**Name:** Rachana Thota

**G-Id:** G01237600

**Instruction on running the Program:**

1. The code is written in Java 13.0.2 version.
2. The code is uploaded in zip file. After unzipping it, run Main.java file from the folder to get the required output.
3. If you want to run the code with ‘n’ number of trees, change the n value used in the ‘Main.java’ file and ‘Tree.java’ file with respective number of trees and COUNT value used in ‘Tree.java’ file.

**Implementation of the Project:**

1. This project contains the implementation of algorithms A1, A2, A3 and verifies the claims in Theorem 1, 2 and 3 empirically.
2. The findings made through algorithms for 5 trees each of size n = 1000, 1100, 1200:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Size of the Tree** | **Algorithm Used** | **Number of rotations for T1** | **Number of rotations for T2** | **Number of rotations for T3** | **Number of rotations for T4** | **Number of rotations for T5** |
| 1000 | A1 | 1964 | 1966 | 1964 | 1966 | 1964 |
| 1000 | A2 | 1352 | 1111 | 1109 | 1114 | 1303 |
| 1000 | A3 | 1960 | 1965 | 1965 | 1964 | 1960 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Size of the Tree** | **Algorithm Used** | **Number of rotations for T1** | **Number of rotations for T2** | **Number of rotations for T3** | **Number of rotations for T4** | **Number of rotations for T5** |
| 1100 | A1 | 2162 | 2162 | 2160 | 2160 | 2162 |
| 1100 | A2 | 1778 | 1321 | 1366 | 1635 | 1860 |
| 1100 | A3 | 2163 | 2163 | 2158 | 2158 | 2163 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Size of the Tree** | **Algorithm Used** | **Number of rotations for T1** | **Number of rotations for T2** | **Number of rotations for T3** | **Number of rotations for T4** | **Number of rotations for T5** |
| 1200 | A1 | 2360 | 2360 | 2362 | 2360 | 2360 |
| 1200 | A2 | 1834 | 1707 | 1691 | 1807 | 1679 |
| 1200 | A3 | 2358 | 2358 | 2363 | 2358 | 2358 |