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package helloworld;
import java.util.*;
import java.io.*;
public class ShreyaAravindanContest3Veitch{
   public static int [][] matrix = new int [4][4];
   public static void main (String []args) throws FileNotFoundException  {
      Scanner s = new Scanner(new File("testFileC3"));
      String string="";
      while (s.hasNextLine()){
          matrix = new int [4][4];
         string=s.nextLine();
         System.out.println(v(string));
      }
   }
      public static void overlaping(int [][] arr, String string, int index){
          String[] str= string.split("[+]");
          int count=0;
          for(int i=0; i<str[index].length(); i++){
             if(!(str[index].charAt(i)=='~')){
                count++;
             }
          }
          for (int i=0; i<=3; i++){
             for(int j=0; j<=3; j++){
                if(arr[i][j]<count){
                   arr[i][j]=0;
                }
             }
          }
       }
      public static void display(int [][] arr){
          for (int i=0; i<=3; i++){
             for(int j=0; j<=3; j++){
                if(arr[i][j]!=0){
                   arr[i][j]=1;
                   matrix[i][j]=1;
                }
             }
          }
       }
      public static String v(String string){
          String[] s= string.split("[+]");
          String [] str = string.split("");
          ArrayList<String> arrlist = new ArrayList<String>();
          for(int i=0; i<str.length; i++){
             arrlist.add(str[i]);
          }
          int [][] array1= new int[4][4];
          int count=0;
          Boolean bool=false;
```

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for(int k=0; k<arrlist.size(); k++){
   if(arrlist.get(k).equals("~")){
      bool=true;
   }
   else if(arrlist.get(k).equals("A")){
      if(bool){
         A2(array1);
         bool=false;
      }
      else{
         A(array1);
      }
   }
   else if(arrlist.get(k).equals("B")){
      if(bool){
               B2(array1);
         bool=false;
      }
      else{
         B(array1);
      }
   }
   else if(arrlist.get(k).equals("C")){
      if(bool){
         C2(array1);
         bool=false;
      }
      else{
         C(array1);
      }         }
   else if(arrlist.get(k).equals("D")){
      if(bool){
         D2(array1);
         bool=false;
      }
      else{
         D(array1);
      }
   }
   else if(arrlist.get(k).equals("+")){
      count++;
      overlaping(array1,string,count-1);
      display(array1);
      array1= new int [4][4];
   }
}
overlaping(array1,string,count);
display(array1);
display(matrix);
```

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        String answer="";
        for (int i=0; i<4; i++){
           String a="";int b=0;
           for(int j=0; j<4; j++){
              a+=Integer.toString(matrix[i][j]);
           }
           b= Integer.parseInt(a, 2);
           String cc=Integer.toHexString(b);
           answer+=cc;
        }
        answer=answer.toUpperCase();
        return answer;
     }

public static void A (int [][] arr){
   for (int i=0; i<=3; i++){
      for(int j=0; j<=1; j++){
         arr[i][j]++;
      }
   }
}
public static void A2 (int [][] arr){
   for (int i=0; i<=3; i++){
      for(int j=2; j<=3; j++){
         arr[i][j]++;
      }
   }
}
public static void B (int [][] arr){
   for (int i=0; i<=1; i++){
      for(int j=0; j<=3; j++){
         arr[i][j]++;
      }
   }
}
public static void B2 (int [][] arr){
   for (int i=2; i<=3; i++){
      for(int j=0; j<=3; j++){
         arr[i][j]++;
      }
   }
}
public static void C (int [][] arr){
   for (int i=0; i<=3; i++){
      for(int j=1; j<=2; j++){
         arr[i][j]++;
      }
   }
}
public static void C2 (int [][] arr){
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```
      for(int i=0; i<=3; i++){
         arr[i][0]++;
      }
      for(int i=0; i<=3; i++){
         arr[i][3]++;
      }
   }
   public static void D (int [][] arr){
      for (int i=1; i<=2; i++){
         for(int j=0; j<=3; j++){
            arr[i][j]++;
         }
      }
   }
   public static void D2 (int [][] arr){
      for(int j=0; j<=3; j++){
         arr[0][j]++;
      }
      for(int j=0; j<=3; j++){
         arr[3][j]++;
      }
   }
}
```