**Test Cases**:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| # | City | Angle w/ North | Solstice | Mutation | Rep. | RQ mapping |
| 1 | Washington, DC | 200 deg. | Jun | Collective, 5 x 5 | 1 |  |
| 2 | Melbourne, Au | 200 deg. | Dec | Collective, 5 x 5 | 1 |  |
| 3 | Panama City, Pan. | 200 deg. | Jun | Collective, 5 x 5 | 1 |  |
| 4 | Lima, Peru | 200 deg. | Dec | Collective, 5 x 5 | 1 |  |
| 5 | Washington, DC | 200 deg. | Dec | Collective, 5 x 5 | 1 |  |
| 6 | Melbourne, Au | 200 deg. | Jun | Collective, 5 x 5 | 1 |  |
| 7 | Seattle, WA | 200 deg. | Jun | Collective w/ rot,  5 x 5 | 3 |  |
| 8 | Seattle, WA | 200 deg. | Jun | Prog. (5 + 5 + 5) x 5 | 3 |  |
| 9 | Melbourne, FL | 200 deg. | Jun | Collective, 5 x 5 | 1 |  |

**Questions**:

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| --- | --- | --- |
| No. | Research Questions | Test Cases |
| 1 | Does the algorithm successfully reduce the total heat load for the house under a variety of scenarios? | 1 – 8 |
| 2 | How do the resulting house designs vary across different cities? | 1 – 8 |
| 3 | Does the algorithm produce different results for similar solar inclination but different local conditions (T, DNI, DIF)? | (1, 2) , (3, 4) |
| 4 | How does the algorithm respond to the annual variation of weather at the same place? | (1, 5) , (2, 6) |
| 5 | How does progressive optimization compare against collective optimization, all other things remaining the same? | (7, 8) |
| 7 | Which aspect of the house design contributes the most to the heat load? | (1, 9) |