

Dependencies

Language dependent;
machine independent

Somewhat language dependent;
largely machine independent

Small language dependencies;
machine dependencies slight
(e.g., register counts/types)

Highly machine dependent;
language independent

Front end per
language

*Intermediate
representation*

High-level
optimizations

Global
optimizer

Code generator

Function

Transform language to
common intermediate form

For example, loop
transformations and
procedure inlining
(also called
procedure integration)

Including global and local
optimizations + register
allocation

Detailed instruction selection
and machine-dependent
optimizations; may include
or be followed by assembler

FIGURE e2.15.1 The structure of a modern optimizing compiler consists of a number of passes or phases. Logically, each pass can be thought of as running to completion before the next occurs. In practice, some passes may handle one procedure at a time, essentially interleaving with another pass.