Problem Name TBD. Given an array of n integers $A_0, A_1, \ldots, A_{n-1}$ where $0 \le i, j < n$ and $\mathtt{gcd}(A_i, A_j) = 1$. Your task is to partition this array into k disjoint sets $S_0, S_1, \ldots S_{k-1}$ where $1 \le k \le n$.
The score of partition is defined to be as:

$$\sum_{\mathtt{i=0}}^{\mathtt{k-1}} \mathtt{f}(\prod_{\mathtt{x \in S_i}} \mathtt{x})$$

Here $f(n)$ is:

$$\mathtt{f(n)} = |\{(\mathtt{a}, \mathtt{b}) \in \mathbb{N} \times \mathbb{N} : \mathtt{gcd(a, b)} = 1 \wedge \mathtt{ab} = \mathtt{n}\}|$$

where $|S|$ denotes the cardinality of the set S, and $\mathbb{N}$ is the set of natural numbers. A partition is deemed `Correct` iff all of $f(\prod_{x \in S_i} x)$ are distinct for all the sets S_i.

Find the maximum possible score over all `Correct Partitions` of the array A. Since the answer might be too big to print it modulo `998244353`.

Constraints:

- $n \le 10^5$
- $A_i \le 10^{12}$

Solution: Some useful observations here are as follows:

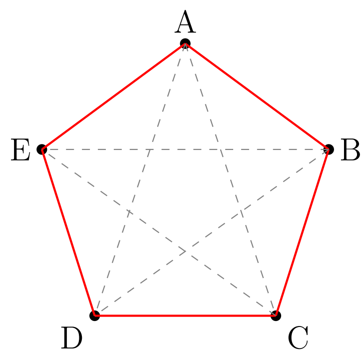
- $f(n) = 2^{|g(n)|}$ where $g(n)$ is the set of prime divisors of n.
- Thus the count of distinct primes in each subset determine the score.

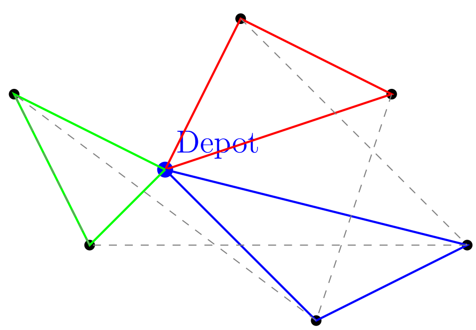
Now the crucial thing to realize here is that, since each partition corresponds to a power of 2 we are essentially summing up powers of 2 over all the partitions. Given the fact that they must all be distinct, the score can be thought of a binary number e.g. `10100101`.

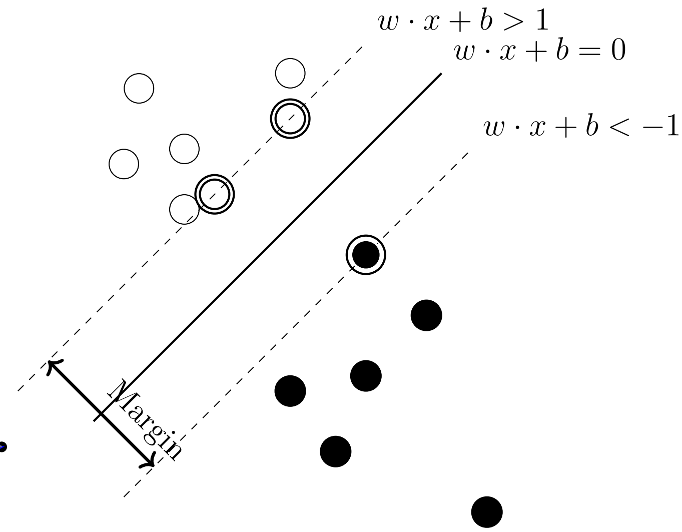
Now suppose we have > 1 subsets the score will of the form `1010010`. So we have $2^6, 2^4, 2^1$ as the f scores. Since all pairs are coprime, the product of the elements in the subsets too will be coprime. Thus rather than summing up individual smaller powers of 2 combining them into a larger subset yields a larger power of 2 i.e. a larger binary number.

Thus the answer to this problem is:

$$2^{\sum_i \mathtt{g(a_i)}}$$


A
B
C
D
E


Depot


$w \cdot x + b > 1$
$w \cdot x + b = 0$
$w \cdot x + b < -1$
Margin

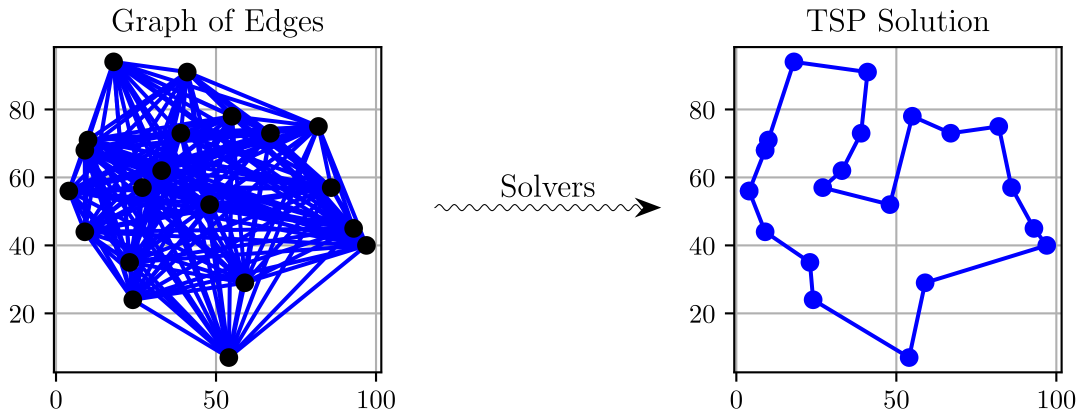


Figure 1: 2D-Euclidean TSP solution