The problem tries to change the amortized cost from 1 per bit to 2^d for the d-th bit. I've decided to use the aggregated method.

We can consider how often we flip each individual bit, and sum those up to bound the total, rather than individually obtaining a worst case bound for each bit.From the analysis in class, we know that d-th bit toggled every 2^d time, e.g. the second bit toggle every twice time.

If the counter now counts up to n, we can write down how frequent the bits are toggled,

$$
\begin{aligned}
& n + \lfloor \frac{n}{2} \rfloor + \lfloor \frac{n}{4} \rfloor + \cdots \\
\leq & n + \frac{n}{2} + \frac{n}{4} + \cdots \\
\leq & 2n
\end{aligned}
\tag{1}
$$

so the time to count to n is $2n$.

But the amortized cost is changed from 1 to 2^d to flip a bit, where d is the position of the bit in the counter. For every increment, it needs two flip to perform a toggle, therefore, the price is 2^{d+1}. Divide it and we can know the answer.