Summary of bin-packing algorithms

Terminology: We say a bin has been opened if we've already put at least one item into it.

Next fit:

If the item fits in the same bin as the previous item, put it there. Otherwise, open a new bin and put it in there.

Note: This means that we never go back to a previously used bin other than the bin we put the last piece into. For example, if we've just put a piece in the fourth bin, that means we'll never put anything else into bins 1-3. The next item will go into the fourth bin if possible, or the fifth bin if it won't fit in the fourth.

First fit:

Put each item as you come to it into the oldest (earliest opened) bin into which it fits.

Note: So whenever an item fits into bin 1, put it there. If not, and it fits in bin 2, put it there. Et cetera. Only open a new bin if the item doesn't fit in any bin that's already got something in it.

Worst fit:

1. Put each item into the emptiest bin among those with something in them. Only start a new bin if the item doesn't fit into any bin that's already been started.
2. If there are two or more bins already started which are tied for emptiest, use the bin opened earliest from among those tied.

Note: You can think of this as putting each piece into the box which is lightest so far, trying to "even things out." The second rule is just a "tie breaker" when the first rule has more than one answer.

Each method has a decreasing variation:

Next Fit Decreasing:

Put the pieces in decreasing order by size, then use Next Fit on the resulting list.

Note: This is often the LEAST efficient of these methods.

First Fit Decreasing:

Put the pieces in decreasing order by size, then use First Fit on the resulting list.

Note: This is usually an excellent approach.

Worst Fit Decreasing:

Put the pieces in decreasing order by size, then use Worst Fit on the resulting list.

Note: This is also usually an excellent approach.