January Camp - 2020
Number theory L4+

Warmup

1. Let n be a positive integer and $\varphi(n)$ be the number of positive integers not greater than n that are relatively prime to it. Find all values of n such that $\varphi(n) \mid n$.

2. Let $k \geq 2$ be an integer number. Find all sets of positive integers $n_1, n_2, \ldots, n_k$ such that

$$n_2 \mid 2^{n_1} - 1, \quad n_3 \mid 2^{n_2} - 1, \quad \ldots, \quad n_k \mid 2^{n_{k-1}} - 1, \quad n_1 \mid 2^{n_k} - 1.$$