In the bin packing problem, the goal is to minimize the bin used to pack all of the items given. The lower bound is calculated by rounding up the result of summing all the values of the items divided by the capacity of each bin.

The bin\_contents variable is a list of empty list contains the index put in each bin, and the caplist variable is a list keeps track of the remaining capacity for each bin.

We use a nested for loop to first loop through the item list, then loop through the caplist. Another list is created in the nested for loop in order to find the first index of the minimum non-negative capacity if an item is put into a bin, which is called min\_indx, to minimize the remaining capacity in each bin.

The corresponding index is used to determine which empty list in the bin\_contents contains the key of the item, and update the remaining capacity of the bin for the same index.

If there are no non-negative number in the list of remaining capacity, it means an extra bin is needed, therefore, append the key as a list in the bin\_contents and append the remaining capacity of te new bin into caplist.