

## Problem D. Bit Operations

Input file: *standard input*  
 Output file: *standard output*  
 Time limit: 1 second  
 Memory limit: 256 mebibytes

You are given  $N$  pairs of integers  $(x_i, y_i)$ . Construct a function  $f$  that satisfies  $y_i = f(x_i)$  for each  $i$ . It must be possible to write the function  $f$  in the C programming language in the following form:

```
uint32_t f(uint32_t x) {
    return Expression;
}
```

Here, `uint32_t` is an unsigned 32-bit integer. The Expression must satisfy the following BNF:

```
<expr> ::= "x"
        | <num>
        | "(" ~<expr> ")"
        | "(" <expr> <op2> <expr> ")"
<op2> ::= "&" | "|" | "^" | "+" | "-" | "*"
```

Here, `<num>` is an unsigned 32-bit integer represented as a decimal number. It must not contain leading zeroes, except if it is zero itself which must be represented as 0.

### Input

The first line contains an integer  $N$  ( $1 \leq N \leq 8$ ).

The  $i$ -th of the next  $N$  lines contains two integers  $x_i$  and  $y_i$  ( $0 \leq x_i, y_i < 256$ ).

### Output

Print an expression that satisfies the conditions.

The output must strictly follow the BNF format in the statement. Extra whitespaces, newlines, parentheses, etc. are not allowed. The output must contain at most  $10^5$  characters. It is guaranteed that the answer exists for the given input.

### Examples

| standard input                                            | standard output |
|-----------------------------------------------------------|-----------------|
| 8<br>1 1<br>2 2<br>3 3<br>4 0<br>5 1<br>6 2<br>7 3<br>8 0 | (x&3)           |
| 8<br>1 0<br>2 0<br>3 2<br>4 0<br>5 4<br>6 4<br>7 6<br>8 0 | (x&(x-1))       |