

## Performance:

1. We created Record and DataReader class to read the specified dataset into memory buffer for faster data processing speed. During the initialization phase, DataReader invokes readData method to load all records from the dataset.

```
DataReader.java Record.java
1 package comp3111.covid;
2
3 import java.util.HashMap;
4
5
6 /** Class to store each row of the dataset by its header.
7  * @author LU, Weiqi
8  * */
9 public class Record{
10     private static String[] attributeNames=null; /* All attribute names of the data set */
11     private static Map<String,Integer> indexOfName=null; /* The index of an attribute in a record */
12     private String[] attributes=null; /* The attribute values of the record */
13
14     public Record(String[] record) {}
15
16     /** Set attribute names of the record according to the header of the data set */
17     public static void setAttributeNames(String[] names){}
18
19     /** Get the attribute of a record by name */
20     public String get(String attributeName) {}
21
22     /** Get the attribute of a record by index */
23     public String get(int index) {}
24
25     /** Find the index of an attribute in a record, return -1 if not exists */
26     private static int getAttributeIndex(String attributeName) {}
27
28     public String toString() {}
29 }
```

2. When DataReader invokes readData, records will be sorted by location and date to enable binary search when finding records by location and date.

```
DataReader.java Record.java
20 public class DataReader {
21     private static String dataset=null;
22     private static Record[] records=null;
23     private static String[] sortRule=null;
24     private static Map<String,List<String>> countryOfContinent=new HashMap<>(); // Map continent to country list, map empty String to list of continents and wc
25     private static SimpleDateFormat sdf=new SimpleDateFormat("MM/dd/yyyy");
26
27     /** Read the data set into buffer, sort the records by location and then date in default. */
28     public static int readData(String dataset, boolean isSorted) throws Exception {}
29
30     /** Add country to countryOfContinent. */
31     private static void addCountry(Record rec, Map<String,List<String>> countryMap) {}
32
33     /** Get the data set name. */
34     public static String getDatasetName() {}
35
36     /** Get the records of the data set. */
37     public static Record[] getRecords() {}
38
39     /** Get the record by index. */
40     public static Record getRecord(int index) {}
41
42     /** Get the number of records of the data set. */
43     public static int getSize() {}
44
45     /** Return the rules that have been applied to sort the records. */
46     public static String[] getSortedRule() {}
47
48     /** Get all continents reported (as a whole) in records */
49     public static String[] getReportedContinents() {}
50
51     /** Get all countries with or without continents */
52     public static String[] getCountries(boolean withContinents) {}
53
54     /** Get smallest and largest date in dataset records */
55     public static Date[] getDateRange() throws Exception {}
56
57     /** Sort the records first by location, then date, in ascending order. */
58     public static int sortByLocationDate() {}
59
60     /** Return the start and end index of the location,
```

3. We added Reload Button in Task Zero Tab to reload the dataset to the buffer if user changes the file name or updates the dataset.

