

And, for the hous is crinkled to and fro,
And hath so queinte weyes for to go—
For hit is shapen as the mase is wrought—
Therto have I a remedie in my thoght,
That, by a clewe of twyne, as he hath goon,
The same way he may retorne anoon,
Folwing alwey the threed, as he hath come.

— Geoffrey Chaucer, *The Legend of Good Women* (c. 1385)

"Com'è bello il mondo e come sono brutti i labirinti!" dissi sollevato.

"Come sarebbe bello il mondo se ci fosse una regola per girare nei labirinti,"
rispose il mio maestro.

["How beautiful the world is, and how ugly labyrinths are," I said, relieved.

"How beautiful the world would be if there were a procedure for moving through
labyrinths," my master replied.]

— Umberto Eco, *Il nome della rosa* (1980)

English translation (*The Name of the Rose*) by William Weaver (1983)

6

Depth-First Search

In the previous chapter, we considered a generic algorithm—whatever-first search—for traversing arbitrary graphs, both undirected and directed. In this chapter, we focus on a particular instantiation of this algorithm called *depth-first search*, and primarily on the behavior of this algorithm in directed graphs.

Although depth-first search can be accurately described as “whatever-first search with a stack”, the algorithm is normally implemented recursively, rather than using an explicit stack:

<p><u>DFS(v):</u> if v is unmarked mark v for each edge $v \rightarrow w$ DFS(w)</p>
