



### Czech ACM Student Chapter

Charles University in Prague  
Slovak University of Technology  
University of Žilina  
Matej Bel University in Banská Bystrica

### Czech Technical University in Prague

Technical University of Ostrava  
Pavol Jozef Šafárik University in Košice  
Masaryk University  
University of West Bohemia



## CTU Open Contest 2011

---

### Ambiguous Result

`result.c, result.C, result.java, result.p`

The ACM (Advanced Cosmos Monitor) recorded a set of messages transmitted by alien race of Space Invaders. Unfortunately, the antenna used for recording only handles lower frequencies representing numbers and two arithmetical operators in space-invaderian language, while all parentheses (corresponding to a high frequency) were lost.

Since numbers are important for those 8-bit creatures, we really need to know what number ranges these messages belong to — please, write a program that can do this for us!

#### Input Specification

Input contains several legal arithmetical expressions, each expression on a separate line. Each expression consists only of non-negative integers  $x_i$  ( $0 \leq x_i \leq 100$ ) and binary operators “+” and “\*”. The expression starts with a number, then the operators and numbers alternate, and the last element is a number. Each expression contains  $P$  numbers ( $1 \leq P \leq 100$ ) and  $P - 1$  operators. There are no parentheses, no other operators, no unary operator, etc.

The last input expression is followed by a line containing the single word “END”.

#### Output Specification

For each input line (not counting the final END), output one line containing the minimum and maximum values (separated by a single space) that are achievable by adding parentheses to the input in a way that forms a legal expression and computing the result of that expression.

For example, the minimum value for  $2 + 1 * 0$  input is achieved by  $(2 + 1) * 0$  and the maximum value is achieved by  $2 + (1 * 0)$ . Therefore, you should print “0 2”.

It is guaranteed that for *any* placement of parentheses, the value of *each* parenthesis will be less than  $2^{63}$ . This means that also the maximal result will be between 0 and  $2^{63} - 1$ , inclusive.

#### Sample Input

```
2+1*0
3+2*5+1*7+16
0
END
```

#### Output for Sample Input

```
0 2
36 690
0 0
```