Problem of the Week   Week 13, Due Monday, April 14, 11:59pm   NAME:_____

NAU Email:_____

Please write clean, neat and complete solutions to the problem in order to recieve full credit. Your job is to convince me, or really anybody who reads this document, that you understand the problem and are able to communicate what you are thinking. Please submit your solutions through Gradescope (https://www.gradescope.com) by the indicated deadline. You might need to create an account with your NAU email. To enroll in the Problem of the Week course use entry code: NYZ56P. Good luck and have fun!

We say that a number is **very even** if and only if it is even and its binary expansion contains an even numbers of 1's. For example 12 is very even because $2|12$ and

$$12_{10} = 1100_2$$

which contains an even number of 1's. Find the sum of all very even numbers smaller than $2^n, n \in \mathbb{N}$.