

Due date: 27/October (2023)

1 Introduction

The N-queens problem was introduced in 1850 by Carl Gauss and has been studied for many decades by scientists. The 8-queens problem is an effort to find a placement of 8 queens on an 8 x 8 chess board so that no two queens attack each other. The queens should be placed on the chessboard in a way that these conflicts are minimized — no two queens should be in the same row, column, or diagonal.

In this assignment you'll have to implement an evolutionary solution for 8-queens problem. Apply GA with the following properties shown in Table 1 to this problem. Read the lecture slides for more details. Plot the maximum and average fitness per generation for your result reports.

Table 1: GA solution properties for 8-queens problem

Representation	Premutation
Recombination	'Cut-and-Fill' crossover
Recombination probability	100%
Mutation	Swap
Mutation probability	80%
Parent selection	Best 2 out of random 5
Survival selection	Replace the worse individual of new generation with the best one in old generation.
Population size	100
Number of offspring	2
Initialization	Random
Termination condition	Solution or 10,000 fitness evaluations

Notes:

- Allowed programming languages: Python, MATLAB
- Any sign of cheating would result in a zero grade for this assignment.
- You should upload your submissions at:
https://quera.org/course/add_to_course/course/14736/
All of the files should be in a ZIP file named in this format: "Lastname-SudentNumber.zip"
Ex: "Zamani-4023040.zip"
- Your reports should be in a PDF file including: key points of your implementation, reports of your final results and answers of assignment questions (if given).