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# Bali Sculptures

Time limit: 1000 ms

Memory limit: 65536 KB

## Description

The province of Bali has many sculptures located on its roads. Let's focus on one of its main roads.

There are  $N$  sculptures on that main road, conveniently numbered 1 through  $N$  consecutively. The age of sculpture  $i$  is  $Y_i$  years. To make the road more beautiful, the government wants to partition the sculptures into several groups. Then, the government will plant beautiful trees between the groups, to attract more tourists to Bali.

Here is the rule in partitioning the sculptures:

- The sculptures must be partitioned into exactly  $X$  groups, where  $A \leq X \leq B$ . Each group must consist of at least one sculpture. Each sculpture must belong to exactly one group. The sculptures in each group must be consecutive sculptures on the road.
- For each group, compute the sum of the ages of the sculptures in that group.
- Finally, compute the bitwise OR of the above sums. Let's call this the final beauty value of the partition.

What is the minimum final beauty value that the government can achieve?

Note: the bitwise OR of two non-negative integers  $P$  and  $Q$  is computed as follows:

- Convert  $P$  and  $Q$  into binary.
- Let  $n_P$  = number of bits of  $P$ , and  $n_Q$  = number of bits of  $Q$ . Let  $M = \max(n_P, n_Q)$ .
- Represent  $P$  in binary as  $p_{M-1}p_{M-2} \dots p_1p_0$  and  $Q$  in binary as  $q_{M-1}q_{M-2} \dots q_1q_0$ , where  $p_i$  and  $q_i$  are the  $i$ -th bits of  $p$  and  $q$ , respectively. The  $(M-1)$ st bits are the most significant bits, while the  $0$ th bits are the least significant bits.
- $P \text{ OR } Q$ , in binary, is defined as  $(p_{M-1} \text{ OR } q_{M-1})(p_{M-2} \text{ OR } q_{M-2}) \dots (p_1 \text{ OR } q_1)(p_0 \text{ OR } q_0)$ , where
  - $0 \text{ OR } 0 = 0$
  - $0 \text{ OR } 1 = 1$
  - $1 \text{ OR } 0 = 1$
  - $1 \text{ OR } 1 = 1$

## Input Format

The first line contains three space-separated integers  $N$ ,  $A$ , and  $B$ . The second line contains  $N$  space-separated integers  $Y_1, Y_2, \dots, Y_N$ .

## Output Format

A single line containing the minimum final beauty value.

## Sample Input

```
6 1 3
8 1 2 1 5 4
```

## Sample Output

11

## Explanation

Partition the sculptures into 2 groups: (8 1 2) and (1 5 4). The sums are (11) and (10). The final beauty value is (11 OR 10) = 11.

## Subtasks

### Subtask 1 (9 points)

- $1 \leq N \leq 20$
- $1 \leq A \leq B \leq N$
- $0 \leq Y_i \leq 1,000,000,000$

### Subtask 2 (16 points)

- $1 \leq N \leq 50$
- $1 \leq A \leq B \leq \min(20, N)$
- $0 \leq Y_i \leq 10$

### Subtask 3 (21 points)

- $1 \leq N \leq 100$
- $A = 1$
- $1 \leq B \leq N$
- $0 \leq Y_i \leq 20$

### Subtask 4 (25 points)

- $1 \leq N \leq 100$
- $1 \leq A \leq B \leq N$
- $0 \leq Y_i \leq 1,000,000,000$

### Subtask 5 (29 points)

- $1 \leq N \leq 2,000$
  - $A = 1$
  - $1 \leq B \leq N$
  - $0 \leq Y_i \leq 1,000,000,000$
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