Project Report

Artificial Intelligence

Azeem Waqar
I210679
CS-B

Initialization: The Timetable Scheduler class is initialized with lists of courses, professors, sections, rooms, and course types, along with parameters defining the timetable structure such as the number of days, morning and afternoon slots, session start times, etc.

Chromosome Generation: The generate_chromosome method generates a chromosome for each course, randomly assigning details such as course type, section, professor, day, timeslot, and room for both the first and second lectures.

Fitness Function: The fitness_function evaluates the fitness of a chromosome based on constraints such as classroom size, professor and room assignment conflicts, section assignment conflicts, professor and section course limits, lecture days, and lab lecture constraints. The fitness score is calculated as the negative of the total number of conflicts.

Crossover and Mutation: The crossover method selects two parents, performs crossover at a random point, and generates two offspring. The mutate method introduces random mutations in the offspring chromosomes.

Evolution: The evolve method evolves the population over a specified number of generations. It calculates fitness scores, selects parents using tournament selection, performs crossover and mutation, and replaces the old population with the new one. The best fitness score and chromosome are printed for each generation.

It is a traditional implementation of Genetic Algorithm; it runs for 100 Generations (Iterations) and returns the best chromosome after 100 generations.