# CS 776 Assignment 2 Report

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## Code

Link to SGA GA Source Code:

Link to CHC GA Source Code:

Link to DeJong Functions Evaluation Code:

## Genetic Algorithm Parameters - SGA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Function | Pop. Size | Generations | X-Over | Mutation | AVG Number of Function Evaluations |
| 1 | 100 | 200 | 80% | 0.1% | 20000 |
| 2 | 50 | 100 | 67% | 0.1% | 5000 |
| 3 | 74 | 150 | 67% | 0.01% | 11100 |
| 4 | 300 | 600 | 67% | 0.1% | 180000 |
| 5 | 50 | 100 | 67% | 0.1% | 5000 |

## Genetic Algorithm Parameters – CHC

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Function | Pop. Size | Generations | X-Over | Mutation | AVG Number of Function Evaluations |
| 1 | 50 | 100 | 66.7% | 0.1% | 5000 |
| 2 | 50 | 100 | 67% | 0.1% | 5000 |
| 3 | 74 | 150 | 67% | 0.1% | 11100 |
| 4 | 120 | 250 | 67% | 0.1% | 30000 |
| 5 | 50 | 100 | 67% | 0.1% | 5000 |

For Function 4, it took a considerable amount of time for my code to run for SGA, so I instead limited the number of x’s in the summation to 12 instead of 30, resulting in a 96-bit string.

## Reliability, Quality, and Speed

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Function | SGA Reliability | CHC Reliability | SGA Quality | CHC Quality | SGA Speed (Gen with chromosome with best fitness) | CHC Speed (Gen with chromosome with best fitness) |
| 1 | 30/30 | 30/30 | Optimum Not Found | Optimum Found | 169 | 72 |
| 2 | 30/30 | 30/30 | Optimum Not Found | Optimum Not Found | 62 | 94 |
| 3 | 30/30 | 30/30 | Optimum Found | Optimum Found | 0 | 0 |
| 4 | 3/30 | 2/30 | Optimum Not Found | Optimum Not Found | 116 | 249 |
| 5 | 30/30 | 30/30 | Optimum Not Found | Optimum Not Found | 37 | 53 |

## Plots

A graph of a fitness graph

Description automatically generated

A graph of a function

Description automatically generatedA graph of a fitness graph

Description automatically generated

