Gebze Technical University
Computer Engineering

CSE 222 - 2019 Spring

HOMEWORK 2 REPORT

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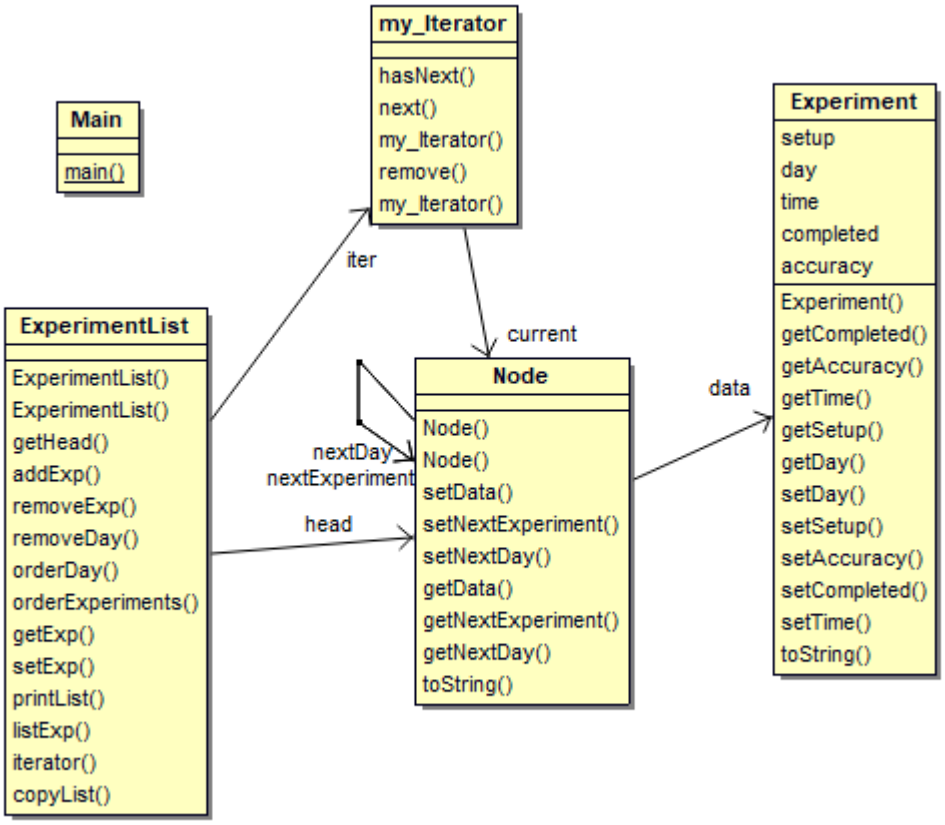
1 INTRODUCTION

1.1 Problem Definition

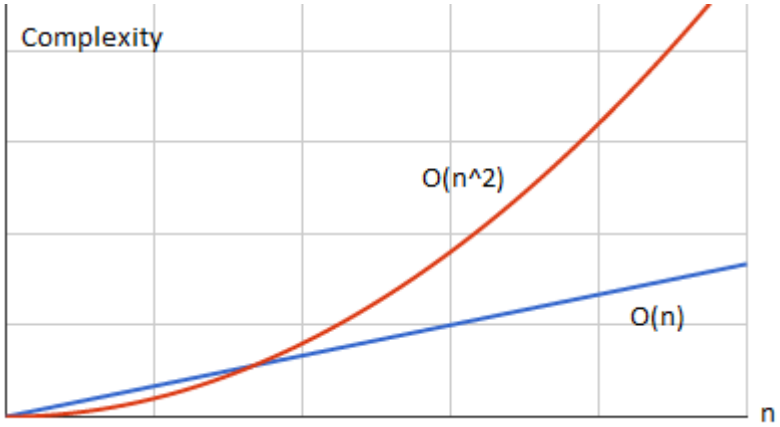
Due to constant size of arrays and collections that use underlying arrays , making changes on collections is quiet inefficient.There must be a new collection created and the original collection must be copied to there which is really unefficient in terms of memory usage and complexity.Also in order to reach days , each element of collection must be visited until specified data is found which is a slow technique to deal with.

2 METHOD

2.1 Class Diagrams



2.2 Other Diagrams



Complexities of methods in ExperimentList Class

addExp(): This method scans the list from head till find the place that experiment will be added on.There is a loop which iterates thats why the complexity is = O(n).
Remove(): This methods complexity is equal to add(O(n)) because of same loop to find the place
RemoveDay(): Complexity of this method is O(n^2) because it calls the remove method in while loop which indicates all experiments in that day
OrderDay():Complexity of this method isO(n^2) because it uses the algortihm bubble sort.
OrderExp(): Complexity of OrderExp is same as OrderDay,it also do bubble sort.O(n^2)
GetExp(): This is a getter method so it starts with head and try to find the index that will be returned
in a loop.Thats why its complexity is O(n)
SetExp(): This method also indicates experiments till find its place to set.O(n)
ListExp():This method finds the day and iterates it while printing.O(n)

2.3 Problem Solution Approach

A programmer should always care about the usage of computer memory and speed of a program.In this Project,In order to avoid extra data copying , a single linked list structure has been created and also to make functions more efficient there is 2 linked list created.In more details , if the user wants to add an experiment into the middle of the list , there will be no data copying necessary.Program only has to change the links of 2 nodes that new experiment will be added between them.Lets assume that the user wants to add an experiment which will begin on 7th day and there are 100 experiments before 7th day.If a collection used in this program , it would slower to reach 7th day before adding but with second list , its much faster.

3 RESULT

3.1 Test Cases

AddExp method

Case 1 -> when head is null
Case 2 -> when add to the head
Case 3 -> when add to the end of the list
Case 4 -> when add to the middle of the list

RemoveExp method

Case 1 -> removing from head
Case 2 -> removing from end
Case 3 -> removing from middle

RemoveDay method

Case 1 -> removing first day
Case 2 -> removing day in the middle
Case 3 -> removing last day

listExp method

Case 1 -> listing first day

Case 2 -> listing last day

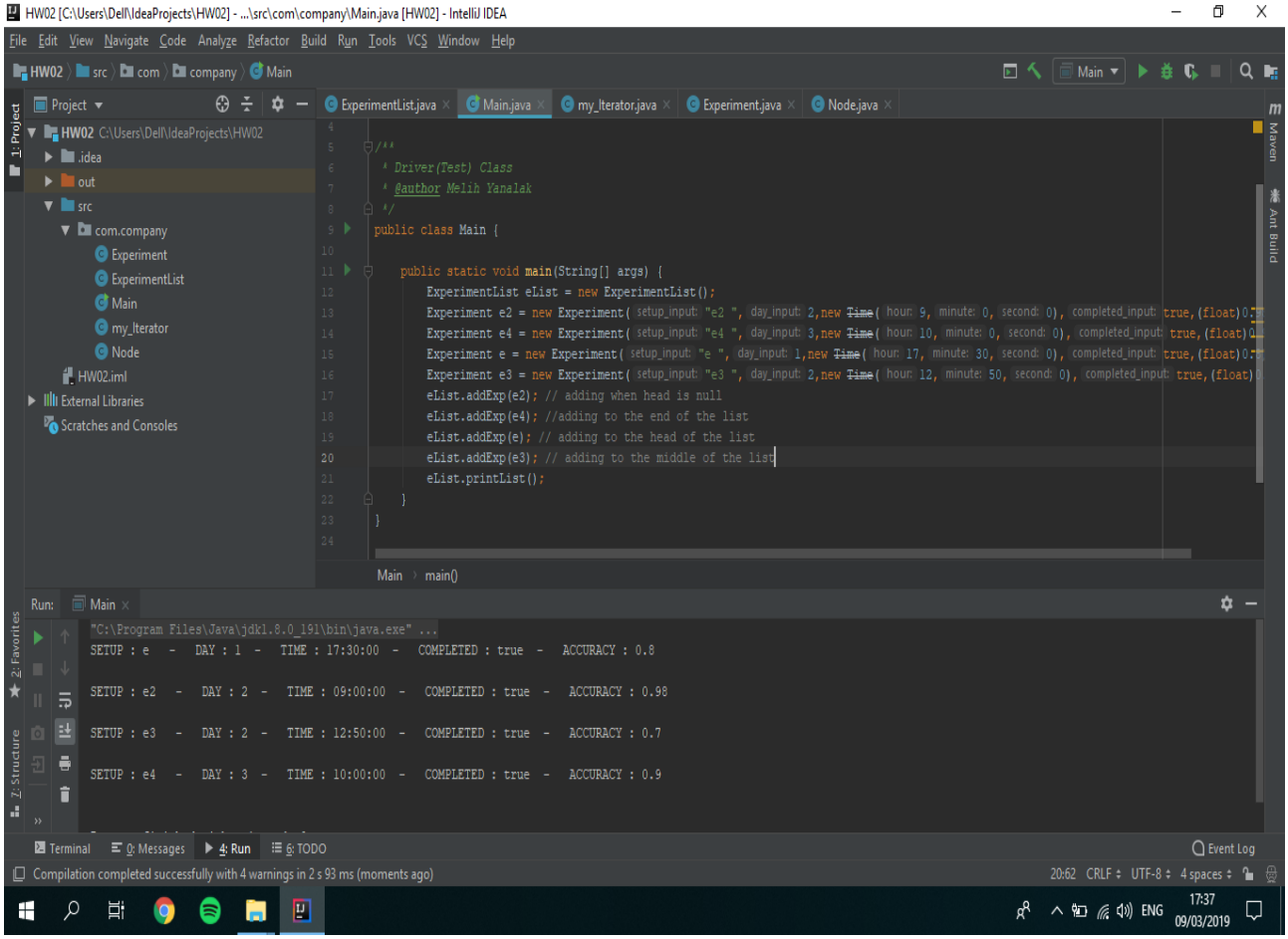
Case 3 -> listing day in the middle

orderDay,orderExperiments,getExp,setExp methods

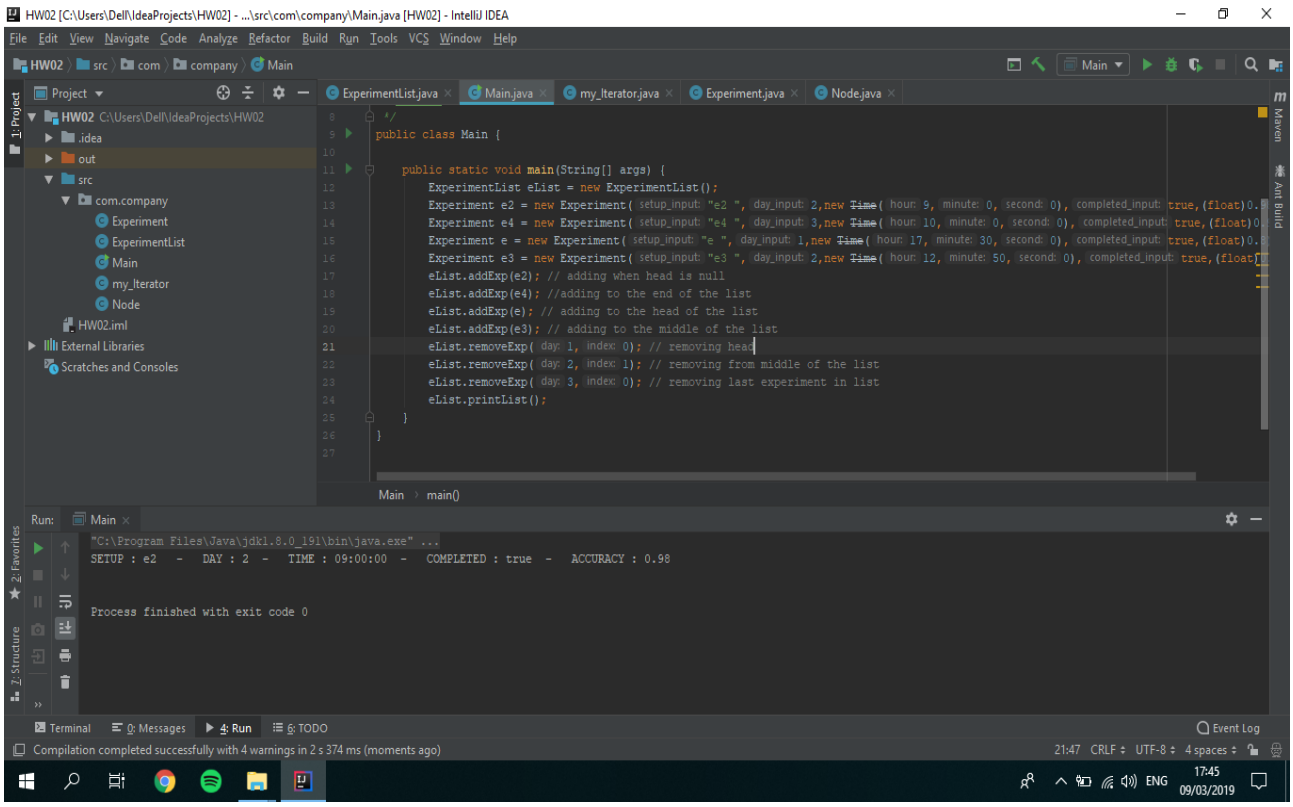
OUTPUTS ARE BELOW

3.2 Running Results

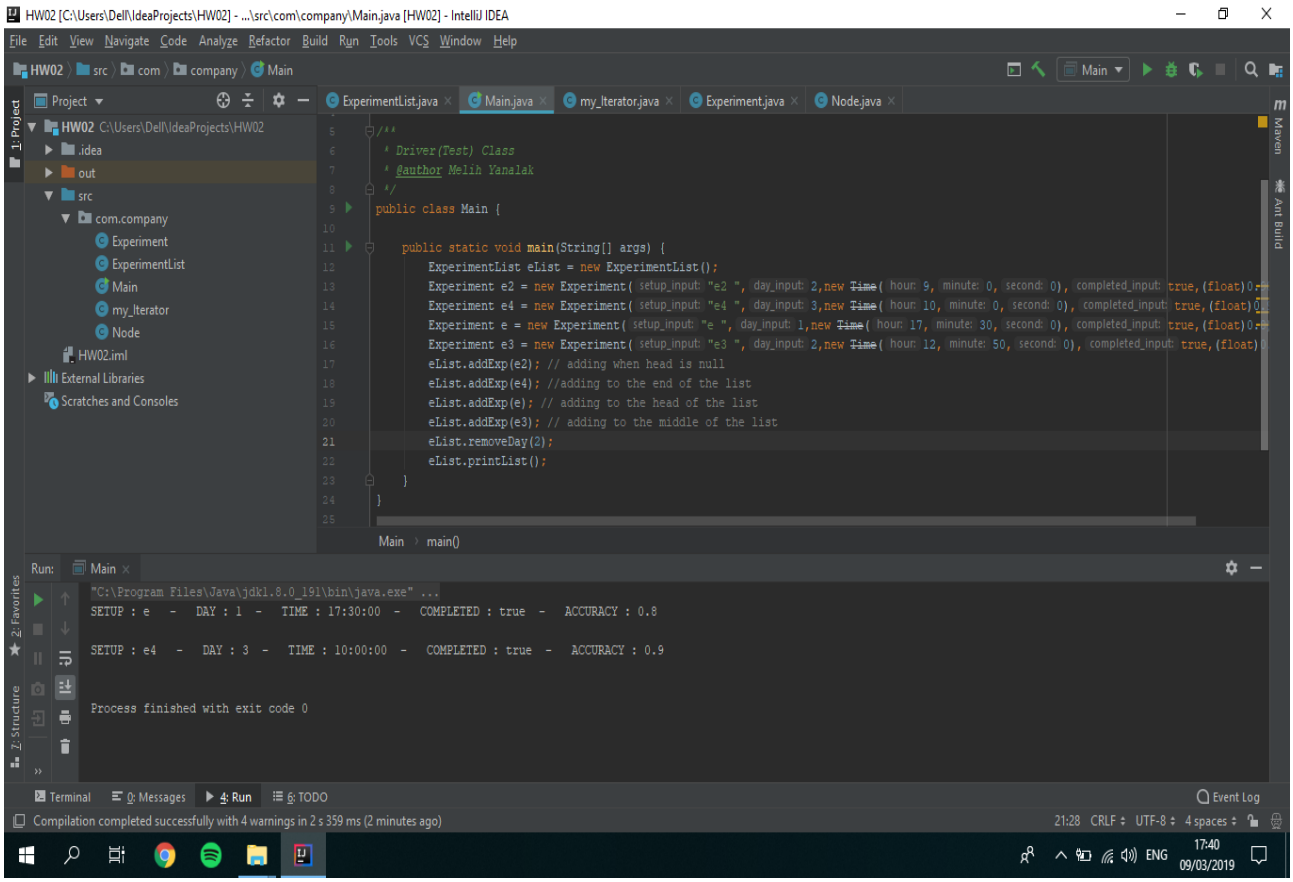
Add method with all cases



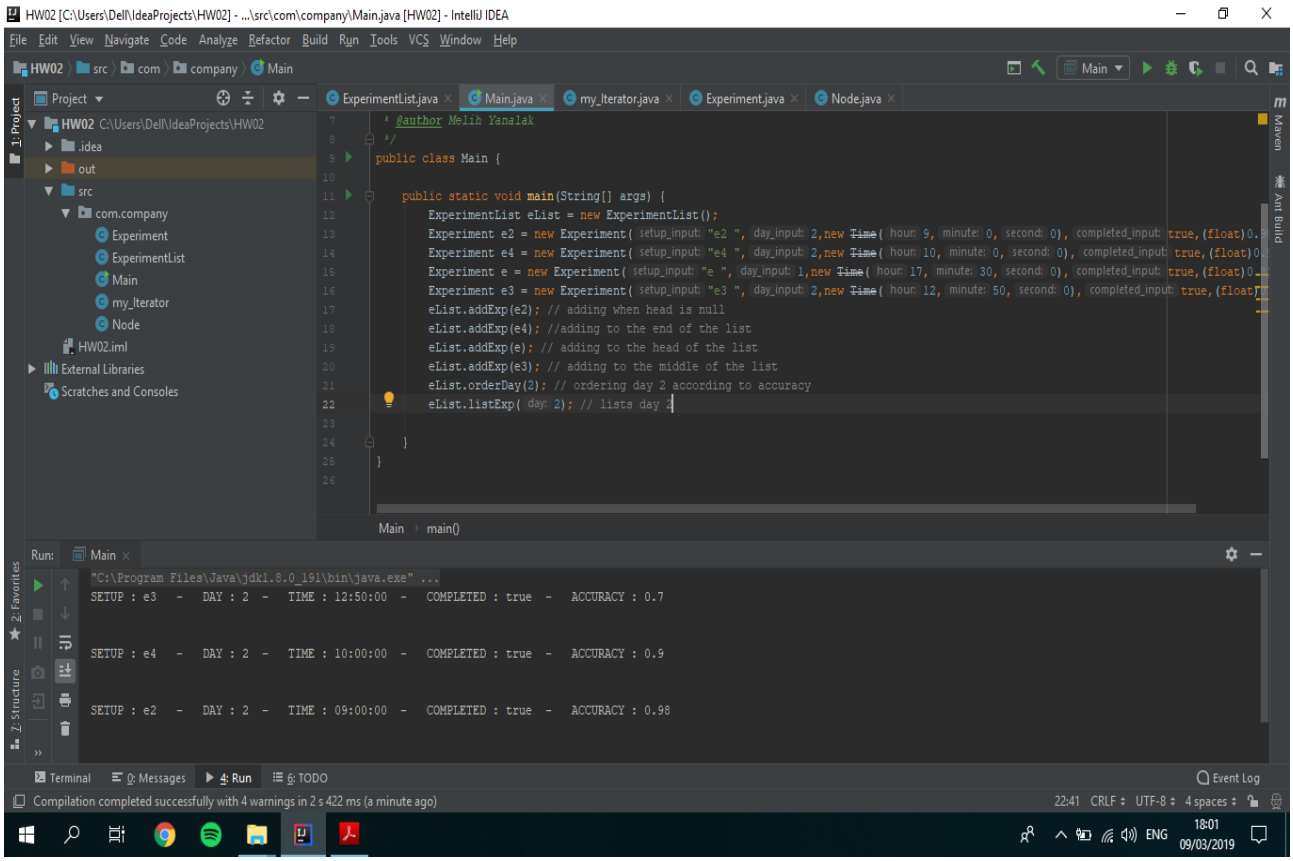
RemoveExp method with all cases



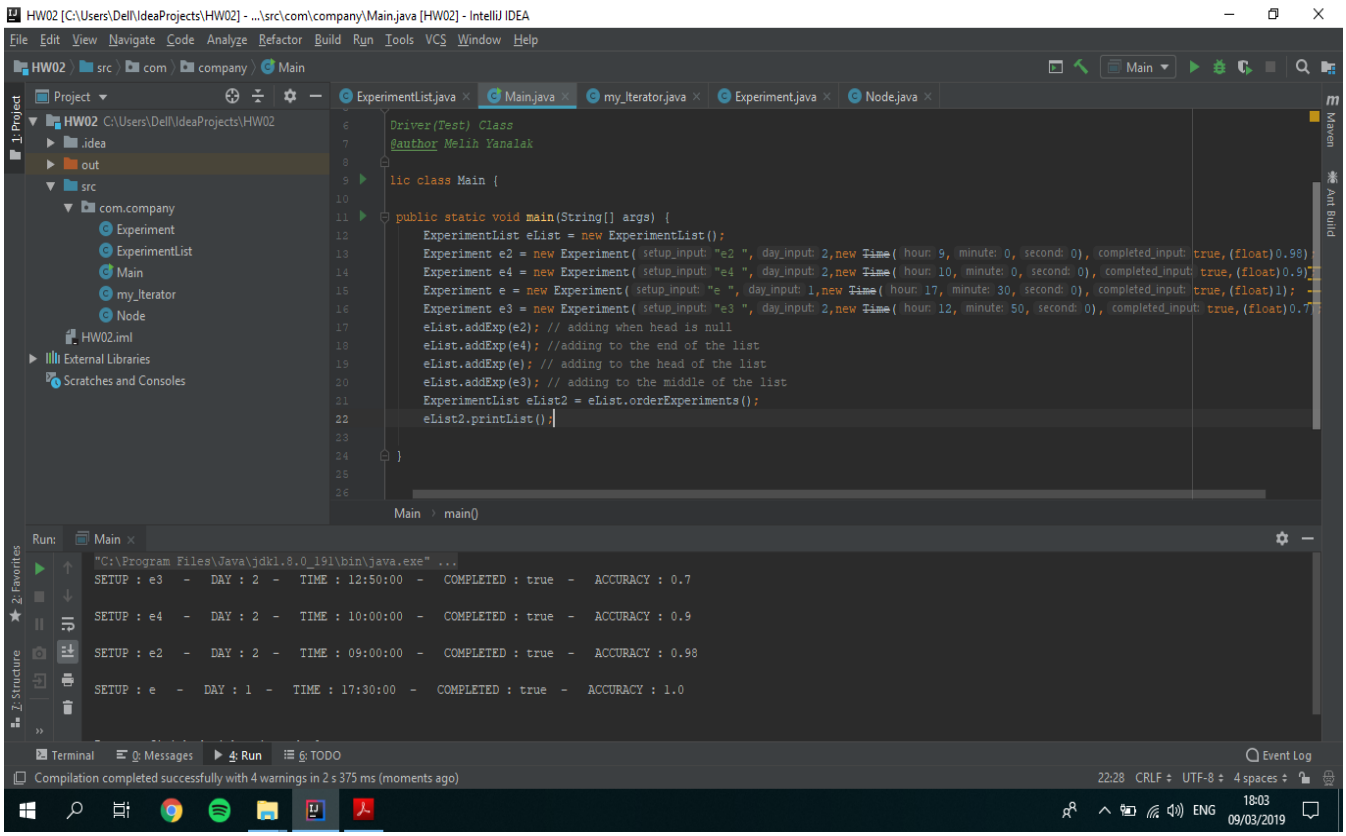
RemoveDay method



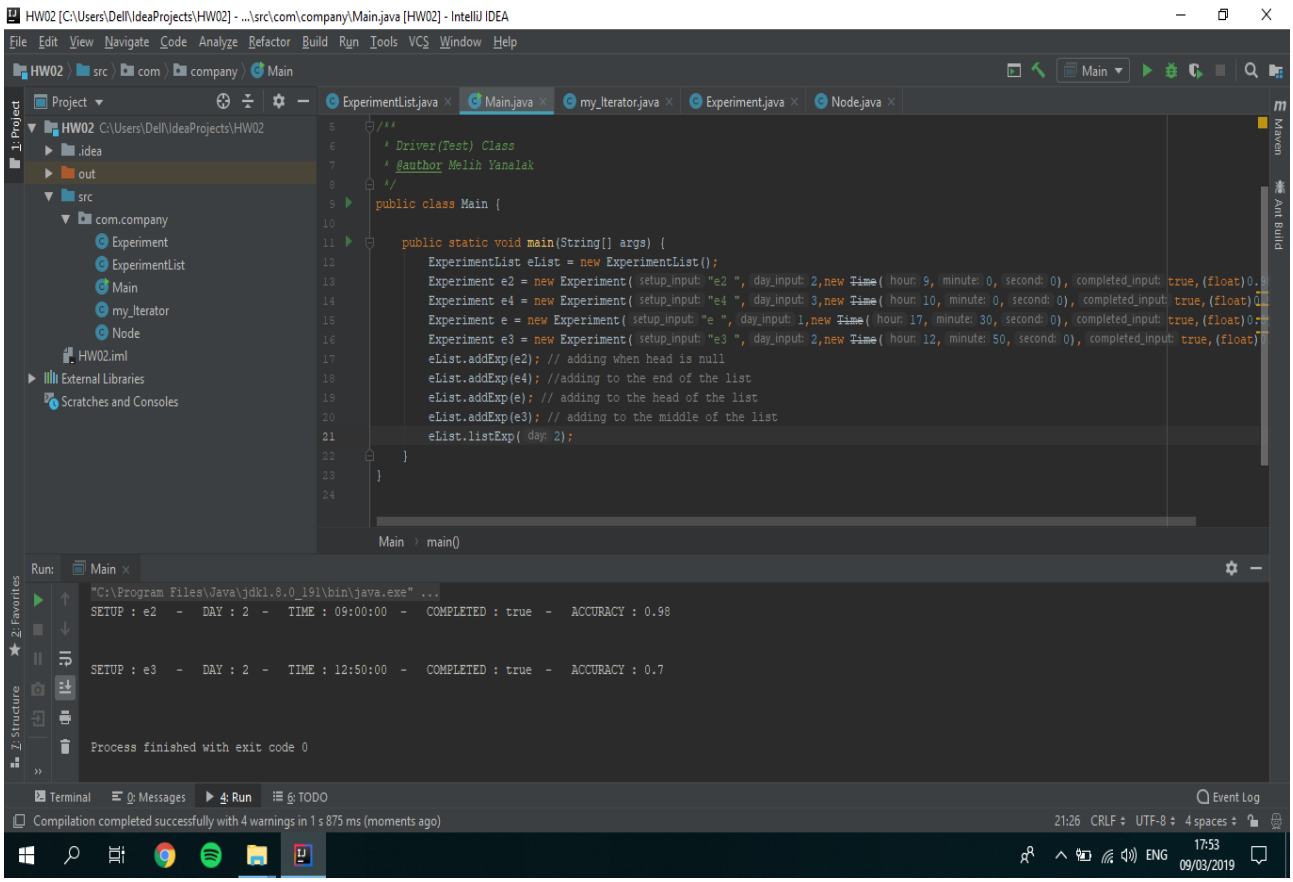
OrderDay method



OrderExperiments method



ListExp Method



SetExp and GetExp Methods