2. For n items, each item I_i has a value v_i and size s_i. The capacity is B. First, we can re-index them such that $\frac{v_1}{s_1} \geq \frac{v_2}{s_2} \geq \cdots \geq \frac{v_n}{s_n}$

We can write the greedy solution as $G = (x_1, x_2, x_3, \cdots, x_n)$, where x_i indicates fraction of item I_i taken.

We can write any optimal solution as $O = (y_1, y_2, y_3, \cdots, y_n)$, where y_i indicates fraction of item I_i taken.

We can get $\sum_{i=1}^{n} x_i s_i = \sum_{i=1}^{n} y_i s_i = B$

For the first item I_a where the two solutions differ from each other, we can have $x_a > y_a$ since greedy alway takes as much as it can.

Then we consider a new solution $O' = (y_1', y_2', y_3', \cdots, y_n')$.

For $j < a$, we let $y_j' = y_j$.

For $j = a$, we let $y_j' = x_j$.

For $j > a$, we remove items of total size $(x_a - y_a) s_a$ and reset y_j'.

The total value of solution O' is no less than O.

Since O is an optimal solution, the total value of O' and O must equal to each other.

Therefore, O' is also an optimal solution.

If we continue this process, we can finally convert O into G without changing the total value.

Therefore, G is an optimal solution.