

#### **4.5 Lexical Error Recovery:**

Few errors are possible at the lexical level alone, because a lexical analyzer view of a source program.

- if the string `fi` in a C-program `fi( a==10) - - -`

A lexical analysis can not tell whether `fi` is a misspelling of the keyword `if` or an undeclared function identifier. Since `fi` is a valid identifier, the lexical analysis, must return the token for an identifier and let other phase of the compiler handle any error.

But, if the lexical analysis is unable to proceed because non of the patterns for tokens matches a prefix of the remaining input. The simplest recovery strategy is "Panic Mode" recovery. We delete successive characters from the remaining input until the lexical analyzer can find a well-formed token. Other possible error recovery actions are:

- 1- deleting an extraneous character
- 2- inserting a missing character
- 3- replacing an incorrect character
- 4- transposing two adjacent characters.

#### **Preprocessors:**

Preprocessors produce input to compilers. They may perform the following functions:

- 1- Macro processing: a preprocessor may allow a user to define macros that are shorthand for longer constructs.
- 2- File inclusion: a preprocessor may include header files into the program text. E.g., the 'C' preprocessor causes the contents of the file `<string.h>` to replace the statement `#include <string.h>` when it processes a file.
- 3- Rational preprocessors: these processors augment older languages with more modern flow-of-control and data-structuring facilities. e.g. provide the user with built-in macros for constructs like while-statement or if-statement, where none exist in the programming language.
- 4- Language extensions: these preprocessors add capabilities to the language by what amounts to built-in macros. e.g., the language (Equal) is a database query language embedded in C. statements beginning with `##` are taken by the preprocessor to be database access statement, unrelated to C, and are translated into procedure calls on routines that perform the database access.