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

public class ACSL_CONTEST3_RAINA {
    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(" ");
                int[][] v = vietch(num);
                bin(v[0]);
                bin(v[1]);
                bin(v[2]);
                bin(v[3]);
                System.out.println();
            }
        } catch (Exception e) {
        }
    }

    public static int[][] vietch(String[] n) {
        int[][] v = new int[4][4];
        for (int i = 0; i < n.length; i++) {
            if (n[i].equals("A")) {
                v[0][0] = 1;
                v[1][0] = 1;
                v[2][0] = 1;
                v[3][0] = 1;
                v[0][1] = 1;
                v[1][1] = 1;
                v[2][1] = 1;
                v[3][1] = 1;
            }
            if (n[i].equals("~A")) {
                v[0][2] = 1;
                v[1][2] = 1;
                v[2][2] = 1;
                v[3][2] = 1;
                v[0][3] = 1;
                v[1][3] = 1;
                v[2][3] = 1;
                v[3][3] = 1;
            }
            if (n[i].equals("B")) {
                v[0][0] = 1;
                v[0][1] = 1;
                v[0][2] = 1;
                v[0][3] = 1;
                v[1][0] = 1;
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            v[1][1] = 1;
            v[1][2] = 1;
            v[1][3] = 1;
        }
        if (n[i].equals("~B")) {
            v[2][0] = 1;
            v[2][1] = 1;
            v[2][2] = 1;
            v[2][3] = 1;
            v[3][0] = 1;
            v[3][1] = 1;
            v[3][2] = 1;
            v[3][3] = 1;
        }
        if (n[i].equals("~C")) {
            v[0][0] = 1;
            v[1][0] = 1;
            v[2][0] = 1;
            v[3][0] = 1;
            v[0][3] = 1;
            v[1][3] = 1;
            v[2][3] = 1;
            v[3][3] = 1;
        }
        if (n[i].equals("C")) {
            v[0][1] = 1;
            v[1][1] = 1;
            v[2][1] = 1;
            v[3][1] = 1;
            v[0][2] = 1;
            v[1][2] = 1;
            v[2][2] = 1;
            v[3][2] = 1;
        }
        if (n[i].equals("~D")) {
            v[0][0] = 1;
            v[0][1] = 1;
            v[0][2] = 1;
            v[0][3] = 1;
            v[3][0] = 1;
            v[3][1] = 1;
            v[3][2] = 1;
            v[3][3] = 1;
        }
        if (n[i].equals("D")) {
            v[1][0] = 1;
            v[1][1] = 1;
            v[1][2] = 1;
            v[1][3] = 1;
            v[2][0] = 1;
            v[2][1] = 1;
            v[2][2] = 1;
            v[2][3] = 1;
        }
        if (n[i].equals("AB")) {
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        v[0][0] = 1;
        v[0][1] = 1;
        v[1][0] = 1;
        v[1][1] = 1;
    }
    if (n[i].equals("~AB")) {
        v[0][2] = 1;
        v[0][3] = 1;
        v[1][2] = 1;
        v[1][3] = 1;
    }
    if (n[i].equals("A~B")) {
        v[2][0] = 1;
        v[2][1] = 1;
        v[3][0] = 1;
        v[3][1] = 1;
    }
    if (n[i].equals("~A~B")) {
        v[2][2] = 1;
        v[2][3] = 1;
        v[3][2] = 1;
        v[3][3] = 1;
    }
    if (n[i].equals("~C~D")) {
        v[0][0] = 1;
        v[3][0] = 1;
        v[0][3] = 1;
        v[3][3] = 1;
    }
    if (n[i].equals("~CD")) {
        v[1][0] = 1;
        v[2][0] = 1;
        v[1][3] = 1;
        v[2][3] = 1;
    }
    if (n[i].equals("CD")) {
        v[1][1] = 1;
        v[1][2] = 1;
        v[2][1] = 1;
        v[2][2] = 1;
    }
    if (n[i].equals("C~D")) {
        v[0][1] = 1;
        v[0][2] = 1;
        v[3][1] = 1;
        v[3][2] = 1;
    }
    if (n[i].equals("A~D")) {
        v[0][0] = 1;
        v[0][1] = 1;
        v[3][0] = 1;
        v[3][1] = 1;
    }
    if (n[i].equals("AD")) {
        v[1][0] = 1;
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    v[1][1] = 1;
    v[2][0] = 1;
    v[2][1] = 1;
}
if (n[i].equals("~A~D")) {
    v[0][2] = 1;
    v[0][3] = 1;
    v[3][2] = 1;
    v[3][3] = 1;
}
if (n[i].equals("~AD")) {
    v[1][2] = 1;
    v[1][2] = 1;
    v[2][3] = 1;
    v[2][3] = 1;
}
if (n[i].equals("B~C")) {
    v[0][0] = 1;
    v[1][0] = 1;
    v[0][3] = 1;
    v[1][3] = 1;
}
if (n[i].equals("BC")) {
    v[0][1] = 1;
    v[1][1] = 1;
    v[0][2] = 1;
    v[1][2] = 1;
}
if (n[i].equals("~B~C")) {
    v[2][0] = 1;
    v[3][0] = 1;
    v[2][3] = 1;
    v[3][3] = 1;
}
if (n[i].equals("~BC")) {
    v[2][1] = 1;
    v[3][1] = 1;
    v[2][2] = 1;
    v[3][2] = 1;
}
if (n[i].equals("A~C")) {
    v[0][0] = 1;
    v[1][0] = 1;
    v[2][0] = 1;
    v[3][0] = 1;
}
if (n[i].equals("AC")) {
    v[0][1] = 1;
    v[1][1] = 1;
    v[2][1] = 1;
    v[3][1] = 1;
}
if (n[i].equals("~AC")) {
    v[0][2] = 1;
    v[1][2] = 1;
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    v[2][2] = 1;
    v[3][2] = 1;
}
if (n[i].equals("~A~C")) {
    v[0][3] = 1;
    v[1][3] = 1;
    v[2][3] = 1;
    v[3][3] = 1;
}
if (n[i].equals("B~D")) {
    v[0][0] = 1;
    v[0][1] = 1;
    v[0][2] = 1;
    v[0][3] = 1;
}
if (n[i].equals("BD")) {
    v[1][0] = 1;
    v[1][1] = 1;
    v[1][2] = 1;
    v[1][3] = 1;
}
if (n[i].equals("~BD")) {
    v[2][0] = 1;
    v[2][1] = 1;
    v[2][2] = 1;
    v[2][3] = 1;
}
if (n[i].equals("~B~D")) {
    v[3][0] = 1;
    v[3][1] = 1;
    v[3][2] = 1;
    v[3][3] = 1;
}
if (n[i].equals("AB~C")) {
    v[0][0] = 1;
    v[1][0] = 1;
}
if (n[i].equals("ABC")) {
    v[0][1] = 1;
    v[1][1] = 1;
}
if (n[i].equals("~ABC")) {
    v[0][2] = 1;
    v[1][2] = 1;
}
if (n[i].equals("~AB~C")) {
    v[0][3] = 1;
    v[1][3] = 1;
}
if (n[i].equals("A~B~C")) {
    v[2][0] = 1;
    v[3][0] = 1;
}
if (n[i].equals("A~BC")) {
    v[2][1] = 1;
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    v[3][1] = 1;
}
if (n[i].equals("~A~BC")) {
    v[2][2] = 1;
    v[3][2] = 1;
}
if (n[i].equals("~A~B~C")) {
    v[2][3] = 1;
    v[3][3] = 1;
}
if (n[i].equals("A~C~D")) {
    v[0][0] = 1;
    v[3][0] = 1;
}
if (n[i].equals("AC~D")) {
    v[0][1] = 1;
    v[3][1] = 1;
}
if (n[i].equals("~AC~D")) {
    v[0][2] = 1;
    v[3][2] = 1;
}
if (n[i].equals("~A~C~D")) {
    v[0][3] = 1;
    v[3][3] = 1;
}
if (n[i].equals("A~CD")) {
    v[1][0] = 1;
    v[2][0] = 1;
}
if (n[i].equals("ACD")) {
    v[1][1] = 1;
    v[2][1] = 1;
}
if (n[i].equals("~ACD")) {
    v[1][2] = 1;
    v[2][2] = 1;
}
if (n[i].equals("~A~CD")) {
    v[1][3] = 1;
    v[2][3] = 1;
}
if (n[i].equals("AB~D")) {
    v[0][0] = 1;
    v[0][1] = 1;
}
if (n[i].equals("~AB~D")) {
    v[0][2] = 1;
    v[0][3] = 1;
}
if (n[i].equals("ABD")) {
    v[1][0] = 1;
    v[1][1] = 1;
}
if (n[i].equals("~ABD")) {
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    v[1][2] = 1;
    v[1][3] = 1;
}
if (n[i].equals("A~BD")) {
    v[2][0] = 1;
    v[2][1] = 1;
}
if (n[i].equals("~A~BD")) {
    v[2][2] = 1;
    v[2][3] = 1;
}
if (n[i].equals("A~B~D")) {
    v[3][0] = 1;
    v[3][1] = 1;
}
if (n[i].equals("~A~B~D")) {
    v[3][2] = 1;
    v[3][3] = 1;
}
if (n[i].equals("~B~CD")) {
    v[2][0] = 1;
    v[2][3] = 1;
}
if (n[i].equals("~BCD")) {
    v[2][1] = 1;
    v[2][2] = 1;
}
if (n[i].equals("~B~C~D")) {
    v[3][0] = 1;
    v[3][3] = 1;
}
if (n[i].equals("~BC~D")) {
    v[3][1] = 1;
    v[3][2] = 1;
}
if (n[i].equals("AB~C~D")) {
    v[0][0] = 1;
}
if (n[i].equals("ABC~D")) {
    v[0][1] = 1;
}
if (n[i].equals("~ABC~D")) {
    v[0][2] = 1;
}
if (n[i].equals("~AB~C~D")) {
    v[0][3] = 1;
}
if (n[i].equals("AB~CD")) {
    v[1][0] = 1;
}
if (n[i].equals("ABCD")) {
    v[1][1] = 1;
}
if (n[i].equals("~ABCD")) {
    v[1][2] = 1;
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        }
        if (n[i].equals("~AB~CD")) {
            v[1][3] = 1;
        }
        if (n[i].equals("A~B~CD")) {
            v[2][0] = 1;
        }
        if (n[i].equals("A~BCD")) {
            v[2][1] = 1;
        }
        if (n[i].equals("~A~BCD")) {
            v[2][2] = 1;
        }
        if (n[i].equals("~A~B~CD")) {
            v[2][3] = 1;
        }
        if (n[i].equals("A~B~C~D")) {
            v[3][0] = 1;
        }
        if (n[i].equals("A~BC~D")) {
            v[3][1] = 1;
        }
        if (n[i].equals("~A~BC~D")) {
            v[3][2] = 1;
        }
        if (n[i].equals("~A~B~C~D")) {
            v[3][3] = 1;
        }
    }
    return v;
}

public static void bin(int[] v) {
    if (v[0] == 0 && v[1] == 0 && v[2] == 0 && v[3] == 0) {
        System.out.print("0");
    }
    if (v[0] == 0 && v[1] == 0 && v[2] == 0 && v[3] == 1) {
        System.out.print("1");
    }
    if (v[0] == 0 && v[1] == 0 && v[2] == 1 && v[3] == 0) {
        System.out.print("2");
    }
    if (v[0] == 0 && v[1] == 0 && v[2] == 1 && v[3] == 1) {
        System.out.print("3");
    }
    if (v[0] == 0 && v[1] == 1 && v[2] == 0 && v[3] == 0) {
        System.out.print("4");
    }
    if (v[0] == 0 && v[1] == 1 && v[2] == 0 && v[3] == 1) {
        System.out.print("5");
    }
    if (v[0] == 0 && v[1] == 1 && v[2] == 1 && v[3] == 0) {
        System.out.print("6");
    }
    if (v[0] == 0 && v[1] == 1 && v[2] == 1 && v[3] == 1) {
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            System.out.print("7");
        }
        if (v[0] == 1 && v[1] == 0 && v[2] == 0 && v[3] == 0) {
            System.out.print("8");
        }
        if (v[0] == 1 && v[1] == 0 && v[2] == 0 && v[3] == 1) {
            System.out.print("9");
        }
        if (v[0] == 1 && v[1] == 0 && v[2] == 1 && v[3] == 0) {
            System.out.print("A");
        }
        if (v[0] == 1 && v[1] == 0 && v[2] == 1 && v[3] == 1) {
            System.out.print("B");
        }
        if (v[0] == 1 && v[1] == 1 && v[2] == 0 && v[3] == 0) {
            System.out.print("C");
        }
        if (v[0] == 1 && v[1] == 1 && v[2] == 0 && v[3] == 1) {
            System.out.print("D");
        }
        if (v[0] == 1 && v[1] == 1 && v[2] == 1 && v[3] == 0) {
            System.out.print("E");
        }
        if (v[0] == 1 && v[1] == 1 && v[2] == 1 && v[3] == 1) {
            System.out.print("F");
        }
    }
}
```