**Scheduling algorithm.**

**Project Outline**

Context: the scheduling algorithm that needs to be improved was developed to tackle the problem of designing real life schedules with complex and changing restrictions. It works well enough for many problems but it takes too long to run with bigger sets of data and in some cases it runs forever instead of simply stating that there is no solution.

**Current algorithm:**

Python implementation of the algorithm tries to find an optimal solution (or increasingly optimal solutions) for a restricted minimization model that represents the problem, using the following data extracted from the Excel file:

|  |  |
| --- | --- |
| **Variable** | **Content** |
| **Subjects** | List of all subjects. |
| **Divididas** | List of subjects that divide the group in two. (Not relevant for this example). |
| **Espejos** | List of pairs of subjects that have to occur at the same time. |
| **Un\_bloque** | List of subjects that need to have two consecutive hours at some point of the week. |
| **Dia\_cerrado** | Dictionary with the day of the week in which the class must occur. (Not relevant for this example). |
| **Mats\_examen** | Dictionary with a list of subjects that must have at least one day in common. (Not relevant for this example). |
| **Definidas** | Dictionary that contains, for those subjects that must occur in already defined times, the slots in which they must be located. |
| **Teachers** | List of all teachers. |
| **Teacher\_work\_hours** | List that contains a list for each teacher with a 0/1 value for each slot in the schedule. 1 means that the teacher is available for teaching that slot. |
| **Sin\_pesos** | Too hard to explain. Not applicable for the example. Just ignore for now. |
| **Castigo** | List of values indicating how badly should we try to respect the availability for each teacher. |
| **Ahorcadas** | List of values indicating how badly should we try to avoid that each teacher has idle periods between classes. |
| **Curriculum** | Dictionary that contains, for each group and subject, how many hours a week they must have. |
| **Dicc\_salones** | Variables that state which classrooms must or can be used for each subject. Not relevant for the example. Ignore for now. |
| **Indistintos** |
| **Salon\_por\_materia** |