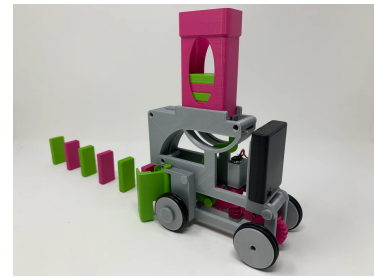


Problem Nov 14: Domino Day

Time limit: 4 seconds

After years of silence, *Domino Day* is finally being revived with an ambitious goal: to set a new world record for the largest domino stack ever created! To make this happen, an unprecedented number of dominoes must be produced. You are tasked with setting up a factory line to group dominoes by colour for the event.



A domino robot laying green and pink dominoes. Photo by Greg Zumwalt

In the factory, there are 2^n machines producing dominoes of distinct colour. The machines are set up in a line. After each machine has produced a domino, the dominoes are stacked in the following way to ensure that there are no manufacturing defects: Two neighbouring domino stacks of equal size are stacked in a random order. This process is performed such that in the end there is exactly one stack left.

Afterwards, the dominoes are sorted by colour into boxes. For this, a robot picks up the entire stack and drives over the boxes. The robot can only drop the lowest domino in its stack. When it drives over a box matching the colour of this domino, it drops the domino into the box. However, the robot can only drive into one direction.

Therefore, an arrangement of boxes is needed, such that the robot can entirely unload every possible stack into the boxes. As space in the factory is limited, the number of boxes should be as small as possible.

Input

The input consists of:

- One line with an integer n ($1 \leq n \leq 13$), indicating that there are 2^n machines.

The first machine produces dominoes of colour 1, the second of colour 2 and so on.

Output

Output the shortest sequence of colour boxes such that the dominoes can always be unloaded completely.

If there are multiple valid solutions, output the lexicographically smallest one.

Sample Input 1

1

Sample Output 1

1 2 1

Sample Input 2

2

Sample Output 2

1 2 1 3 4 3 1 2 1

In the second sample case, there are $2^2 = 4$ machines producing dominoes with colours 1, 2, 3 and 4. After one stacking round, possible stacks could be $[2, 1]$ and $[3, 4]$. Note that a stack $[2, 3]$ is not possible since it would be impossible to complete the stacking process. After another stacking round, the final stack could be $[3, 4, 2, 1]$.

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