DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING

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Experiment-3.1

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Subject Name: Project Based learning with Java **Subject Code:** 21CSH-319

1. **Aim:** Create a palindrome creator application for making a longest possible palindrome out of given input string**.**

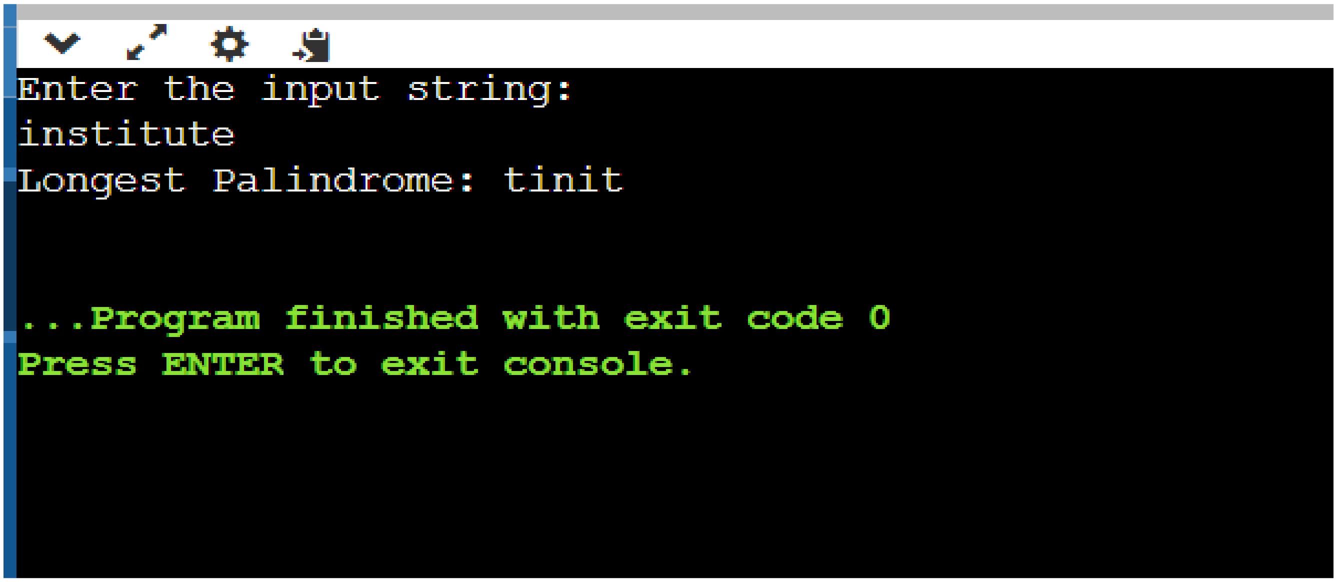
2. **Objective:** The objective of Program to learn about concept of HashMap in java and learn about concept of String in java.

3. Algorithm/Approach/Code:

```
import java.util.HashMap;
import java.util.Map;
import java.util.Scanner;
public class PalindromeCreator {
public static void main(String[] args) {
Scanner scanner = new Scanner(System.in);
System.out.println("Enter the input string:");
String inputString = scanner.nextLine();
String palindrome = createPalindrome(inputString);
System.out.println("Longest Palindrome: " + palindrome);
scanner.close();
}
```

```
private static String createPalindrome(String input) {
// Count the frequency of each character
Map<Character, Integer> charFrequency = new HashMap<>();
for (char ch : input.toCharArray()) {
charFrequency.put(ch, charFrequency.getOrDefault(ch, 0) + 1);
}
StringBuilder leftHalf = new StringBuilder();
StringBuilder rightHalf = new StringBuilder();
char middleChar = '\0';
// Construct the left and right halves of the palindrome
for (Map.Entry<Character, Integer> entry : charFrequency.entrySet()) {
char ch = entry.getKey();
int frequency = entry.getValue();
// If frequency is even, add half occurrences to both left and right halves
if (frequency % 2 == 0) {
int halfFrequency = frequency / 2;
leftHalf.append(String.valueOf(ch).repeat(halfFrequency));
rightHalf.insert(0, String.valueOf(ch).repeat(halfFrequency));
} else {
// If frequency is odd, add one occurrence to the middle and the rest to
both halves
middleChar = ch;
int halfFrequency = (frequency - 1) / 2;
leftHalf.append(String.valueOf(ch).repeat(halfFrequency));
rightHalf.insert(0, String.valueOf(ch).repeat(halfFrequency));
}
}
// Combine left half, middle character (if any), and right half
StringBuilder palindrome = new StringBuilder(leftHalf);
if (middleChar != '\0') {
palindrome.append(middleChar);
}
palindrome.append(rightHalf);
return palindrome.toString();
}
}
```

4. Output:



```
Enter the input string:
institute
Longest Palindrome: tinit


...Program finished with exit code 0
Press ENTER to exit console.
```

5. Learning Outcomes:

1) Learnt about concept of HashMap in java.
2) Learnt about concept of String in java.