

Midterm Exam Scheduling - Implementation Report

<https://github.com/belkiz-ozbek/303-term-project/tree/main>

Group 15

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The purpose of this program is to implement a scheduling algorithm for midterm exams, considering various constraints such as student and professor availability, classroom capacities, and the ability to block specific hours for common courses. The program reads input data from CSV files, including the class list, blocked hours and classroom capacities, and outputs a schedule that adheres to the specified constraints.

1. Reading CSV Files

The program reads three CSV files: one containing class lists, another containing blocked hours, and a third containing classroom capacities. The user is prompted to input the file names with the .csv extension for each of these datasets via the command line. It uses separate functions (readingToClassesStruct, readingToBlockedHoursStruct, and readingToClassroomsStruct) to parse the data into appropriate data structures (Classes, BlockedHours, and Classrooms arrays).

2. Scheduling Algorithm

The scheduling algorithm is implemented using backtracking. The program attempts to assign exam times for each class while adhering to the specified constraints. It checks student and professor availability, ensures that a classroom's capacity is not exceeded, and considers any blocked hours for common courses. The `backtrackToFindSchedule` function recursively explores possible schedules, and the `checkSchedule` function verifies whether a given schedule is valid based on the defined constraints.

3. Challenges Faced

One notable challenge was ensuring the correctness of the scheduling algorithm and handling various constraints simultaneously. The implementation required careful consideration of class capacities, student and professor availability, and blocked hours. While testing the program, we encountered different outputs in different environments, which posed challenges during the implementation.

4. Conclusion

The program utilizes backtracking to explore possible schedules while considering student, professor, and classroom constraints. The final output provides a clear representation of the exam schedule, helping users visualize the assigned times for each class.

5. Output Screenshot

All exams are scheduled

Exam Schedule:				
Day	Starting Time	Room	Prof Name	Course ID
Saturday	1000	B206	Dr. Brown	BIOLOGY202
Thursday	900	B206	Dr. Flores	ANTHROPOLOGY201
Friday	1000	A105	Dr. Flores	ANTHROPOLOGY201
Tuesday	1000	B206	Dr. Flores	ANTHROPOLOGY201
WednesdayThu: 930		B206	Dr. Wilson	ANTHROPOLOGY201
WednesdayThu: 1530		B206		
Thursday	1130	B206	Dr. Lewis	CHEMISTRY301
Friday	1130	B206	Dr. Johnson	CHEMISTRY301
Friday	1630	B206	Dr. Hernandez	ECON101
Thursday	1530	B206	Dr. Garcia	ECON101
Thursday	1430	B206	Dr. Moore	ECON101
Thursday	1430	B206	Dr. Anderson	ECON301
Thursday	1530	B206	Dr. Scott	ECON301
Thursday	1700	B210	Dr. Allen	ENGL301
Saturday	1030	B206	Dr. Allen	ENGL301
Monday	1130	B206	Prof. Martinez	HIST101
Friday	1430	B206	Prof. Baker	HIST201
Saturday	1000	B206	Prof. Davis	HIST201
Friday	1030	B206	Prof. Clark	HIST201
WednesdayThu: 1730		B206	Prof. Miller	MATH301
Thursday	1330	B206		
Thursday	1430	B206	Dr. Clark	MUSIC301
Monday	900	B206	Dr. Davis	PHY301
Friday	1430	B210	Prof. King	POLSCI201
Friday	1030	B206	Prof. King	PSYCH101
Monday	1430	B210	Prof. Moore	PSYCH201
WednesdayThu: 930		B206	Prof. Moore	PSYCH201
WednesdayThu: 1330		B206		
WednesdayThu: 1630		B212	Prof. Turner	PSYCH201
Friday	1530	B206		
Tuesday	1430	B206	Dr. Wilson	ANTHROPOLOGY101
Saturday	1700	B206	Dr. Brown	ANTHROPOLOGY301
WednesdayThu: 1600		B212	Prof. Clark	ART103
Friday	1030	B206		
Tuesday	1600	B206	Dr. Wilson	BIOLOGY201
Tuesday	1100	B206	Dr. Lewis	BIOLOGY201
WednesdayThu: 1100		B206	Prof. White	CHEM101
WednesdayThu: 1630		B206		
Monday	1700	B206	Dr. Bailey	CHEM101