Politico

Assignment 3
Data Structures & Algorithms
Due date: – March, 2020

Problem Statement: Corrupt times have struck Codeland. As the prime minister you must ensure establish friendship between the major political parties. There are M political parties. Each political party has K politicians. Every politician has his own seniority defined by P_i. Now a political party is represented in a curious way.
A political party is represented by a bench of K seats, with politicians seated in descending order of seniority. 'Power' of seat j is defined by GCD(P_1,P_2,P_3....P_j).
where P_j is the seniority of the politician at j^{th} seat.
To establish friendship between two political parties A and B, you can choose any one seat from bench of A and any one seat from bench of B, and Pay a cost equal to bit-wise-xor of the power of the two seats .
Your goal is simple. At the end of your plan, If you pick any two parties, either they should directly be friends of each other, or they should be somehow friends through mutual friends. For example If A and B are friends , B and C are friends, C and D are friends then A and D are friends by mutual friendship. You must figure out the minimum money required to buy your way to your goal.

NOTE: GCD(a,b) = GCD(a%b,b)

Input
First line of input has M,K
M lines follow with K integers in i^{th} line denoting the power of politicians of the i^{th} party.
Output
A single non-negative integer which is the minimum value of establishing the goal.
Constraints
$1 \leq M \leq 300$
$1 \leq K \leq 10^4$
$1 \leq P_i \leq 10^9$
Time Limit: 1 sec
Memory Limit: 256 MB

Sample Test Case

Input	Output
3 2 10 5 3 3 6 4	4

Explanation
The Benches of the 3 parties will look like Party 1: 10 5 (since gcd(10,5)=5) Party 2: 3 3 (since gcd(3,3)=3) Party 3: 6 2 (since gcd(6,4)=2)
The optimal way is to establish friendship between Party 1 and Party 3 , Party 2 and Party 3.
friendship between Party 1 and Party 1 will cost 3 if we choose seat 2 in bench of party 1 and seat 1 in

bench of party 3, as 5 xor 6 = 3 .
friendhship between party 2 and party 3 will cost 1 if we choose seat 1 in bench of party 2 and seat 2 in bench of party 3 , as 3 xor 2 = 1.
In this way total Cost would be 3 + 1 = 4 , and all parties will have befriended each other either directly or indirectly. <
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