

## Practice Question: Re-recursion

(20)

The double factorial of a positive integer  $n$  is a generalization of the standard factorial that we all know. The double factorial is defined similarly, but with “steps” of two.

For  $n$  that are even the double factorial is

$$n!! = \prod_{k=1}^{\frac{n}{2}} (2k) = n(n-2)(n-4) \cdots 4 \cdot 2,$$

and for  $n$  that are odd it is

$$n!! = \prod_{k=1}^{\frac{n+1}{2}} (2k-1) = n(n-2)(n-4) \cdots 3 \cdot 1.$$

Write a recursive C++ function to compute  $n!!$ , as defined above, given an  $n$ . It should return  $n!!$  for those  $n$  where double factorial is defined and print an error message otherwise.