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 $(x_i - y_i) S_i$ and reset y_j'.

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

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.