the same time slot
- Two optional subjects may or may not in the same time slot
- Same time slot and room cannot be assigned for 2 different subjects.

Implementation

Consider compulsory subjects first. Since two compulsory subjects cannot be in the same time slot only assign the subject to a time slot and room when that particular time slot is not already assigned either for compulsory or optional subjects. After assigning the slot and room call the backtracking algorithm recursive mode again and until in finds the final solution or else remove the assigned slot and room and go in a different branch of the DFS tree.

Consider optional module now. When the available slot is not already assigned for another module then do the same procedure as compulsory module. When the slot is assigned for a compulsory module then check other available time slot to assign. If the time slot is assigned for another compulsory module and there is no other available time slot remaining, then we have choose another branch from where the conflict arose but if there is another time slot then assign that slot for that specific compulsory module.

Solution

GitHub: https://github.com/KabilanMA/csp-time-tabling-problem

Google Colab:
https://colab.research.google.com/drive/1sfcZ63oMrhM4ZZPp8lSwpud2xbWiSzKl?usp=sharing