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FAST LEARNER COMPLEX PROBLEMS
PBLJ LAB:

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1. Problem 1:

Encoding Three Strings: Anand was assigned the task of coming up with an encoding mechanism for any given three strings.He has come up with the following plan.

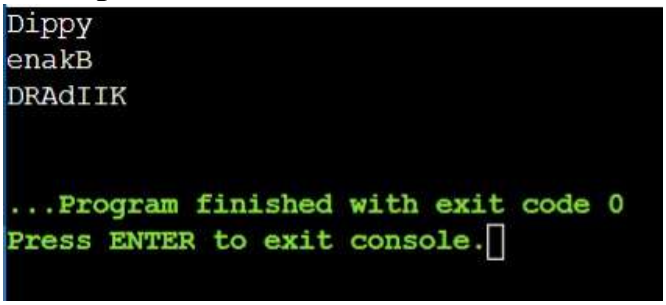
2. Implementation/Code:

```
public class StringEncoder
   { public static void
   main(String[] args) {
      String input1 = "Dipendra";
      String input2 = "Dipak";
      String input3 = "Biky";

      String[] out = encodeStrings(input1,
      input2, input3); for (String s : out) {
         System.out.println(s);
      }
   }

   public static String[] encodeStrings(String a, String b, String c) {
      String[] splitA = splitThreeParts(a);
      String[] splitB = splitThreeParts(b);
      String[] splitC = splitThreeParts(c);

      String output1 = splitA[0] + splitB[1] + splitC[2];
      String output2 = splitA[1] + splitB[2] +
      splitC[0]; String output3 = splitA[2] +
```

```
        splitB[0] + splitC[1]; output3 =
        toggleCase(output3);
        return new String[]{output1, output2, output3};
    }

    public static String[]
        splitThreeParts(String s) { int
        len = s.length(); int rem = len %
        3; int part = len / 3; int front =
        part, mid = part, end = part;

        if (rem
        == 1)
        mid++;
        else if
        (rem
        == 2) {
        front+
        +;
            end++;
        }

        String[] res = new
        String[3]; res[0] =
        s.substring(0, front);
        res[1] = s.substring(front,
        front + mid); res[2] =
        s.substring(front + mid);
        return res;
    }

    public static String toggleCase(String s) { StringBuilder sb =
        new StringBuilder(); for (char ch : s.toCharArray()) {
        sb.append(Character.isLowerCase(ch) ?
        Character.toUpperCase(ch) :
Character.toLowerCase(ch));
        }
        return sb.toString();
```

```
    }
}
```

3. Output:



1. Problem 2:

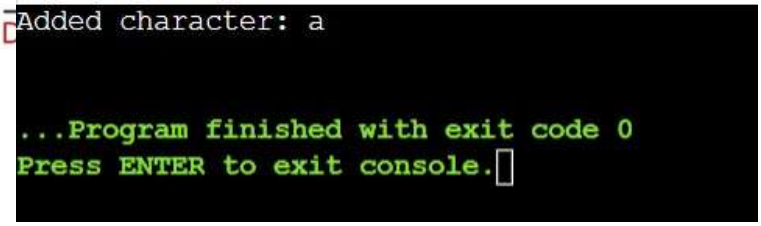
String t is generated by random shuffling string s and then add one more letter at a random position. Return the letter that was added to t.

Hint: Input: s = "abcd", t = "abcde" Output: "e"

2. Implementation/Code:

```
public class ExtraCharacterFinder {
    public static char findExtraChar(String s, String t) { int sum = 0; for (char ch : t.toCharArray()) sum += ch; for (char ch : s.toCharArray()) sum -= ch; return (char) sum;
    }

    public static void main(String[] args) {
        String s = "dipendr";
        String t = "dipendra";
        System.out.println("Added character: " + findExtraChar(s, t)); // Output: e
    }
}
```

3. Output:



1. Problem 3:

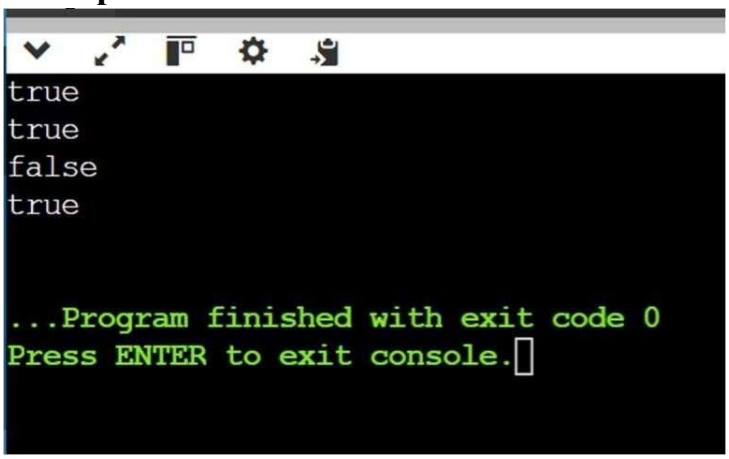
A string containing only parentheses is balanced if the following is true: 1. if it is an empty string 2. if A and B are correct, AB is correct, 3. if A is correct, (A) and {A} and [A] are also correct. Examples of some correctly balanced strings are: "{}()", "[{()}]", "({()})" Examples of some unbalanced strings are: "{}(", "({)}", "[[", "}{" etc. Given a string, determine if it is balanced or not. Input Format There will be multiple lines in the input file, each having a single non-empty string. You should read input till end-of-file. Output Format For each case, print 'true' if the string is balanced, 'false' otherwise. Sample Input {}() ({()}) {}([] Sample Output true true false true

2. Implementation/Code:

```
import java.util.*;

public class BalancedParentheses
   { public static boolean
   isBalanced(String str) {
   Stack<Character> stack = new
   Stack<>(); for (char ch :
   str.toCharArray()) { switch (ch)
   { case '(': case '{': case '[':
                stack.push(ch
            ); break; case ')':
                if (stack.isEmpty() || stack.pop() != '(') return
                false; break;
            case '}': if (stack.isEmpty() || stack.pop()
            != '{') return false; break; case ']':
                if (stack.isEmpty() || stack.pop() != '[') return
                false; break;
        }
    }
```

```
        return stack.isEmpty();
    }

    public static void main(String[] args) {
        String[] inputs = {"{}()", "({()})",
        "{}(", "[]"}; for (String s : inputs) {
            System.out.println(is
        Balanced(s)); }
}
}
```

3. Output:



1. Problem 4:

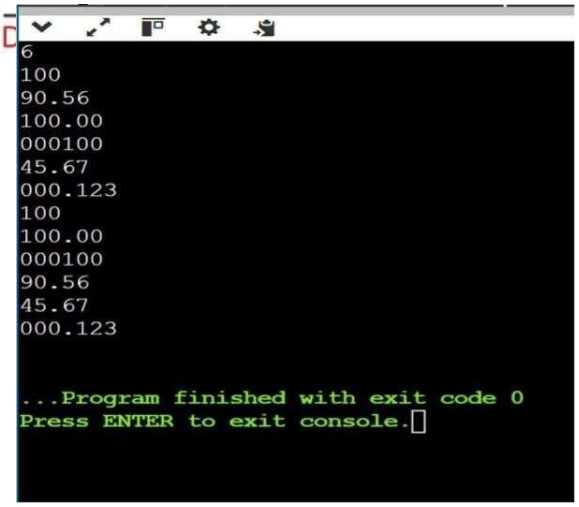
Java's BigDecimal class can handle arbitrary-precision signed decimal numbers. Let's test your knowledge of them! Given an array, , of real number strings, sort them in descending order — but wait, there's more! Each number must be printed in the exact same format as it was read from stdin, meaning that is printed as , and is printed as . If two numbers represent numerically equivalent values (e.g.,), then they must be listed in the same order as they were received as input). You must rearrange array 's elements according to the instructions above.

2. Implementation/Code:

```
import
java.math.BigDecimal;
import java.util.*;
```

```
public class BigDecimalSort {
    public static void main(String[] args) {
    Scanner sc = new Scanner(System.in); int n = Integer.parseInt(sc.nextLine()); String[] values = new String[n];
for (int i = 0; i < n; i++) {
    values[i] = sc.nextLine();
    }

    Arrays.sort(values, (a, b) -> {
      BigDecimal aVal = new BigDecimal(a); BigDecimal bVal = new BigDecimal(b);
      return bVal.compareTo(aVal);
      // descending
    });

    for (String v : values) {
      System.out.println(v);
    }
  }}
```

3. Output:



1. Problem 5:

Given an array of integers nums sorted in non-decreasing order, find the starting and ending position of a given target value. If target is not found in the array, return [-1, -1]. You must write an algorithm with O(log n) runtime complexity.

2. Implementation/Code:

```
public class TargetFinder { public static
   int[] searchRange(int[] nums, int target)
   { int start = findBound(nums, target,
   true); int end = findBound(nums, target,
   false);
      return new int[]{start, end};
   }

   private static int findBound(int[] nums, int target, boolean isFirst) {
      int low = 0, high = nums.length -
      1, bound = -1; while (low <= high)
      { int mid = (low + high) / 2; if
      (nums[mid] == target) { bound =
      mid;
            if (isFirst) high
            = mid - 1; else
            low = mid + 1;
         } else if (nums[mid] < target) low =
         mid + 1; else high = mid - 1;
```

```
            }
        }

        public static void
            main(String[] args) { int[]
            nums = { 2, 5, 5, 9, 10, 12};
            int target = 5;
            int[] result = searchRange(nums, target);
            System.out.println("[" + result[0] + ", " +
        result[1] + "]"); }
    }
```

3. Output