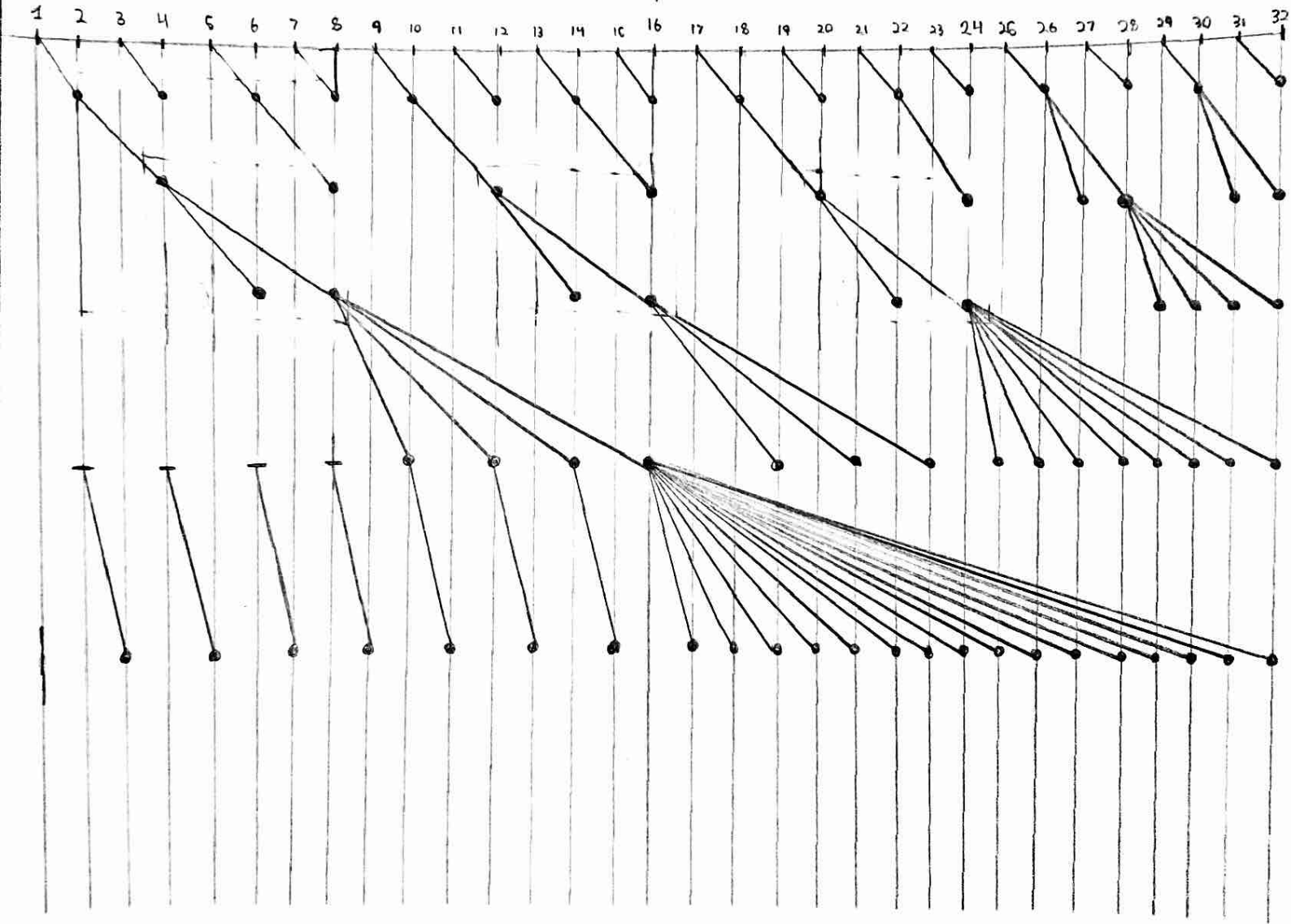


Question 4:

Draw $P_0(32)$. While coming up with this solution, pay attention to the relation between the depth and the recursive application of the algorithm. Can you show that the depth is $\log_2 N$?

We need $P_0(16)$ and $P_1(16)$

* Upper/Lower parallel prefix algorithm
* Pul



Depth

$$\log_2 N = \log_2 32 = 5$$

Size

$$\frac{N}{2} \log_2 N = \frac{32}{2} \log_2 32 = 16 \times 5 = 80 \text{ operations}$$

$$P_1 = \text{depth} \lceil \log_2 N \rceil + 1 \text{ but only applied to } N/2 \text{ so. only } \lceil \log_2 N \rceil$$

level 1 - 16 operations
level 2 - 10 operations
level 3 - 10 operations
level 4 - 15 operations
level 5 - 24 operations
=

$$\text{Size } P_0(N) \leq 4N$$

$$75 \leq 160 \checkmark$$

* Depth grows by 1 for each doubling of N