Appendix B

Module Guide

B.1 Module Summary

Each SHAM module has a unique *long name* and a *short name*, and may have a shorter *module prefix* used to avoid name conflicts in exported C identifiers.

format: long name (short name, prefix)

SHAM modules
- Behavior hiding
  - Load (*load*, `ld_`)
  - Token (*token*, `tk_`)
  - Abstract Machine (*absmach*, `am_`)
  - Screen Driver (*scndr*, `sd_`)
  - Screen Geometry (*scngeom*, `sg_`)
- Software decision hiding
  - SHAM Coordinator (*sham*)
  - Execute (*exec*, `ex_`)
- Machine hiding
  - Keyboard Input (*keybdin*, `ki_`)
  - Screen String (*scnstr*, `ss_`)

UNIX modules
- *ctype*, *curses*, *stdio*, *string*, *strtod*

B.2 Module Service and Secret

B.2.1 Behavior-hiding modules

B.2.1.1 The *load* module

- **Service**. Performs the load phase. Issues exception messages for incorrect input and, for correct input, stores the resulting object code in the *absmach* module.

- **Secret**. The details of the load-phase user interface, including the source language concrete syntax and the exception messages.

B.2.1.2 The *token* module

- **Service**. Extracts tokens from a string supplied by the user. Tokens are retrieved sequentially, in the order they occur in the user's string. The user is given access to the token value (a string) and the token type (integer, identifier, or unknown).

- **Secret**. The rules governing token types and token separators.

B.2.1.3 The *absmach* module

- **Service**. Implements the *mem*, *acc*, and *pc* state variables, as well as the Language Semantics Table from the SHAM Requirements Specification. Following each instruction execution, the user is given a status indicator and access to the state variables.

- **Secret**. The SHAM language semantics, including the execution-phase exceptions.

B.2.1.4 The *scndr* module

- **Service**. Updates the terminal screen, using the values stored by *absmach* and according to the screen format described in the ISHAM Requirements Specification.

- **Secret**. The means used to accomplish screen updates.

B.2.1.5 The *scngeom* module

- **Service**. Provides the length, row, and column position for each screen field, as per the screen format in the SHAM Requirements Specification.

- **Secret**. Hides, until execution time, the length, row, and column values.

B.2.2 Software decision–hiding modules

B.2.2.1 The *sham* module

- **Service**. Uses the other modules to provide the load-and-go assembler specified in the SHAM Requirements Specification.
- **Secret**. The way in which the other modules are used and the handling of command-line parameters.

B.2.2.2 The *exec* module

- **Service**. Performs the execution phase, executing the program stored in *absmach* and managing the run-time user interface, batch or interactive.
- **Secret**. The way in which the other modules are used, and the format and content of the exception messages.

B.2.3 Machine-hiding modules

B.2.3.1 The *keybdin* module

- **Service**. Provides keyboard input, one character at a time, without echoing or waiting for carriage return.
- **Secret**. The UNIX system services used to accomplish this task.

B.2.3.2 The *scnstr* module

- **Service**. Provides write access to the terminal screen. A string may be written to any position on the screen, the cursor may be moved to any position on the screen, and any screen position may be highlighted. To allow for efficient screen control, *scnstr* calls are buffered. An "apply changes to screen" access routine is provided; *scnstr* calls have no visible effect on the screen until the apply routine is invoked.
- **Secret**. The UNIX system services used to accomplish this task.