

## GENETIC ALGORITHM BASED SOLUTION FOR FINAL EXAM SCHEDULING

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### ABSTRACT

The automatic generation of schedules has been in focus of researches for decades. Since small changes in the input have exponential impact on the tested state space, methods based on heuristics and artificial intelligence are the most successful.

In our paper we analysed the opportunities of automatic generation of the academic final exam scheduling, which is a special subtask of schedule generation. We examined the problem with the genetic algorithm approach. We created a point system, wherewith the goodness of the generated schedules is measurable and comparable. We analysed the effect on achievable results caused by the different changes on our algorithm. We evaluated the algorithms on a real test set of 100 students.

Our results show that for this complexity there is an acceptable solution, and with some improvements on our algorithm we will be able to give solutions, which are better and fairer, than the manually compiled schedules.

### INTRODUCTION

Final examination takes place at the end of the degree course in most universities. One current form of this is the oral examination, where at one time in one room only one student takes the exam in front of a board of examiners. All of these instructors have a special role, and only some particular people can fill in these places.

The scheduling of the final exams may be done manually, but the non-automated process can cause human errors, and it is hard to see through the whole scheduling, whether all requirements are realized and the timing is appropriate for everyone.

The complexity of this problem can be approached on two levels. The scheduling problem in itself is NP-complete [1], as there are too many possible combinations for scheduling people. In addition, many final-exam specific conditions must be satisfied during the scheduling and some of them contradict each other easily. For example, we may want to distribute the load among the examiners equally, but to perform certain tasks, such as filling the position of the president or examination from some subjects, only certain academics are suitable. Some teachers may have much more students than others, and it is also possible that not every necessary instructor is available at the same time.

# Final Exam And Solution For Genetic Algorithm

**A Gutmann**



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*Artificial Intelligence and Applications* Amita Yadav, Amit M. Joshi, Mehmet Ergezer, Valentina Emilia Balas, 2025-02-24  
The papers in this book are high quality refereed papers presented at ICAIA 2024 the second International conference on Artificial Intelligence and Applications held at Maharaja Surajmal Institute of Technology New Delhi in collaboration with Wentworth Institute of Technology Boston USA in March 2024 This book presents new and innovative developments and applications in machine learning data mining neural networks computation optimisation technologies followed by research applications in signals language and classification prediction recommendations and systems This book is essential for researchers and practitioners in this field

**Grouping Genetic Algorithms** Michael Mutingi, Charles Mbohwa, 2016-10-04  
This book presents advances and innovations in grouping genetic algorithms enriched with new and unique heuristic optimization techniques These algorithms are specially designed for solving industrial grouping problems where system entities are to be partitioned or clustered into efficient groups according to a set of guiding decision criteria Examples of such problems are vehicle routing problems team formation problems timetabling problems assembly line balancing group maintenance planning modular design and task assignment A wide range of industrial grouping problems drawn from diverse fields such as logistics supply chain management project management manufacturing systems engineering design and healthcare are presented Typical complex industrial grouping problems with multiple decision criteria and constraints are clearly described using illustrative diagrams and formulations The problems are mapped into a common group structure that can conveniently be used as an input scheme to specific variants of grouping genetic algorithms Unique heuristic grouping techniques are developed to handle grouping problems efficiently and effectively Illustrative examples and computational results are presented in tables and graphs to demonstrate the efficiency and effectiveness of the algorithms Researchers decision analysts software developers and graduate students from various disciplines will find this in depth reader friendly exposition of advances and applications of grouping genetic algorithms an interesting informative and valuable resource

**Modern Information Technology and IT Education** Vladimir Sukhomlin, Elena Zubareva, 2020-05-11 This book constitutes the refereed proceedings of the 13th International Conference on Modern Information Technology and IT Education held in Moscow Russia in November December 2018 The 30 full papers and 1 short papers were carefully reviewed and selected from 164 submissions The papers are organized according to the following topics IT education methodology methodological support e learning and IT in education educational resources and best practices of IT education research and development in the field of new IT and their applications scientific software in education and science school education in computer science and ICT economic informatics

*Trends in Developing Metaheuristics, Algorithms, and Optimization Approaches* Yin, Peng-Yeng, 2012-10-31 Developments in metaheuristics continue to advance computation beyond its traditional methods With groundwork built on multidisciplinary research findings metaheuristics algorithms and

optimization approaches uses memory manipulations in order to take full advantage of strategic level problem solving Trends in Developing Metaheuristics Algorithms and Optimization Approaches provides insight on the latest advances and analysis of technologies in metaheuristics computing Offering widespread coverage on topics such as genetic algorithms differential evolution and ant colony optimization this book aims to be a forum researchers practitioners and students who wish to learn and apply metaheuristic computing

Evolutionary Computation in Combinatorial Optimization Peter Merz, Jin-Kao Hao, 2011-04-27 This book constitutes the refereed proceedings of the 11th European Conference on Evolutionary Computation in Combinatorial Optimization EvoCOP 2011 held in Torino Italy in April 2011 The 22 revised full papers presented were carefully reviewed and selected from 42 submissions The papers present the latest research and discuss current developments and applications in metaheuristics a paradigm to effectively solve difficult combinatorial optimization problems appearing in various industrial economical and scientific domains Prominent examples of metaheuristics are evolutionary algorithms simulated annealing tabu search scatter search memetic algorithms variable neighborhood search iterated local search greedy randomized adaptive search procedures estimation of distribution algorithms and ant colony optimization

**Practice and Theory of Automated Timetabling**, 2000 *Fundamentals of the New Artificial Intelligence* Toshinori Munakata, 2008-01-01 The book covers the most essential and widely employed material in each area particularly the material important for real world applications Our goal is not to cover every latest progress in the fields nor to discuss every detail of various techniques that have been developed New sections subsections added in this edition are Simulated Annealing Section 3 7 Boltzmann Machines Section 3 8 and Extended Fuzzy if then Rules Tables Sub section 5 5 3 Also numerous changes and typographical corrections have been made throughout the manuscript The Preface to the first edition follows General scope of the book Artificial intelligence AI as a field has undergone rapid growth in diversification and practicality For the past few decades the repertoire of AI techniques has evolved and expanded Scores of newer fields have been added to the traditional symbolic AI Symbolic AI covers areas such as knowledge based systems logical reasoning symbolic machine learning search techniques and natural language processing The newer fields include neural networks genetic algorithms or evolutionary computing fuzzy systems rough set theory and chaotic systems

**Regional Conference on Science, Technology and Social Sciences (RCSTSS 2016)** Nor Azizah Yacob, Nur Asmaliza Mohd Noor, Nor Yuziah Mohd Yunus, Rahmah Lob Yussof, Shaikh Abdul Karim Yamani Zakaria, 2018-05-26 This book gathers selected theoretical and applied science papers presented at the 2016 Regional Conference of Sciences Technology and Social Sciences RCSTSS 2016 organized biannually by the Universiti Teknologi MARA Pahang Malaysia Addressing a broad range of topics including architecture computer science engineering environmental and management furniture forestry health and medicine material science mathematics plantation and agrotechnology sports science and statistics the book serves as an essential platform for disseminating research findings and inspires positive innovations in the region s development The carefully reviewed papers

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