

*page*

1

**page.** T<sub>E</sub>X processes a document by assembling *pages* one at a time and passing them to the output routine. As it proceeds through your document, T<sub>E</sub>X maintains a list of lines and other items to be placed on the page. (The lines are actually hboxes.) This list is called the “main vertical list”. Periodically T<sub>E</sub>X goes through a process called “exercising the page builder”. The items added to the main vertical list between exercises of the page builder are called “recent contributions”.

The page builder first examines the main vertical list to see if it’s necessary to ship out a page yet, either because the items on the main vertical list won’t all fit on the page or because of an explicit item, such as `\eject` (p. ‘`\eject`’), that tells T<sub>E</sub>X to end the page. If it’s not necessary to ship out a page, then the page builder is done for the time being.

Otherwise the page builder analyzes the main vertical list to find what it considers to be the best possible page break. It associates penalties with various kinds of unattractive page breaks—a break that would leave an isolated line at the top or bottom of a page, a break just before a math display, and so forth. It then chooses the least costly page break, where the cost of a break is increased by any penalty associated with that break and by the badness of the page that would result (see page 111 of *The T<sub>E</sub>Xbook* for the cost formula). If it finds several equally costly page breaks, it chooses the last one.

Once the page builder has chosen a page break, it places the items on the list that are before that break into `\box255` and leaves the remaining ones for the next page. It then calls the output routine. `\box255` acts as a mailbox, with the page builder as the sender and the output routine as the receiver. Ordinarily the output routine processes `\box255`, adds other items, such as insertions, headers, and footers, to the page, and ships out the page to the `.dvi` file with a `\shipout` command. (Specialized output routines may behave differently.) From T<sub>E</sub>X’s standpoint, it doesn’t matter whether or not the output routine ships out a page; the only responsibility of the output routine is to process `\box255` one way or another.

It’s important to realize that the best place to break a page isn’t necessarily the last possible place to break the page. Penalties and other considerations may cause the page break to come earlier. Furthermore, T<sub>E</sub>X appends items to the main vertical list in batches, not just singly. The lines of a paragraph are an example of such a batch. For these reasons the page builder usually has items left over when it breaks a page. These leftover items then form the beginning of the main vertical list for the next page (possibly in the middle of a batch). Because items are carried over from one page to another, you can’t assume that as T<sub>E</sub>X is processing input, the current page number accurately reflects the page on which the corresponding output will appear. See pages 110–114 of *The T<sub>E</sub>Xbook* for a full description of T<sub>E</sub>X’s page-breaking rules.