Jacquelyn Loven

Research Week 2

Results: [See the code](https://github.com/jLoven/research_week2)

**Original Matrices**

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| Simple3DMatrix: 10x10x10 | Pillar3DMatrix: 10x10x10 |
| JackieOS:Users:platypus:Desktop:research:week2:week2_images:originals:simple3DMatrix.png | JackieOS:Users:platypus:Desktop:research:week2:week2_images:originals:pillar3DMatrix.png |

**Runtime**

For five 100x100x100 matrices, the runtime to create a new generation is maximum 0.104084 seconds. It can be as low as 0.004861 seconds. Average worst-case scenario: 0.021 seconds per creation of 100x100x100 matrix.

**Tuned, No Seeds**

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| JackieOS:Users:platypus:Desktop:research:week2:week2_images:tuned_no_seeds:tuned1.png | Tuner: 1  (many random replacements, no seeds) |
| JackieOS:Users:platypus:Desktop:research:week2:week2_images:tuned_no_seeds:tuned5.png | Tuner: 5 |
| JackieOS:Users:platypus:Desktop:research:week2:week2_images:tuned_no_seeds:tuned10.png | Tuner: 10  (few random replacements, no seeds) |

**Tuned, Random Seeds**

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|  | Tuner: 3 (more replacements, larger volume)  Number of seeds: 2  Percentage of replacements allotted to each seed: 50%  **Note:** All replacements relate to seeds. |
|  | Tuner: 10 (fewer replacements, more concentrated)  Number of seeds: 2  Percentage of replacements allotted to each seed: 40%  **Note:** 80% of replacements relate to seeds. 20% are random. |

**Tuned, Provided Seeds**

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|  | Tuner: 5  Seeds locations: [1, 1, 1] and [10, 10, 10]  Percentage of replacements allotted to each seed: 50% |
|  | Tuner: 5  Seeds locations: [2, 2, 2] and [10, 10, 10]  Percentage of replacements allotted to each seed: 30% |
|  | Tuner: 10 (very selective)  Seeds locations: [1, 1, 1] and [10, 10, 10]  Percentage of replacements allotted to each seed: 30% |

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| A | JackieOS:Users:platypus:Desktop:research:week2:week2_images:tuner5:gen1:A.png | **Generation 1, Tuner: 5**  **Note:** A, B, C, D, and E matrices began as matrices of ones, twos, threes, fours, and fives, respectively.  **Note:** randomIndex1 and randomIndex2 refer to the matrices that are being combined randomly.  scaledTuner is related to the average fitting function value for the two matrices.  seeds is the number of seeds.  Settings for 5 crossovers:  JackieOS:Users:platypus:Desktop:research:week2:week2_images:tuner5:gen1:settings_gen1.png |
| B | JackieOS:Users:platypus:Desktop:research:week2:week2_images:tuner5:gen1:B.png |
| C | JackieOS:Users:platypus:Desktop:research:week2:week2_images:tuner5:gen1:C.png |
| D | JackieOS:Users:platypus:Desktop:research:week2:week2_images:tuner5:gen1:D.png |
| E | JackieOS:Users:platypus:Desktop:research:week2:week2_images:tuner5:gen1:E.png |
| A1 |  | **Generation 2, Tuner: 5**  Settings for 5 crossovers: |
| B1 |  |
| C1 |  |
| D1 |  |
| E1 |  |
| A2 |  | **Generation 3, Tuner: 5**  Settings for 5 crossovers: |
| B2 |  |
| D2 |  |
| E2 |  |

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| A |  | **Generation 2, Tuner: 10**  **Note:** Since the tuner is so selective, the generation 2 matrices are very similar. |
| B |  |