Department of Computer Science, COMSATS University Islamabad, Abbottabad Campus.

(LAB Assignment 1)

Course: Artificial Intelligence (CSC462) **Class:** BSSE (6^{th} A, 6^{th} B)

Instructor: Dr. Mubashir Ahmad **Start date:** 21/04/2024

Submission date: 30/04/2024

Note: Assignment must be error free, upload the code and results that was calculated in the class in PDF form before the submission date. Code should be copyable in the file (No need handwritten on paper or screen shot). Code must be in Python using Anaconda.

Q no 1. Maximize the value of the function **$F(X) = -X^2 + 2X$**, over the range of real number from 0 to 2 with initial population **['11010', '00111', '10110', '00101']** and with random numbers **[0.4, 0.15, 0.7, 0.9]** adjust the numbers in range of **0 to 2**. Select the crossover between the **first and fifth digit**. Run the algorithm in 2 iterations. Your Results should be as follows.

First Generation Individuals:

Individual 1: Binary: 11010, Decoded: 26, Adjusted: 1.6774193548387097, Fitness: 0.5411030176899061

Individual 2: Binary: 00111, Decoded: 7, Adjusted: 0.45161290322580644, Fitness: 0.6992715920915713

Individual 3: Binary: 10110, Decoded: 22, Adjusted: 1.4193548387096775, Fitness: 0.8241415192507802

Individual 4: Binary: 00101, Decoded: 5, Adjusted: 0.3225806451612903, Fitness: 0.5411030176899063

Second Generation Individuals:

Individual 1: Binary: 01011, Decoded: 11, Adjusted: 0.7096774193548387, Fitness: 0.9157127991675338

Individual 2: Binary: 10110, Decoded: 22, Adjusted: 1.4193548387096775, Fitness: 0.8241415192507802

Individual 3: Binary: 10100, Decoded: 20, Adjusted: 1.2903225806451613, Fitness: 0.9157127991675338

Individual 4: Binary: 00111, Decoded: 7, Adjusted: 0.45161290322580644, Fitness: 0.6992715920915713