

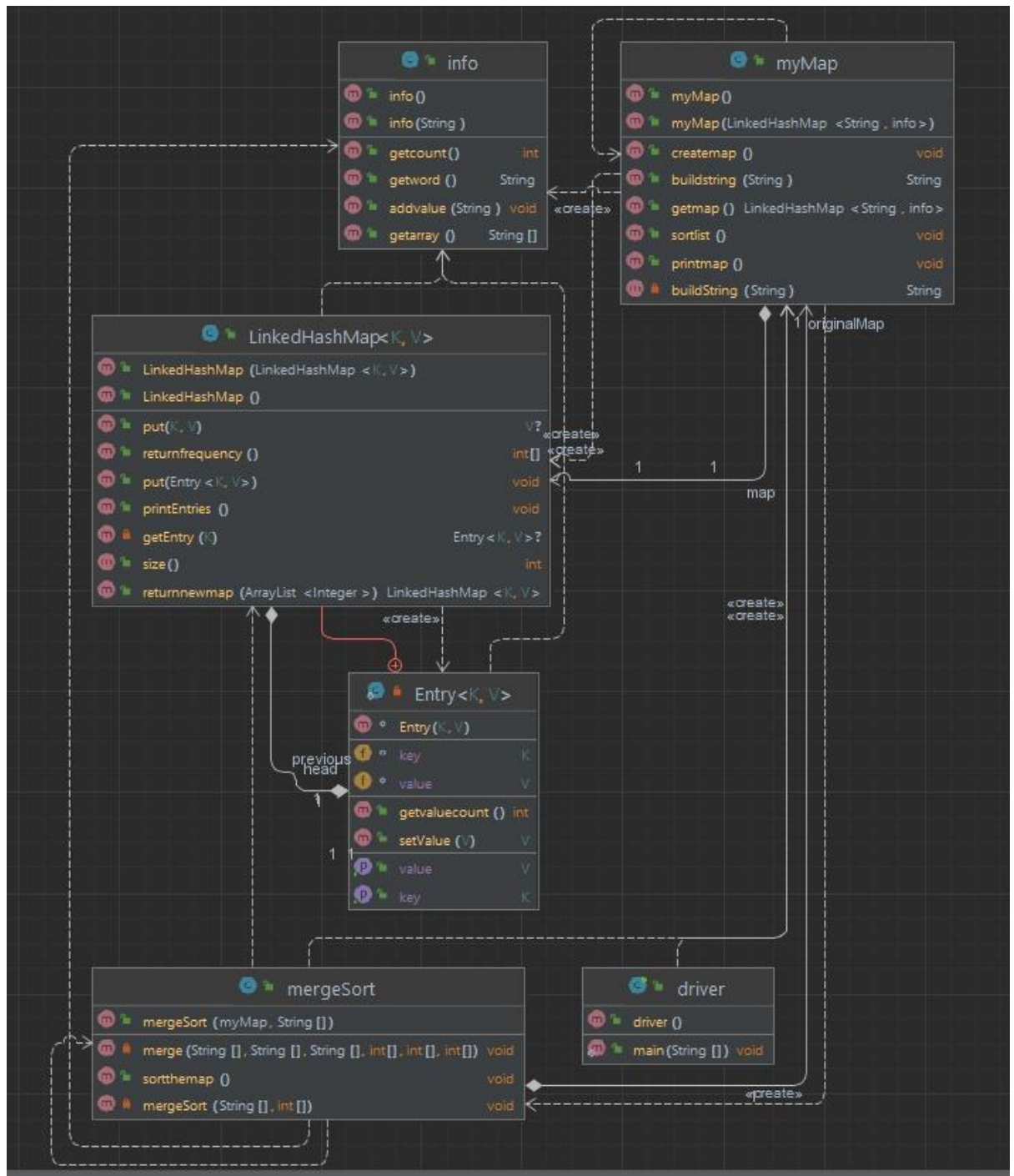
**GIT Department of Computer Engineering
CSE 222/505 - Spring 2023
Homework # Report**

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1. SYSTEM REQUIREMENTS

In this assignment we need to create a map and perform mergesort algorithm on it. Our map values key are instance class object's. Therefore I have implemented info class. I have implemented mymap class for create map print map and se-ort map. mergesort class sort the values by count of word number.

2. USE CASE AND CLASS DIAGRAMS



3. OTHER DIAGRAMS

Not necessarily

4. PROBLEM SOLUTION APPROACH

For creating map I have implemented a class named mymap. This class takes a string and preprocesses it. Then I create a map by using unique letters in this string. I have collected the keys and values in the LinkedHashMap structure. Normally, LinkedHashMap class changes values if the new key exists in the map. But in this assignment, we must not change the value; we must add new words to the values string array. To perform this operation, I have overridden the LinkedHashMap class. Thanks to this, I can add new words to existing keys' value string array. Furthermore, I have added new methods in this class and used these classes for printing values and maps.

For sorting, I have created a class that takes mymap's object. Then, by using an aux array, I have taken values' word numbers. Finally, I have sorted the aux array and number array according to word numbers. Then, I have created a sorted object and printed the values.

Merge sort algorithm=>

Merge sort takes an array and divides it into two halves until the range of the array size is equal to 1. Then, it sorts every part of the array and merges them. Finally, it returns the sorted array. To perform the merge sort algorithm, we must use recursion.

5. TEST CASES

TEST STRING=> Buzzing bees buzz

TEST STRING=> 'Hush, hush!' whispered the rushing wind.

6. RUNNING AND RESULTS

TEST STRING=> Buzzing bees buzz

```
ENTER THE STRING(For exit press -1): Buzzing bees buzz
Original String : Buzzing bees buzz
Preprocessed String: buzzing bees buzz
```

The original (unsorted) map:

```
Letter: b - Count: 3 Words: [buzzing,bees,buzz]
Letter: u - Count: 2 Words: [buzzing,buzz]
Letter: z - Count: 4 Words: [buzzing,buzzing,buzz,buzz]
Letter: i - Count: 1 Words: [buzzing]
Letter: n - Count: 1 Words: [buzzing]
Letter: g - Count: 1 Words: [buzzing]
Letter: e - Count: 2 Words: [bees,bees]
Letter: s - Count: 1 Words: [bees]
```

The sorted map:

```
Letter: i - Count: 1 Words: [buzzing]
Letter: n - Count: 1 Words: [buzzing]
Letter: g - Count: 1 Words: [buzzing]
Letter: s - Count: 1 Words: [bees]
Letter: u - Count: 2 Words: [buzzing,buzz]
Letter: e - Count: 2 Words: [bees,bees]
Letter: b - Count: 3 Words: [buzzing,bees,buzz]
Letter: z - Count: 4 Words: [buzzing,buzzing,buzz,buzz]
```

TEST STRING=>'Hush, hush!' whispered the rushing wind.

```
Letter: z - Count: 1 Words: [buzzing,buzzing,buzz,buzz]
ENTER THE STRING(For exit press -1): 'Hush, hush!' whispered the rushing wind.
Original String : 'Hush, hush!' whispered the rushing wind.
Preprocessed String: hush hush whispered the rushing wind
```

The original (unsorted) map:

```
Letter: h - Count: 7 Words: [hush,hush,hush,hush,whispered,the,rushing]
Letter: u - Count: 3 Words: [hush,hush,rushing]
Letter: s - Count: 4 Words: [hush,hush,whispered,rushing]
Letter: w - Count: 2 Words: [whispered,wind]
Letter: i - Count: 3 Words: [whispered,rushing,wind]
Letter: p - Count: 1 Words: [whispered]
Letter: e - Count: 3 Words: [whispered,whispered,the]
Letter: r - Count: 2 Words: [whispered,rushing]
Letter: d - Count: 2 Words: [whispered,wind]
Letter: t - Count: 1 Words: [the]
Letter: n - Count: 2 Words: [rushing,wind]
Letter: g - Count: 1 Words: [rushing]
```

The sorted map:

```
Letter: p - Count: 1 Words: [whispered]
Letter: t - Count: 1 Words: [the]
Letter: g - Count: 1 Words: [rushing]
Letter: w - Count: 2 Words: [whispered,wind]
Letter: r - Count: 2 Words: [whispered,rushing]
Letter: d - Count: 2 Words: [whispered,wind]
Letter: n - Count: 2 Words: [rushing,wind]
Letter: u - Count: 3 Words: [hush,hush,rushing]
Letter: i - Count: 3 Words: [whispered,rushing,wind]
Letter: e - Count: 3 Words: [whispered,whispered,the]
Letter: s - Count: 4 Words: [hush,hush,whispered,rushing]
Letter: h - Count: 7 Words: [hush,hush,hush,hush,whispered,the,rushing]
```