|  |  |
| --- | --- |
| Function/Operation | Time Complexity |
| generate\_wallet\_address | O(1) |
| MerkleTree.\_\_init\_\_ | O(n)- *n* transactions for leaves and tree. |
| MerkleTree.\_hash\_transaction | O(1) |
| MerkleTree.\_build\_merkle\_tree | O(m)- *m* leaves, O(n) for *n* transactions. |
| MerkleTree.get\_root | O(1) |
| Transaction.\_\_init\_\_ | O(1) |
| Transaction.\_\_str\_\_ | O(1) |
| BlockchainComponent.calculate\_hash | O(1) |
| Node.\_\_init\_\_ | O(1) |
| Node.get\_hash | O(1) |
| Node.get\_previous\_hash | O(1) |
| TransactionLedger.\_\_init\_\_ | O(n)- Due to load previous transactions |
| TransactionLedger.load\_previous\_transactions | O(n)- *n* transactions fetched and linked. |
| TransactionLedger.get\_wallet\_address | O(1) |
| TransactionLedger.get\_balance | O(1) |
| TransactionLedger.add\_transaction | O(n) - Fetching *n* transactions and Merkle Tree. |
| TransactionLedger.search\_transactions | O(n)- Linear scan of linked list. |
| TransactionLedger.verify\_chain | O(n log n)- Sorting dominates. |
| TransactionLedger.display\_ledger | O(n)- Iterate *n* transactions. |

DSA

Cryptocurrency Transactions Ledger

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