**Short Project 10**

**RMQ**

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**To Run the Program:**

Store the 2 files in a folder : HybridRMQ.java, Timer.java

Open Terminal in the location of the folder

Run the following commands:

Javac HybridRMQ.java

Java HybridRMQ test\_128M.txt

In the argument, give the name of the test file.

For larger files, run the code on csgrads1.utdallas.edu

**Report Analysis**

1. Running for 128M size array

Test\_128M.txt

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| --- |
| Time for Preprocessing:  Time: 3127 msec.  Memory: 1579 MB / 2018 MB.  Time for Query:  Time: 0 msec.  Memory: 1579 MB / 2018 MB.  **Range : 40203946 - 43956558**  Index of minimum value : 40203955  Minimum value : 5915613.0 |

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| Time for Preprocessing:  Time: 3809 msec.  Memory: 1579 MB / 1853 MB.  Time for Query:  Time: 0 msec.  Memory: 1579 MB / 1853 MB.  **Range : 111399556 - 122058812**  Index of minimum value : 122058798  Minimum value : 3085149.0 |

1. Running for 256M size array

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| Time for Preprocessing:  Time: 4458 msec.  Memory: 3012 MB / 4998 MB.  Time for Query:  Time : Time: 0 msec.  Memory: 3012 MB / 4998 MB.  **Range : 7237240 - 103674047**  Index of minimum value : 50935498  Minimum value : 776219.0 |

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| Time for Preprocessing:  Time: 4809 msec.  Memory: 3975 MB / 4998 MB.  Time for Query:  Time : Time: 0 msec.  Memory: 3975 MB / 4998 MB.  **Range : 102825008 - 119416301**  Index of minimum value : 104258258  Minimum value : 185481.0 |

1. Running for 512M size array

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| Time for Preprocessing:  Time: 11863 msec.  Memory: 4364 MB / 6983 MB.  Time for Query:  Time: 0 msec.  Memory: 4364 MB /6983 MB.  Range : **111197236 - 113043862**  Index of minimum value : 113043856  Minimum value : 2586906.0 |

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| --- |
| Time for Preprocessing:  Time: 9558 msec.  Memory: 4572 MB / 6983 MB.  Time for Query:  Time: 0 msec.  Memory: 4572 MB / 6983 MB.  **Range : 86517615 - 88830808**  Index of minimum value : 86517625  Minimum value : 7922916.0 |

The query time for all the ranges comes out to be 0msec.

The average value of the query time is 0msec.

The range size has no effect on query time since the query time is constant at 0msec irrespective of the size of the array or the range size.