# Problem 1: Beautiful Array

An array nums of length n is beautiful if:  
  
- nums is a permutation of the integers in the range [1, n].  
- For every 0 <= i < j < n, there is no index k with i < k < j where 2 \* nums[k] == nums[i] + nums[j].  
  
Given the integer n, return any beautiful array nums of length n.  
  
Example 1:  
Input: n = 4  
Output: [2,1,4,3]  
  
Example 2:  
Input: n = 5  
Output: [3,1,2,5,4]  
  
Constraints:  
1 <= n <= 1000

## C++ Solution

#include <bits/stdc++.h>  
using namespace std;  
  
vector<int> beautifulArray(int n) {  
 vector<int> res = {1};  
 while (res.size() < n) {  
 vector<int> next;  
 for (int x : res) if (2 \* x - 1 <= n) next.push\_back(2 \* x - 1);  
 for (int x : res) if (2 \* x <= n) next.push\_back(2 \* x);  
 res = next;  
 }  
 return res;  
}  
  
int main() {  
 int n = 5;  
 vector<int> beautiful = beautifulArray(n);  
 for (int num : beautiful) cout << num << " ";  
 cout << endl;  
 return 0;  
}