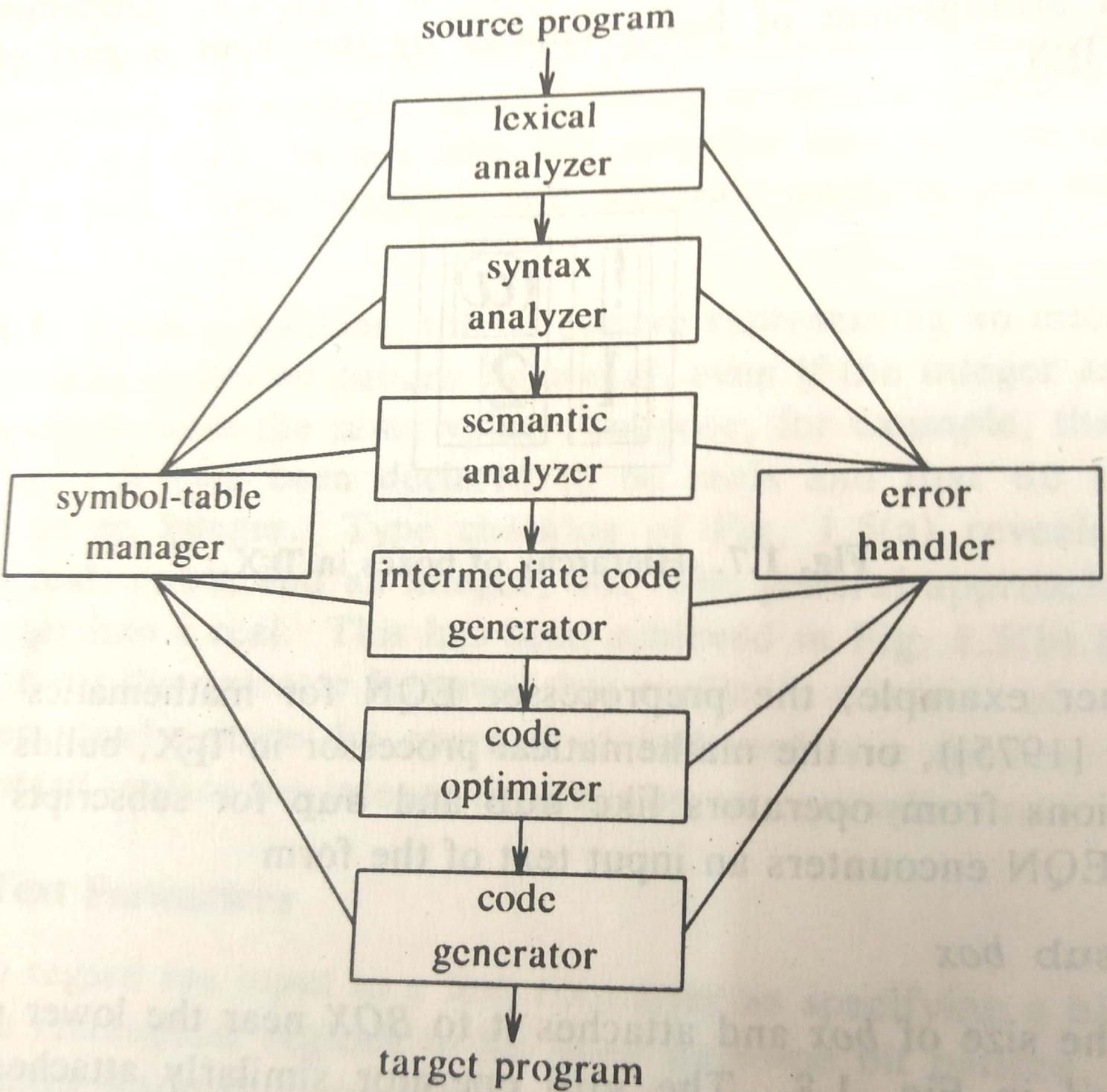

Fig. 1.9. Phases of a compiler.

1.4.

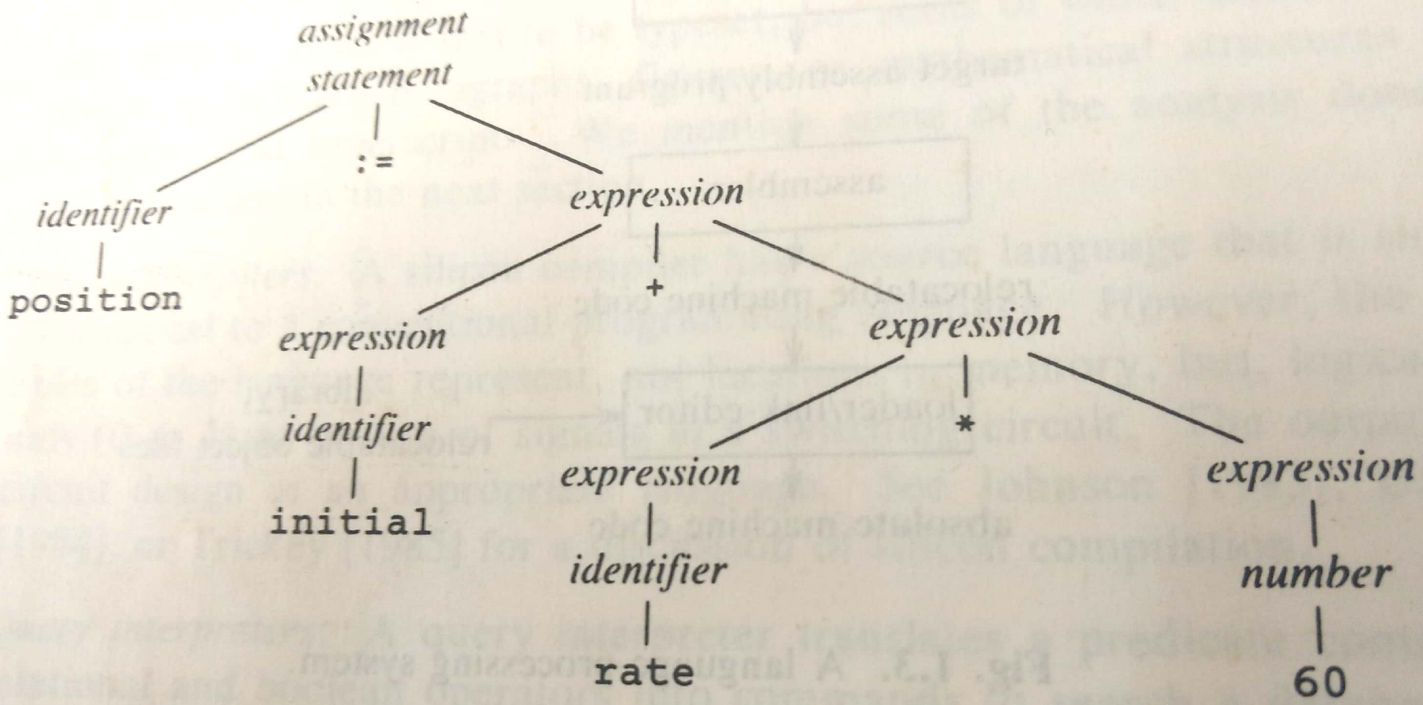

Fig. 1.4. Parse tree for `position := initial + rate * 60`.

1. Any *identifier* is an expression.
2. Any *number* is an expression.
3. If $expression_1$ and $expression_2$ are expressions, then so are

$$expression_1 + expression_2$$
$$expression_1 * expression_2$$
$$(expression_1)$$

1. If *identifier*$_1$ is an identifier, and *expression*$_2$ is an expression, then

   identifier$_1$:= *expression*$_2$

   is a statement.

2. If *expression*$_1$ is an expression and *statement*$_2$ is a statement, then

   while (*expression*$_1$) **do** *statement*$_2$
   if (*expression*$_1$) **then** *statement*$_2$

   are statements.

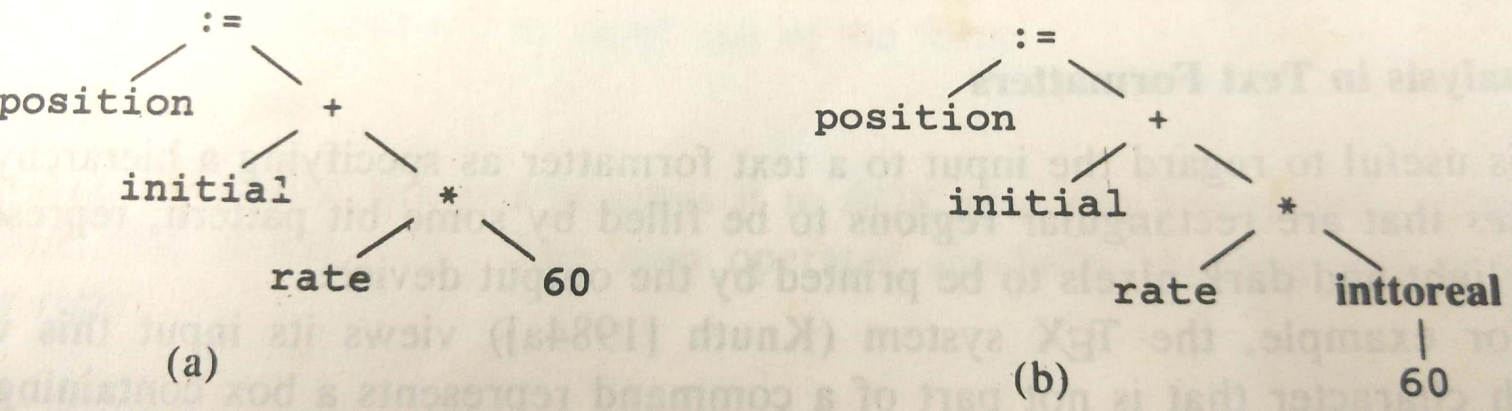

Fig. 1.5. Semantic analysis inserts a conversion from integer to real.

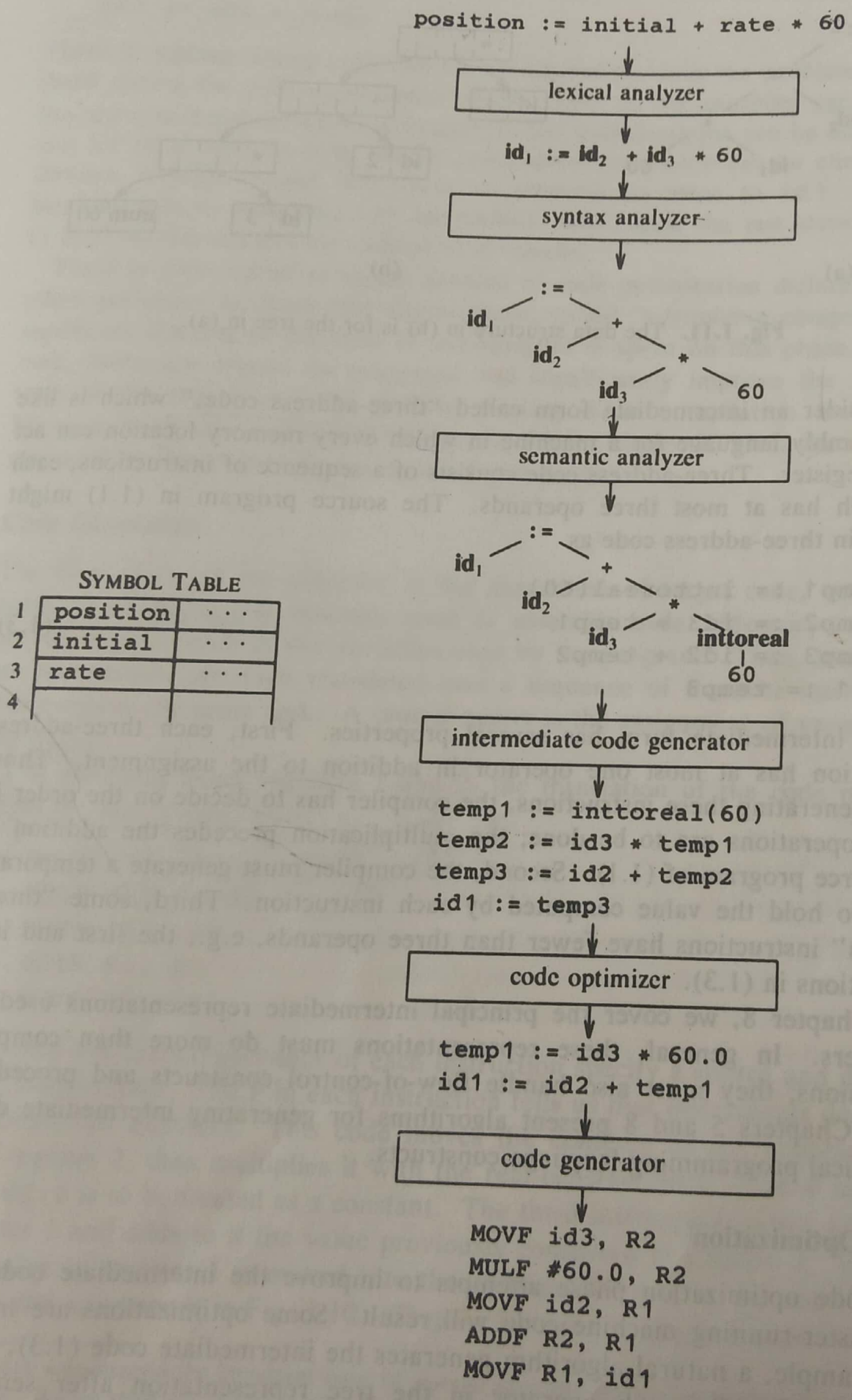

Fig. 1.10. Translation of a statement.