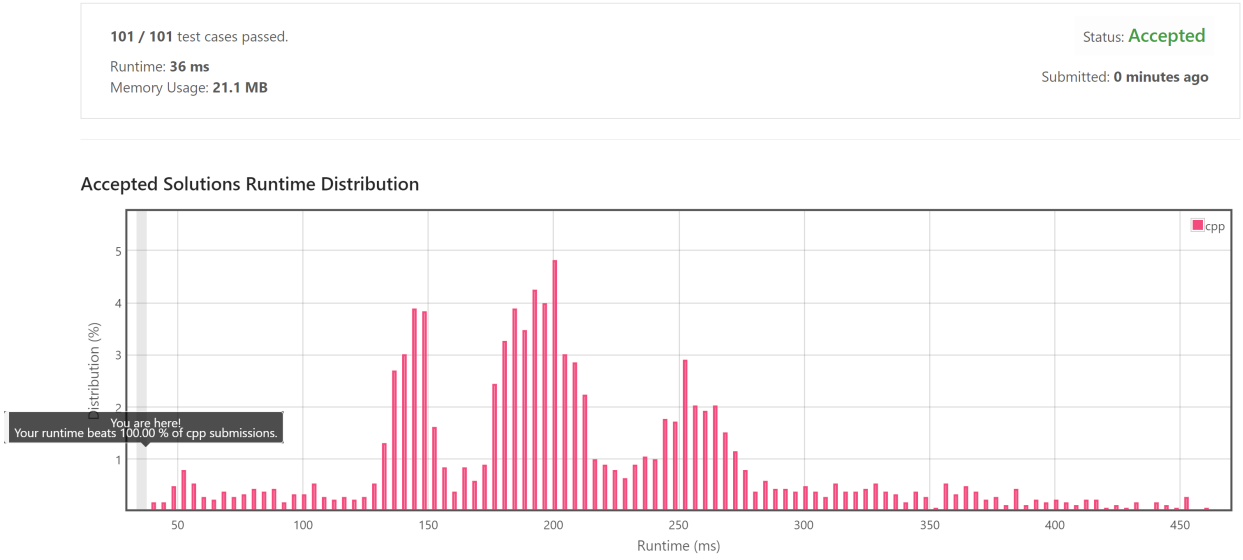
Use RMQ to find the minimum and maximum value in $[l_i, r_i]$ (denote by mi and ma), then compute the common difference d. Use polynomial identity testing to test whether $\sum_{l_i \le j \le r_i} x^{a_j} = \sum_{j=0}^{r_i - l_i} x^{mi + d \cdot j}$. $O(n \log U)$ or $O(n \log_n U)$.
simpler hash function, $O(n)$?



References