جامعة بيرزيت
BIRZEIT UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE

COMP338 - Artificial Intelligence

Course Project 1
Due date: Jan 11, 2025

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Project Summary:

To simulate an attempt to break a password, use *Genetic Algorithm* to guess a 32 bit long randomly generated bit sequence; your program should begin by generating a random sequence of binary bits called *Passcode*, 32 bits long. Then, run *Genetic Algorithm* to keep evolving a set of proposed sequences until it finds the same *Passcode* generated prior.

Notes:

- You need to implement the algorithm on our own, using any programming language you prefer, YOU CANNOT USE existing libraries. This is to help you understand the very details of the algorithm.
- Convergence rate of Genetic Algorithm heavily depends on the tuning of its setting parameters. When implementing the algorithm, you will need to try the algorithm for many times while tuning the parameters. Draw a plot to show the convergence rate for each of the proposed setting parameters. I suggest you have your program calculate and store the convergence rate in a file

What to submit:

1. Your source code
2. Report containing the following:
   - Background on Genetic Algorithms: explain its steps and its setting parameters
   - Make sure you clearly explain the problem formulation, you need to explain how you represent the solution, what does the chromosome represent, what does the gene represent.
   - Include and explain the code, each stage of the Genetic Algorithm.
   - Parameter tuning analysis: as mentioned earlier, make sure you include a plot to

show the effect of the tuning on the convergence rate

- References: make sure you quote every reference or website you read, the libraries you used.
- Screenshots for the run
- Results and discussion: if you managed to find the passcode, make sure your report mentions: a. how long it took to find the passcode
  b. How many generations did it take to find the passcode

Submission guidelines:

- The project is a teamwork of two students
- Submit through Ritaj as a reply to the assignment message ONLY, submissions through other means will not be accepted
- Deadline is announced in the Ritaj assignment message
- Plagiarism will not be tolerated
- Chatbot misuse will not be tolerated
- Prepare for a discussion, it will have a significant impact on your score, and if you dont attend the discussion your project will not be graded.

Best Luck