ADVANCED DATA STRUCTURES – PROGRAMMING ASSIGNMENT

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Compiler Information: Java Programming Language Compiler (javac) is used.

There are 3 classes used in this programming assignment.

Fibheapnode.java:

Fibheapnode describes the basic structure of the node which is going to be used in the two other classes .it consists of all the attributes of the node such as child,left,right,parent,degree and childcut.all these attributes are initialized in the constructor of the class.

FibonacciHeap.java:

FibonacciHeap class describes how the structure of the heap with data and methods required instilled in it. Data includes the Root Fibonacci node and the Hash map created for lookups**.** Methods involved in this class are insert, Increasekey, removemax, printhashtags, pairwisecombine and melding.

Insert:

Insert method is called in main class when there is a hashtag is to be inserted. If the hashtag already exists in the hash map, then it is redirected to increase key function.

Insertkey:

Increase key increases the value of the element and checks whether the value of element is greater than the parent element value. If this condition satisfies then node is removed and inserted in the root's level. Now it checks whether the child cut value of the parent is true if so then even it is cascade cut and so on Regardless the value of child cut value is changed to true.

Removemax:

Removemax is called from the main class whenever there is a integer in the input line. It removes the max element recursively until mentioned.Everytime the max element is removed , it is saved in a different node. Pairwise combine is done every time the removemax is done and hence pairwise combine method is called. After pairwise combine is done then the printhashtags is called with the saved max nodes .Then the max node are reinserted through the insert method.

Pairwise combine:

Pairwise combine is used for restructuring the Fibonacci heap node after removemax.Each node has degree mentioned in its attributes , this degree will be used to combine two different trees. New hash

map is created and used to track the degree of each tree.Starting from the root , each node with same degree are combined recursively until there are no two nodes with same degree.Everytime two nodes are combined it tries to update the hashmap if the combined degree already exists , then it combines again until there is no tree of such degree.It continues until you reach the first node where you started.Max value is also updated after the pairwise combine is done.

Melding :

Melding merely takes the root's right node and root's children and melds them after the root is removed from the heap.

Printhashtags:

After the pairwise combine , the maxnodes which are removed are printed into the output file.

Hashtagcounter main class:

The main class merely reads the input file line by line.It reads the first character and accordingly decides its actions.When the first character is # , the insert function is called , when it is a number then removemax function is called and finally it starts with S program exits these actions are done according to the input specifications.