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February 17, 2022

Professor Eick

COSC 4368

Assignment 1, Task 1 Report

For my project, I have x, y, p, z as mandatory inputs and seed as an optional input. I had the program output the initial f(sol) followed by p-1 more solutions recursively. I used a while loop to ensure the neighbor x,y values would still be within the [-512, 512] range and used a dictionary to store original data and the best solution’s data. I’ve ensured that my initial run matched the solutions as posted on Teams. Below will be tables of data I’ve created with my program:

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|  | Run1 (Seed 12) | | | | Run2 (Seed 99) | | | |
| p = 30  z = 3 | #sol Searched | sol | f(sol) | Total # sol searched | #sol Searched | sol | f(sol) | Total # sol searched |
| (404, 504) | 14 | (401.3647081771338, 506.4902018604597) | -309.23746222407874 | 60 | 35 | (401.7855616542051, 506.18357669048146) | -298.0817727584905 | 90 |
| (0, 0.23) | 51 | (2.902890415234215, 3.2209708148194376) | -41.12883632910774 | 90 | 23 | (2.8973285337221073, 2.8934635703204026) | -40.09213062316174 | 60 |
| (-200, 300) | 49 | (-201.55047962986174, 297.05177912867396) | -235.36648277381425 | 90 | 113 | (-202.7150693209203, 297.2168498954664) | -242.1859834153051 | 150 |
| (412, -99.9) | 14 | (409.3647081771338, -97.40979813954033) | -220.86893774277627 | 60 | 35 | (409.7855616542051, -97.71642330951855) | -215.36855189334958 | 90 |

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|  | Run1 (Seed 12) | | | | Run2 (Seed 99) | | | |
| p = 30  z = 0.5 | #sol Searched | sol | f(sol) | Total # sol searched | #sol Searched | sol | f(sol) | Total # sol searched |
| (404, 504) | 14 | (403.560784696189, 504.41503364340997) | -247.18782364960796 | 60 | 35 | (403.6309269423675, 504.36392944841356) | -245.38454807793093 | 90 |
| (0, 0.23) | 51 | (0.4838150692057025, 0.7284951358032397) | -28.88272957146586 | 90 | 23 | (0.4828880889536845, 0.6739105950534003) | -28.696018318571056 | 60 |
| (-200, 300) | 49 | (-200.25841327164363, 299.508629854779) | -201.04212788777704 | 90 | 113 | (-200.45251155348672, 299.5361416492444) | -202.16782862102875 | 150 |
| (412, -99.9) | 14 | (411.560784696189, -99.48496635659006) | -188.4630241687141 | 60 | 35 | (411.6309269423675, -99.53607055158643) | -187.49231304454798 | 90 |

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|  | Run1 (Seed 12) | | | | Run2 (Seed 99) | | | |
| p = 250  z = 3 | #sol Searched | sol | f(sol) | Total # sol searched | #sol Searched | sol | f(sol) | Total # sol searched |
| (404, 504) | 448 | (401.06108894728226, 506.76754469427544) | -247.18782364960796 | 750 | 437 | (401.1976485984862, 506.9223882863018) | -316.66375128096996 | 750 |
| (0, 0.23) | 51 | (2.902890415234215, 3.2209708148194376) | -41.12883632910774 | 500 |  |  |  |  |
| (-200, 300) |  |  |  |  | 203 | (-202.57724842525974, 297.00445646497855) | -243.3249860323349 | 500 |
| (412, -99.9) | 448 | (409.06108894728226, -97.13245530572456) | -225.12915831553988 | 750 | 437 | (409.1976485984862, -96.97761171369821) | -224.88353145487946 | 750 |

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|  | Run1 (Seed 12) | | | | Run2 (Seed 99) | | | |
| p = 250  z = 0.5 | #sol Searched | sol | f(sol) | Total # sol searched | #sol Searched | sol | f(sol) | Total # sol searched |
| (404, 504) | 448 | (403.5101814912137, 504.4612574490459) | -248.57652659792416 | 750 | 437 | (403.532941433081, 504.4870647143836) | -248.38077491064345 | 750 |
| (0, 0.23) | 51 | (0.4838150692057025, 0.7284951358032397) | -28.88272957146586 | 500 |  |  |  |  |
| (-200, 300) |  |  |  |  | 203 | (-200.42954140420994, 299.5007427441631) | -202.365195467628 | 500 |
| (412, -99.9) | 448 | (411.5101814912137, -99.4387425509541) | -189.22157144998417 | 750 | 437 | (411.532941433081, -99.41293528561637) | -189.17558851539025 | 750 |

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|  | Run1 (Seed 23) | | | |
| p = 59  z = 2 | #sol Searched | sol | f(sol) | Total # sol searched |
| (-512, 512) | 170 | (-510.0972084722964, 510.00016321540113) | 1038.4874838580586 | 236 |