Subset Component

You are given an array with n 64-bit integers: $d[0], d[1], \ldots, d[n-1]$.

BIT(x, i) = (x >> i) & 1. (where $B(x, i)$ is the i^{th} lower bit of x in binary form.)

If we regard every bit as a vertex of a graph G, there exists one undirected edge between vertex i and vertex j if there exists at least one k such that BIT(d[k], i) == 1 && BIT(d[k], j) == 1.

For every subset of the input array, how many connected-components are there in that graph?

The number of connected-components in a graph are the sets of nodes, which are accessible to each other, but not to/from the nodes in any other set.

For example if a graph has six nodes, labelled $\{1, 2, 3, 4, 5, 6\}$. And contains the edges $(1, 2), (2, 4) and (3, 5)$. There are three connected-components: $\{1, 2, 4\}$, $\{3, 5\}$ and $\{6\}$. Because $\{1, 2, 4\}$ can be accessed from each other through one or more edges, $\{3, 5\}$ can access each other and $\{6\}$ is isolated from everone else.

You only need to output the sum of the number of connected-component(S) in every graph.

Input Format

```
n
d[0] d[1] ... d[n - 1]
```

Constraints

$1 <= n <= 20$
$0 <= d[i] <= 2^{64} - 1$

Output Format

Print the value of S.

Sample Input

```
3
2 5 9
```

Sample Output

```
504
```

Explanation

There are 8 subset of $\{2, 5, 9\}$.

{}
=> We don't have any number in this subset => no edge in the graph => Every node is a component by itself => Number of connected-components = 64.

{2}
=> The Binary Representation of 2 is 00000010. There is a bit at only one position. => So there is no edge in the graph, every node is a connected-component by itself => Number of connected-components = 64.

{5}

=> The Binary Representation of 5 is 00000101. There is a bit at the 0^{th} and 2^{nd} position. => So there is an edge: (0, 2) in the graph => There is one component with a pair of nodes (0,2) in the graph. Apart from that, all remaining 62 vertices are indepenent components of one node each (1,3,4,5,6...63) => Number of connected-components = 63.

{9}
=> The Binary Representation of 9 is 00001001. => There is a 1-bit at the 0^{th} and 3^{rd} position in this binary representation. => edge: (0, 3) in the graph => Number of components = 63

{2, 5}
=> This will contain the edge (0, 2) in the graph which will form one component
=> Other nodes are all independent components
=> Number of connected-component = 63

{2, 9}
=> This has edge (0,3) in the graph
=> Similar to examples above, this has 63 connected components

{5, 9}
=> This has edges (0, 2) and (0, 3) in the graph
=> Similar to examples above, this has 62 connected components

{2, 5, 9}
=> This has edges(0, 2) (0, 3) in the graph. All three vertices (0,2,3) make one component => Other 61 vertices are all independent components
=> Number of connected-components = 62

$$S = 64 + 64 + 63 + 63 + 63 + 63 + 62 + 62 = 504$$