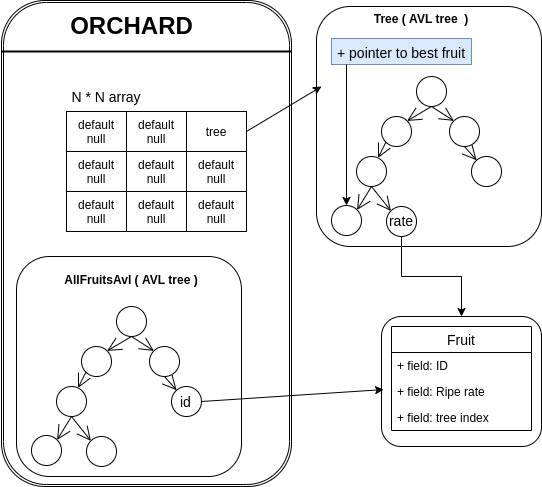
Data Structure Project

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Diagram



**Class Fruit**

Properties :

int fruitID

int ripeRate

int treeIndex

**Class Tree::AvlTree – (ripeRate)**

Index: riperate

shared\_ptr<Fruit> best\_fruit\_ptr

**Class AllFruitsAvl::AvlTree**

Index: fruitID

**Class Orchard**

Properties

int N

InitializedArray<Tree\*> trees

AllFruitsAvl all\_fruits\_avl

**Notes :**

* **Tree** will be added to 2d array .
* Each **Tree** node index will be the “ripeRate” and the data will include a pointer to fruit node.
* **Fruit** node will include the data of ID ,ripeRate and treeIndex.
* A **AllFruitsAvl** AVL tree will be generated with the Orchard which will include all the indexes of the fruits in the field, each node in this tree will have a pointer to the same **Fruit** node.
* “InitializedArray.h” was used to initialize the 2D array with O(1).
* “best\_fruit\_ptr” pointer points to the fruit node with the lowest ripeRate in the **Tree.**

void\* Init(intN)

הקצאת זיכרון למערך דוממדי בגודל NXN  O(1)

StatusType PlantTree(void \*DS,int i, int j)

שתילת עץ חדש בגומה ה-(i,j)  O(log(n))

StatusType AddFruit(void \*DS,int i, intj, intfruitID, int ripeRate)

הוספת פרי לעץ

Creat Fruit Node O(1)

Find I,j tree O(logn)

Add fruit to **tree** O(log(k))

Add fruit to **AllFruitsAvl** O(log(k))

O(log(k)+log(n))

StatusType PickFruit(void \*DS,intfruitID)

שליפת פרי מ **AllFruitsAvl**  O(log(k)+ log(n))

StatusType RateFruit(void \*DS,intfruitID, intripeRate)

מציאת פרי לפי Id  O(log(k))

עדכון **tree**  O(log(k))

O(log(k))

StatusType GetBestFruit(void \*DS, int i, int j, int\*fruitID)

החזרת ה best\_fruit\_ptr של עץ במקום ה I,j

O(log(1))

StatusType GetAllFruitsByRate(void \*DS,int i, int j, int \*\*fruits, int \*numOfFruits)

לסדר את עץ **tree** תוך מערך ממוין O(k)

StatusTypeUpdateRottenFruits(void \*DS,int rottenBase, int rottenFactor)

עדכון את **ripeRate** זה לעבור על כל הפירות : O(k)

כל פעם שמעדכנים את ה ripeRate צריכים לעדכן את העץ מחדש: O(log(k)(

O(k\*log(k))