Algorithm 3 Construct out-of-range

Input: n

Output: an out-of-order permutation

if $n = 1$ **then**

return 1

end if

divide odd and even: $\{1, 3 \cdots 2, 4 \cdots\}$

fold the odd part: $A : \{1, 3 \cdots k\} \rightarrow B : \{1, 2 \cdots \frac{k+1}{2}\}$

apply this algorithm on B to get B_i

arrange A by B_i to form A_i

return $cat(A_i, A_i + 1)$