

DATA STRUCTURE AND ALGORITHM : HANDS-ON(MANDATORY)

EXERCISE -2 : E-COMMERCE PLATFORM SEARCH FUNCTION

- To build a search feature for an E-COMMERCE site where users look for products by the name.

✓ ALGORITHMS PRACTICED :

1. LINEAR SEARCH :

- * Checks each product one by one.
- * Works on unsorted list.
- * Used in smaller lists for quicker access.

2. BINARY SEARCH :

- * Divides and conquers.
- * Works on sorted list.
- * Used in large list and faster.

✓ TIME COMPLEXITY :

1. LINEAR SEARCH : $O(N)$ ->(Slow for big lists)

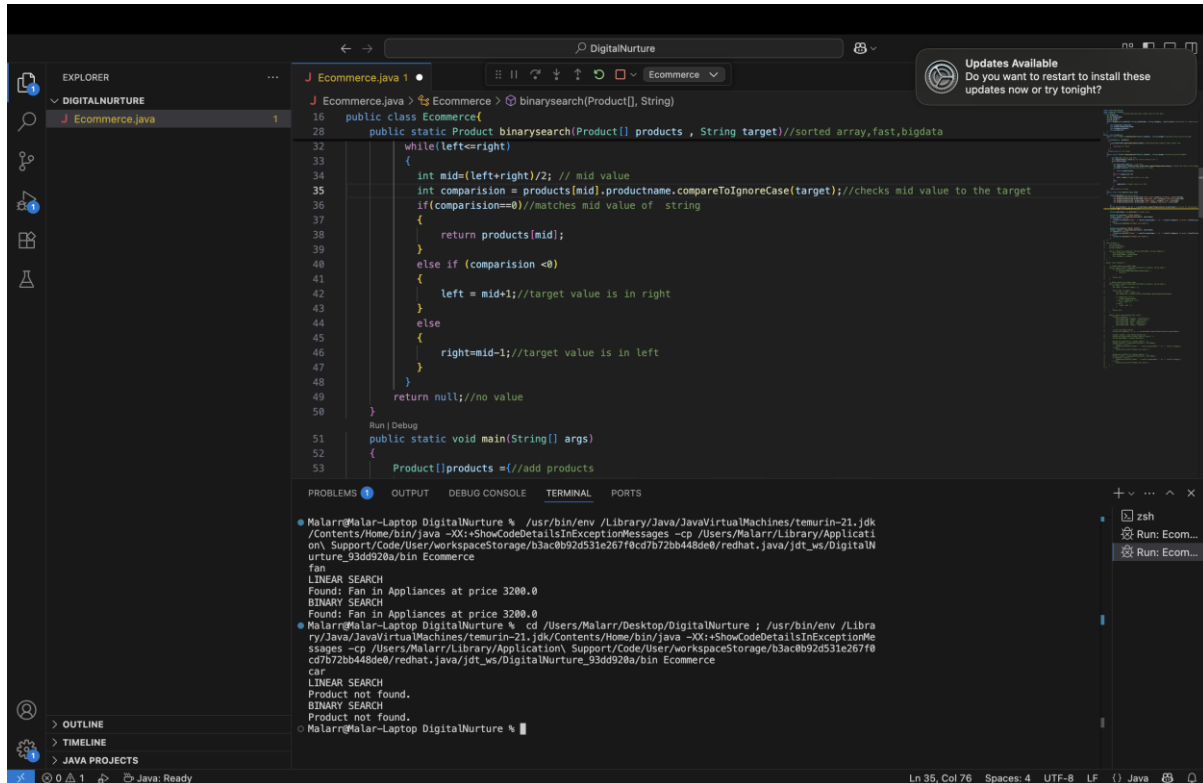
2. BINARY SEARCH : $O(\log N)$ ->(Fast for big lists)

✓ KEYWORDS USED :

1. *compareToIgnoreCase()* : Compares two string without case sensitivity.

2. *Arrays.sort()* : Sorts an array based on product name (needed for binary search)

✓ OUTPUT :



The screenshot shows an IDE with a Java file named `Ecommerce.java`. The code implements a binary search algorithm. The terminal output shows the execution of the program, which finds a product named 'Fan' in the 'Appliances' category at a price of 3200.0. The output also shows the results of a linear search, which found the product in the 'Appliances' category at a price of 3200.0. The terminal output is as follows:

```
Malarr@Malar-Laptop DigitalNurture % /usr/bin/env /Library/Java/JavaVirtualMachines/temurin-21.jdk/Contents/Home/bin/java -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/Malarr/Library/Application\ Support/Code/User/workspaceStorage/b3ac0b92d531e267f0cd7b72bb448de0/redhat.java/jdt_ws/DigitalNurture_93dd928a/bin Ecommerce
fan
LINEAR SEARCH
Found: Fan in Appliances at price 3200.0
BINARY SEARCH
Found: Fan in Appliances at price 3200.0
Malarr@Malar-Laptop DigitalNurture % cd /Users/Malarr/Desktop/DigitalNurture ; /usr/bin/env /Library/Java/JavaVirtualMachines/temurin-21.jdk/Contents/Home/bin/java -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/Malarr/Library/Application\ Support/Code/User/workspaceStorage/b3ac0b92d531e267f0cd7b72bb448de0/redhat.java/jdt_ws/DigitalNurture_93dd928a/bin Ecommerce
car
LINEAR SEARCH
Product not found.
BINARY SEARCH
Product not found.
Malarr@Malar-Laptop DigitalNurture %
```

EXERCISE 7 : FINANCIAL FORECASTING

- To build a tool to predict future values (sales or investments) based on past growth .

✓ CONCEPT :

RECURSION :

- * A function that calls itself with a smaller version of the same problem.
- * Apply formula multiple time without writing loops.
- * Used to calculate future value year by year applying growth at each step.

✓ TIME COMPLEXITY : $O(n)$

✓ KEYWORDS :

1. *Forecast()* : Recursive method used to compute future value.

✓ OUTPUT :

The screenshot displays an IDE with a project named 'DigitalNurture'. The Explorer panel on the left shows a directory structure with folders like 'DIGITALNURTURE', 'WEEK1', 'DESIGN', and 'Factory', and various Java files. The main editor shows the code for 'Forecasting.java' in the 'DSA' package. The code defines a 'Forecasting' class with a 'main' method that uses a 'Scanner' to take input for current value, growth rate, and years, then calls a 'forecast' method to calculate the future value. The terminal at the bottom shows the command to run the program, which outputs the future value after 5 years as 16185.100000000000.

```
public class Forecasting {  
    //  
    public static void main(String[] args)  
    {  
        Scanner sc = new Scanner(System.in);  
        double currentValue = sc.nextDouble();  
        double growthRate = sc.nextDouble();  
        int years = sc.nextInt();  
        double futureValue = forecast(currentValue, growthRate, years);  
        System.out.println("Future value after "+years+" years is: "+futureValue);  
    }  
}
```

```
Malarra@Malar-Laptop DigitalNurture % /usr/bin/env  
/Library/Java/JavaVirtualMachines/temurin-21.jdk/  
Contents/Home/bin/java -Xs+ShowCodeDetails:inExcept  
tionMessages -cp /Users/Malarra/Library/Application  
Support/Code/User/workspaceStorage/b3ac8b92d531e  
267f6cd7b72bb448de8/redhat.java/jdt_ws/DigitalNurt  
ure-33d928a/bin Forecasting  
10000  
0.10  
5  
Future value after 5 years is: 16185.100000000000  
Malarra@Malar-Laptop DigitalNurture %
```