14. PROVE THE PROBLEM IS IN NP

SORT $W_1, W_2, \ldots W_q$

SAY WE HAVE AN ARRAY

$A_1 \ldots \ldots A_n$ is organized from small to large numbers

SORT THESE BOOKS WE WILL PUT IN THE SHELVES FOLLOWING A_n to A_1 until we couldn't put any more books into one shelve. When k happened k is the number of the book that will not be able to put into the shelve Then the complexity will be solved by polynomial time in this case, we have the complexity of $O(n^2 + n)$ Therefore, we proved it **to be a** P problem and p is inside of the NP so this is NP problem

15. $\Theta(n^r)$ $r \geq 1$ solve by polynomial time which means getting the maximum empty space only needs $\Theta(n^r)$

If d is larger than the maximum empty space we do not need the time complexity

16. $\Theta(n^q)$ $q \geq 1$

With a given (d), we can use map and store it which means the time complexity $\Theta(n)$ so total is $\Theta(mn^{q+1})$ which is still polynomial time. m is the number of shelves