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package src;

import java.io.BufferedReader;
import java.io.InputStreamReader;
import java.net.URL;

public class ACSL_Contest3_VedaKalwala{
    public static void main(String[] args) {
        try {
            String urlString =
"http://www.datafiles.acsl.org/2020/contest3/int-sample-
input.txt";

            URL url = new URL(urlString);
            String str;
            BufferedReader br = new BufferedReader(new
InputStreamReader(url.openStream()));
            while ((str = br.readLine()) != null) {
                String[] num = str.replace("+", "
").split(" ");

                String[][] matrix = program(num);
                binary(matrix[0]);
                binary(matrix[1]);
                binary(matrix[2]);
                binary(matrix[3]);
                System.out.println();
            }
        } catch (Exception e) {
        }
    }

    public static String[][] program(String[] n) {
        String[][] a = new String[4][4];
        for (int i = 0; i < n.length; i++) {
            if (n[i].equals("A")) {
                a[0][0] = "x";
                a[1][0] = "x";
                a[2][0] = "x";
                a[3][0] = "x";
                a[0][1] = "x";
                a[1][1] = "x";
                a[2][1] = "x";
                a[3][1] = "x";
            }
            if (n[i].equals("~A")) {
                a[0][2] = "x";
                a[1][2] = "x";
                a[2][2] = "x";
                a[3][2] = "x";
                a[0][3] = "x";
                a[1][3] = "x";
                a[2][3] = "x";
                a[3][3] = "x";
            }
        }
    }
}

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if (n[i].equals("B")) {
    a[0][0] = "x";
    a[0][1] = "x";
    a[0][2] = "x";
    a[0][3] = "x";
    a[1][0] = "x";
    a[1][1] = "x";
    a[1][2] = "x";
    a[1][3] = "x";
}
if (n[i].equals("~B")) {
    a[2][0] = "x";
    a[2][1] = "x";
    a[2][2] = "x";
    a[2][3] = "x";
    a[3][0] = "x";
    a[3][1] = "x";
    a[3][2] = "x";
    a[3][3] = "x";
}
if (n[i].equals("~C")) {
    a[0][0] = "x";
    a[1][0] = "x";
    a[2][0] = "x";
    a[3][0] = "x";
    a[0][3] = "x";
    a[1][3] = "x";
    a[2][3] = "x";
    a[3][3] = "x";
}
if (n[i].equals("C")) {
    a[0][1] = "x";
    a[1][1] = "x";
    a[2][1] = "x";
    a[3][1] = "x";
    a[0][2] = "x";
    a[1][2] = "x";
    a[2][2] = "x";
    a[3][2] = "x";
}
if (n[i].equals("~D")) {
    a[0][0] = "x";
    a[0][1] = "x";
    a[0][2] = "x";
    a[0][3] = "x";
    a[3][0] = "x";
    a[3][1] = "x";
    a[3][2] = "x";
    a[3][3] = "x";
}
if (n[i].equals("D")) {
    a[1][0] = "x";
}

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        a[1][1] = "x";
        a[1][2] = "x";
        a[1][3] = "x";
        a[2][0] = "x";
        a[2][1] = "x";
        a[2][2] = "x";
        a[2][3] = "x";
    }
    if (n[i].equals("AB")) {
        a[0][0] = "x";
        a[0][1] = "x";
        a[1][0] = "x";
        a[1][1] = "x";
    }
    if (n[i].equals("~AB")) {
        a[0][2] = "x";
        a[0][3] = "x";
        a[1][2] = "x";
        a[1][3] = "x";
    }
    if (n[i].equals("A~B")) {
        a[2][0] = "x";
        a[2][1] = "x";
        a[3][0] = "x";
        a[3][1] = "x";
    }
    if (n[i].equals("~A~B")) {
        a[2][2] = "x";
        a[2][3] = "x";
        a[3][2] = "x";
        a[3][3] = "x";
    }
    if (n[i].equals("~C~D")) {
        a[0][0] = "x";
        a[3][0] = "x";
        a[0][3] = "x";
        a[3][3] = "x";
    }
    if (n[i].equals("~CD")) {
        a[1][0] = "x";
        a[2][0] = "x";
        a[1][3] = "x";
        a[2][3] = "x";
    }
    if (n[i].equals("CD")) {
        a[1][1] = "x";
        a[1][2] = "x";
        a[2][1] = "x";
        a[2][2] = "x";
    }
    if (n[i].equals("C~D")) {
        a[0][1] = "x";
    }

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        a[0][2] = "x";
        a[3][1] = "x";
        a[3][2] = "x";
    }
    if (n[i].equals("A~D")) {
        a[0][0] = "x";
        a[0][1] = "x";
        a[3][0] = "x";
        a[3][1] = "x";
    }
    if (n[i].equals("AD")) {
        a[1][0] = "x";
        a[1][1] = "x";
        a[2][0] = "x";
        a[2][1] = "x";
    }
    if (n[i].equals("~A~D")) {
        a[0][2] = "x";
        a[0][3] = "x";
        a[3][2] = "x";
        a[3][3] = "x";
    }
    if (n[i].equals("~AD")) {
        a[1][2] = "x";
        a[1][2] = "x";
        a[2][3] = "x";
        a[2][3] = "x";
    }
    if (n[i].equals("B~C")) {
        a[0][0] = "x";
        a[1][0] = "x";
        a[0][3] = "x";
        a[1][3] = "x";
    }
    if (n[i].equals("BC")) {
        a[0][1] = "x";
        a[1][1] = "x";
        a[0][2] = "x";
        a[1][2] = "x";
    }
    if (n[i].equals("~B~C")) {
        a[2][0] = "x";
        a[3][0] = "x";
        a[2][3] = "x";
        a[3][3] = "x";
    }
    if (n[i].equals("~BC")) {
        a[2][1] = "x";
        a[3][1] = "x";
        a[2][2] = "x";
        a[3][2] = "x";
    }
}

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if (n[i].equals("A~C")) {
    a[0][0] = "x";
    a[1][0] = "x";
    a[2][0] = "x";
    a[3][0] = "x";
}
if (n[i].equals("AC")) {
    a[0][1] = "x";
    a[1][1] = "x";
    a[2][1] = "x";
    a[3][1] = "x";
}
if (n[i].equals("~AC")) {
    a[0][2] = "x";
    a[1][2] = "x";
    a[2][2] = "x";
    a[3][2] = "x";
}
if (n[i].equals("~A~C")) {
    a[0][3] = "x";
    a[1][3] = "x";
    a[2][3] = "x";
    a[3][3] = "x";
}
if (n[i].equals("B~D")) {
    a[0][0] = "x";
    a[0][1] = "x";
    a[0][2] = "x";
    a[0][3] = "x";
}
if (n[i].equals("BD")) {
    a[1][0] = "x";
    a[1][1] = "x";
    a[1][2] = "x";
    a[1][3] = "x";
}
if (n[i].equals("~BD")) {
    a[2][0] = "x";
    a[2][1] = "x";
    a[2][2] = "x";
    a[2][3] = "x";
}
if (n[i].equals("~B~D")) {
    a[3][0] = "x";
    a[3][1] = "x";
    a[3][2] = "x";
    a[3][3] = "x";
}
if (n[i].equals("AB~C")) {
    a[0][0] = "x";
    a[1][0] = "x";
}

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if (n[i].equals("ABC")) {
    a[0][1] = "x";
    a[1][1] = "x";
}
if (n[i].equals("~ABC")) {
    a[0][2] = "x";
    a[1][2] = "x";
}
if (n[i].equals("~AB~C")) {
    a[0][3] = "x";
    a[1][3] = "x";
}
if (n[i].equals("A~B~C")) {
    a[2][0] = "x";
    a[3][0] = "x";
}
if (n[i].equals("A~BC")) {
    a[2][1] = "x";
    a[3][1] = "x";
}
if (n[i].equals("~A~BC")) {
    a[2][2] = "x";
    a[3][2] = "x";
}
if (n[i].equals("~A~B~C")) {
    a[2][3] = "x";
    a[3][3] = "x";
}
if (n[i].equals("A~C~D")) {
    a[0][0] = "x";
    a[3][0] = "x";
}
if (n[i].equals("AC~D")) {
    a[0][1] = "x";
    a[3][1] = "x";
}
if (n[i].equals("~AC~D")) {
    a[0][2] = "x";
    a[3][2] = "x";
}
if (n[i].equals("~A~C~D")) {
    a[0][3] = "x";
    a[3][3] = "x";
}
if (n[i].equals("A~CD")) {
    a[1][0] = "x";
    a[2][0] = "x";
}
if (n[i].equals("ACD")) {
    a[1][1] = "x";
    a[2][1] = "x";
}
}

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if (n[i].equals("~ACD")) {
    a[1][2] = "x";
    a[2][2] = "x";
}
if (n[i].equals("~A~CD")) {
    a[1][3] = "x";
    a[2][3] = "x";
}
if (n[i].equals("AB~D")) {
    a[0][0] = "x";
    a[0][1] = "x";
}
if (n[i].equals("~AB~D")) {
    a[0][2] = "x";
    a[0][3] = "x";
}
if (n[i].equals("ABD")) {
    a[1][0] = "x";
    a[1][1] = "x";
}
if (n[i].equals("~ABD")) {
    a[1][2] = "x";
    a[1][3] = "x";
}
if (n[i].equals("A~BD")) {
    a[2][0] = "x";
    a[2][1] = "x";
}
if (n[i].equals("~A~BD")) {
    a[2][2] = "x";
    a[2][3] = "x";
}
if (n[i].equals("A~B~D")) {
    a[3][0] = "x";
    a[3][1] = "x";
}
if (n[i].equals("~A~B~D")) {
    a[3][2] = "x";
    a[3][3] = "x";
}
if (n[i].equals("~B~CD")) {
    a[2][0] = "x";
    a[2][3] = "x";
}
if (n[i].equals("~BCD")) {
    a[2][1] = "x";
    a[2][2] = "x";
}
if (n[i].equals("~B~C~D")) {
    a[3][0] = "x";
    a[3][3] = "x";
}
}

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if (n[i].equals("~BC~D")) {
    a[3][1] = "x";
    a[3][2] = "x";
}
if (n[i].equals("AB~C~D")) {
    a[0][0] = "x";
}
if (n[i].equals("ABC~D")) {
    a[0][1] = "x";
}
if (n[i].equals("~ABC~D")) {
    a[0][2] = "x";
}
if (n[i].equals("~AB~C~D")) {
    a[0][3] = "x";
}
if (n[i].equals("AB~CD")) {
    a[1][0] = "x";
}
if (n[i].equals("ABCD")) {
    a[1][1] = "x";
}
if (n[i].equals("~ABCD")) {
    a[1][2] = "x";
}
if (n[i].equals("~AB~CD")) {
    a[1][3] = "x";
}
if (n[i].equals("A~B~CD")) {
    a[2][0] = "x";
}
if (n[i].equals("A~BCD")) {
    a[2][1] = "x";
}
if (n[i].equals("~A~BCD")) {
    a[2][2] = "x";
}
if (n[i].equals("~A~B~CD")) {
    a[2][3] = "x";
}
if (n[i].equals("A~B~C~D")) {
    a[3][0] = "x";
}
if (n[i].equals("A~BC~D")) {
    a[3][1] = "x";
}
if (n[i].equals("~A~BC~D")) {
    a[3][2] = "x";
}
if (n[i].equals("~A~B~C~D")) {
    a[3][3] = "x";
}
}

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        }
        return a;
    }
    public static void binary(String[] a) {
        if (a[0] == null && a[1] == null && a[2] == null &&
a[3] == null) {
            System.out.print("0");
        }
        if (a[0] == null && a[1] == null && a[2] == null &&
a[3] == "x") {
            System.out.print("1");
        }
        if (a[0] == null && a[1] == null && a[2] == "x" &&
a[3] == null) {
            System.out.print("2");
        }
        if (a[0] == null && a[1] == null && a[2] == "x" &&
a[3] == "x") {
            System.out.print("3");
        }
        if (a[0] == null && a[1] == "x" && a[2] == null &&
a[3] == null) {
            System.out.print("4");
        }
        if (a[0] == null && a[1] == "x" && a[2] == null &&
a[3] == "x") {
            System.out.print("5");
        }
        if (a[0] == null && a[1] == "x" && a[2] == "x" && a[3]
== null) {
            System.out.print("6");
        }
        if (a[0] == null && a[1] == "x" && a[2] == "x" && a[3]
== "x") {
            System.out.print("7");
        }
        if (a[0] == "x" && a[1] == null && a[2] == null &&
a[3] == null) {
            System.out.print("8");
        }
        if (a[0] == "x" && a[1] == null && a[2] == null &&
a[3] == "x") {
            System.out.print("9");
        }
        if (a[0] == "x" && a[1] == null && a[2] == "x" && a[3]
== null) {
            System.out.print("A");
        }
        if (a[0] == "x" && a[1] == null && a[2] == "x" && a[3]
== "x") {
            System.out.print("B");
        }
    }
}

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    if (a[0] == "x" && a[1] == "x" && a[2] == null && a[3]
== null) {
        System.out.print("C");
    }
    if (a[0] == "x" && a[1] == "x" && a[2] == null && a[3]
== "x") {
        System.out.print("D");
    }
    if (a[0] == "x" && a[1] == "x" && a[2] == "x" && a[3]
== null) {
        System.out.print("E");
    }
    if (a[0] == "x" && a[1] == "x" && a[2] == "x" && a[3]
== "x") {
        System.out.print("F");
    }
}
}
```