



Subject: Parallel programming. 1301421

Instructor: Lec. Arar Al Tawil

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Student Name: .....

Student ID: .....

☐ CS ☐ SE ☐ SEC ☐ DSAI

**PLEASE NOTE THAT THIS HOMEWORK PAGES AND WITH A TOTAL OF 10 POINTS.**

## QUESTION 1:

**[10 POINTS]**

*Solve the nonlinear equation by finding all variables using one optimization algorithm of your choice.*

**Given the equation:**

$$a * x^2 + b * x + c = 0$$

Use one of the following optimization algorithms to find the values of the unknown variables a, b, c, and x such that the result is as close to 0 as possible.

### A. Choose one algorithm from the list below:

1. Genetic Algorithm (GA)
2. Simulated Annealing (SA)
3. Harmony Search (HS)

### B. Requirements

1. Implement the Chosen Algorithm as Sequential way [3 Points]
2. Measure Execution Time for step 1 [1 Points]
3. Implement a Parallel Version Using 4 Threads and find the exetime [2 Points]
4. Implement a Parallel Version Using 8 Threads and the exetime [2 Points]
5. Compare the times of the sequential, 4-thread, and 8-thread versions [2 Points]