```
1: (* $Id: absyn.mli, v 1.2 2019-01-24 17:42:06-08 - - $ *)
 2:
 3: (*
 4: * Abstract syntax definitions for SB.
 6:
 7: type linenr
                     = int
8: type ident = string
9: type label = string
10: type number = float
11: type oper = string
12:
13: type printable = Printexpr of expr
14:
                     | String of string
15:
                     = Arrayref of ident * expr
16: and memref
17:
                    | Variable of ident
18:
                     = Number of number
19: and expr
20:
                     | Memref of memref
                     | Unary of oper * expr
21:
22:
                     | Binary of oper * expr * expr
23:
24: type stmt
                     = Dim of ident * expr
                     | Let of memref * expr
25:
26:
                     | Goto of label
27:
                     | If of expr * label
28:
                     | Print of printable list
29:
                     | Input of memref list
30:
31: type progline = linenr * label option * stmt option
33: type program = progline list
34:
```

```
1: (* $Id: etc.mli,v 1.1 2019-01-24 15:47:38-08 - - $ *)
2:
3: (*
4: * Main program and system access.
5: *)
6:
7: val warn : string list -> unit
8:
9: val die : string list -> unit
10:
11: val syntax_error : Lexing.position -> string list -> unit
12:
13: val usage_exit : string list -> unit
14:
15: val read_number : unit -> float
16:
```

```
1: (* $Id: etc.ml, v 1.2 2019-01-25 15:10:01-08 - - $ *)
 3: let execname = Filename.basename Sys.argv.(0)
 4:
 5: let exit_status_ref = ref 0
 6:
7: let quit () =
        if !Sys.interactive
8:
9:
        then Printf.printf "quit (): exit %d\n%!" !exit_status_ref
10:
        else exit !exit_status_ref
11:
12: let eprint_list message =
13:
        (exit_status_ref := 1;
14:
         flush_all ();
15:
        List.iter prerr_string message;
16:
         prerr_newline ();
17:
         flush_all ())
18:
19: let warn message = eprint_list (execname :: ": " :: message)
21: let die message = (warn message; quit ())
22:
23: let syntax_error position message =
        warn (position.Lexing.pos_fname :: ": "
25:
                :: string_of_int position.Lexing.pos_lnum :: ": "
26:
                :: message)
27:
28: let usage_exit message =
29:
        (eprint_list ("Usage: " :: execname :: " " :: message); quit ())
30:
31: let buffer : string list ref = ref []
32:
33: let rec read_number () = match !buffer with
34:
        | head::tail -> (buffer := tail;
35:
                         try float_of_string head
36:
                         with Failure _ -> nan)
37:
        [] -> let line = input_line stdin
38:
                in (buffer := Str.split (Str.regexp "[ \\t]+") line;
39:
                    read_number ())
40:
```

```
1: (* Generated: Tue Jan 29 17:30:47 PST 2019 *)
2: type variable_table_t = (string, float) Hashtbl.t
3: type array_table_t = (string, float array) Hashtbl.t
4: type unary_fn_table_t = (string, float -> float) Hashtbl.t
5: type binary_fn_table_t = (string, float -> float -> float) Hashtbl.t
6: type label_table_t = (string, Absyn.program) Hashtbl.t
7: val variable_table : variable_table_t
8: val array_table : array_table_t
9: val unary_fn_table : unary_fn_table_t
10: val binary_fn_table : binary_fn_table_t
11: val label_table : label_table_t
12: val init_label_table : Absyn.program -> unit
```

13: val dump_label_table : unit -> unit

```
1: (* $Id: tables.ml, v 1.5 2019-01-29 17:26:15-08 - - $ *)
 3: type variable_table_t = (string, float) Hashtbl.t
 4: type array_table_t = (string, float array) Hashtbl.t
 5: type unary_fn_table_t = (string, float -> float) Hashtbl.t
 6: type binary_fn_table_t = (string, float -> float -> float) Hashtbl.t
7: type label_table_t = (string, Absyn.program) Hashtbl.t
8:
9: let variable_table : variable_table_t = Hashtbl.create 16
10: let _ = List.iter (fun (label, value) ->
11:
                       Hashtbl.add variable_table label value)
12:
                      ["e"
                            , exp 1.0;
                       "eof", 0.0;
13:
                       "pi" , acos ~-.1.0;
14:
15:
                       "nan", nan]
16:
17: let array_table : array_table_t = Hashtbl.create 16
19: let unary_fn_table : unary_fn_table_t = Hashtbl.create 16
20: let _ = List.iter (fun (label, value) ->
21:
                       Hashtbl.add unary_fn_table label value)
22:
                      ["+"]
                              , (~+.);
                       "-"
23:
                              , (~-.);
                       "abs"
                              , abs_float;
24:
25:
                       "acos" , acos;
26:
                       "asin" , asin;
                       "atan" , atan;
27:
                       "ceil" , ceil;
28:
                              , cos;
29:
                       "cos"
                       "exp"
30:
                              , exp;
                       "floor", floor;
31:
                       "log"
                              , log;
32:
                       "log10", log10;
33:
                       "log2", (fun x \rightarrow \log x /. \log 2.0);
34:
                       "round", (fun x \rightarrow floor (x + . 0.5));
35:
                              , sin;
36:
                       "sin"
37:
                       "sqrt" , sqrt;
38:
                       "tan" , tan]
39:
40: let binary_fn_table : binary_fn_table_t = Hashtbl.create 16
41: let _ = List.iter (fun (label, value) ->
                       Hashtbl.add binary_fn_table label value)
42:
43:
                      ["+", (+.);
                       "-", (-.);
44:
                       "*", ( *.);
45:
                       "/", (/.);
46:
47:
                       "%", mod_float;
                       "^", ( ** )]
48:
49:
```

```
50:
51: let label_table : label_table_t = Hashtbl.create 16
53: let rec init_label_table program =
        let rec init program = match program with
55:
            | [] -> ()
56:
            | (_, Some label, _)::rest ->
57:
                  (Hashtbl.add label_table label program; init rest)
58:
            | _::rest -> init rest
59:
        in (Hashtbl.reset label_table; init program)
60:
61: let dump_label_table () =
        let dump key value = match value with
62:
63:
            | [] -> ()
64:
            | (line, _, _)::_ ->
65:
              Printf.fprintf stderr
66:
                  "label_table: \"%s\" -> line %d\n%!" key line
67:
        in Hashtbl.iter dump label_table
68:
```

01/29/19 17:30:47

\$cmps112-wm/Assignments/asg2-ocaml-interp/code-interp dumper.mli

1/1

```
1: (* Generated: Tue Jan 29 17:30:47 PST 2019 *)
2: val quote : string -> string
3: val join : string -> string -> string -> string list -> string
4: val string_of_option : ('a -> string) -> 'a option -> string
5: val string_of_ctor : string -> string list -> string
6: val string_of_list : ('a -> string) -> 'a list -> string
7: val string_of_printable : Absyn.printable -> string
8: val string_of_memref : Absyn.memref -> string
9: val string_of_expr : Absyn.expr -> string
10: val string_of_stmt : Absyn.stmt -> string
11: val dump_progline : int * string option * Absyn.stmt option -> unit
12: val dump_program : Absyn.program -> unit
```

```
1: (* $Id: dumper.ml, v 1.15 2019-01-25 17:43:51-08 - - $ *)
 3: let quote string =
        let regex = Str.regexp "\""
 4:
 5:
        and subst _ = "\\\""
 6:
        in "\"" ^ Str.global_substitute regex subst string ^ "\""
7:
 8: let join start sep stop list =
9:
        let rec join' list' = match list' with
10:
            | [] -> stop
11:
            | [unit] -> unit ^ stop
12:
            | head::tail -> head ^ sep ^ " " ^ join' tail
13:
        in match list with
            | [] -> start ^ stop
14:
15:
            | _::_ -> start ^ join' list
16:
17: let string_of_option str_fn item = match item with
        | None -> "None"
18:
        | Some thing -> "Some (" ^ str_fn thing ^ ")"
19:
20:
21: let string_of_ctor ctor args =
        join (ctor ^ " (") "," ")" args
22:
23:
24: let string_of_list str_fn list =
        join "[" ";" "]" (List.map str_fn list)
25:
26:
27: let rec string_of_printable printable = match printable with
28:
        | Absyn.Printexpr expr ->
29:
              string_of_ctor "Printexpr" [string_of_expr expr]
30:
        | Absyn.String string ->
              string_of_ctor "String" [quote string]
31:
32:
33: and string_of_memref memref = match memref with
34:
        | Absyn.Arrayref (ident, expr) ->
35:
              string_of_ctor "Arrayref" [quote ident; string_of_expr expr]
36:
        | Absyn.Variable ident -> string_of_ctor "Variable" [quote ident]
37:
38: and string_of_expr expr = match expr with
39:
        | Absyn.Number number ->
40:
              string_of_ctor "Number" [string_of_float number]
41:
        | Absyn.Memref memref ->
42:
              string_of_ctor "Memref" [string_of_memref memref]
43:
        | Absyn.Unary (oper, expr) ->
44:
              string_of_ctor "Unary" [quote oper; string_of_expr expr]
45:
        | Absyn.Binary (oper, expr1, expr2) ->
46:
              string_of_ctor "Binary"
47:
                  [quote oper; string_of_expr expr1; string_of_expr expr2]
48:
```

```
49:
50: let string_of_stmt (stmt: Absyn.stmt) = match stmt with
        | Absyn.Dim (ident, expr) ->
52:
              string_of_ctor "Dim"
53:
                  [quote ident ^ ", " ^ string_of_expr expr]
54:
        | Absyn.Let (memref, expr) ->
55:
              string_of_ctor "Let"
56:
                  [string_of_memref memref; string_of_expr expr]
57:
        | Absyn.Goto label ->
              string_of_ctor "Goto" [quote label]
58:
59:
        | Absyn.If (expr, label) ->
60:
              string_of_ctor "If" [string_of_expr expr; quote label]
61:
        | Absyn.Print printable'list ->
62:
              string_of_ctor "Print"
63:
                  [string_of_list string_of_printable printable'list]
64:
        | Absyn.Input memref'list ->
65:
              string_of_ctor "Input"
                  [string_of_list string_of_memref memref'list]
66:
67:
68: let dump_progline (linenr, label'option, stmt'option) =
        Printf.fprintf stderr "%d %s: %s\n%!" linenr
69:
70:
            (string_of_option quote label'option)
            (string_of_option string_of_stmt stmt'option)
71:
72:
73: let dump_program (program : Absyn.program) =
74:
        List.iter dump_progline program
75:
```

01/29/19 17:30:47

\$cmps112-wm/Assignments/asg2-ocaml-interp/code-interp interp.mli

1/1

```
1: (* $Id: interp.mli,v 1.5 2019-01-24 17:08:37-08 - - $ *)
2:
3: (*
4: * Interpreter for Silly Basic
5: *)
6:
7: val want_dump : bool ref
8:
9: val interpret_program : Absyn.program -> unit
10:
```

```
1: (* $Id: interp.ml, v 1.7 2019-01-29 17:26:15-08 - - $ *)
 2:
 3: open Absyn
 4:
 5: exception Unimplemented of string
 6: let unimpl reason = raise (Unimplemented reason)
7:
 8: let want_dump = ref false
9:
10: let rec eval_expr (expr : Absyn.expr) : float = match expr with
11:
        | Number number -> number
12:
        | Memref memref -> unimpl "eval_expr Memref"
        | Unary (oper, expr) -> unimpl "eval_expr Unary"
13:
        | Binary (oper, expr1, expr2) -> unimpl "eval_expr Binary"
14:
15:
16: let interp_print (print_list : Absyn.printable list) =
17:
        let print_item item =
            (print_string " ";
18:
19:
             match item with
20:
             | String string ->
21:
               let regex = Str.regexp "\"\\(.*\\)\""
22:
               in print_string (Str.replace_first regex "\\1" string)
23:
             | Printexpr expr ->
24:
               print_float (eval_expr expr))
25:
        in (List.iter print_item print_list; print_newline ())
26:
27: let interp_input (memref_list : Absyn.memref list) =
28:
        let input_number memref =
29:
            try let number = Etc.read_number ()
30:
                 in (print_float number; print_newline ())
31:
            with End_of_file ->
32:
                 (print_string "End_of_file"; print_newline ())
33:
        in List.iter input_number memref_list
34:
35: let interp_stmt (stmt : Absyn.stmt) = match stmt with
        | Dim (ident, expr) -> unimpl "Dim (ident, expr)"
37:
        | Let (memref, expr) -> unimpl "Let (memref, expr)"
38:
        | Goto label -> unimpl "Goto label"
39:
        | If (expr, label) -> unimpl "If (expr, label)"
40:
        | Print print_list -> interp_print print_list
41:
        | Input memref_list -> interp_input memref_list
42:
43: let rec interpret (program : Absyn.program) = match program with
44:
        | [] -> ()
45:
        | firstline::otherlines -> match firstline with
46:
          | _, _, None -> interpret otherlines
47:
          | _, _, Some stmt -> (interp_stmt stmt; interpret otherlines)
48:
49: let interpret_program program =
50:
        (Tables.init_label_table program;
51:
         if !want_dump then Tables.dump_label_table ();
52:
         if !want_dump then Dumper.dump_program program;
53:
         interpret program)
54:
```

```
1: (* $Id: main.ml, v 1.1 2019-01-24 15:47:38-08 - - $ *)
2:
 3: (*
 4: * Main program reads a file and prints to stdout.
6:
7: let interpret_source filename =
8:
        try (let sourcefile =
                 if filename = "-"
9:
10:
                 then stdin
11:
                 else open_in filename in
12:
             let lexbuf = Lexing.from_channel sourcefile in
13:
             let abstract_syntax = Parser.program Scanner.token lexbuf in
14:
             Interp.interpret_program abstract_syntax)
15:
        with Sys_error (string) -> Etc.die [string]
16:
17: let _ = if !Sys.interactive
18:
            then ()
19:
            else match Array.length Sys.argv with
20:
                 | 1 -> interpret_source "-"
21:
                 | 2 -> interpret_source Sys.argv.(1)
22:
                 | _ -> Etc.usage_exit ["[filename.sb]"]
23:
```

```
1: /* $Id: parser.mly,v 1.2 2019-01-25 16:49:38-08 - - $ */
2:
 3: %{
 4:
 5: let linenr () = (symbol_start_pos ()).Lexing.pos_lnum
 6:
7: let syntax () = Etc.syntax_error (symbol_start_pos ()) ["syntax error"]
8:
9: %}
10:
11: %token <string> RELOP EQUAL ADDOP MULOP POWOP
12: %token <string> IDENT NUMBER STRING
13: %token COLON COMMA LPAR RPAR LSUB RSUB EOL EOF
14: %token DIM LET GOTO IF PRINT INPUT
15:
16: %type <Absyn.program> program
17:
18: %start program
19:
20: %%
21:
22: program : stmt_list EOF
                                {List.rev $1}
24: stmt_list : stmt_list stmt EOL
                                         {$2::$1}
                                         {syntax (); $1}
25:
               | stmt_list error EOL
26:
                                         {[]}
27:
28: stmt
               : label action
                                         {(linenr (), Some $1, Some $2)}
29:
               | action
                                         {(linenr (), None, Some $1)}
30:
                                         {(linenr (), Some $1, None)}
               | label
31:
                                         {(linenr (), None, None)}
32:
           : IDENT COLON
33: label
                                         {$1}
34:
35: action
              : DIM IDENT LSUB expr RSUB {Absyn.Dim ($2, $4)}
36:
               | LET memref EQUAL expr
                                       {Absyn.Let ($2, $4)}
37:
               | GOTO IDENT
                                         {Absyn.Goto $2}
38:
               | IF relexpr GOTO IDENT
                                         {Absyn.If ($2, $4)}
39:
               | PRINT print_list
                                         {Absyn.Print $2}
40:
               | PRINT
                                         {Absyn.Print ([])}
41:
               | INPUT input_list
                                         {Absyn.Input $2}
42:
43: print_list : print COMMA print_list {$1::$3}
44:
               | print
                                         {[$1]}
45:
46: print
               : expr
                                         {Absyn.Printexpr $1}
               | STRING
47:
                                         {Absyn.String $1}
48:
49: input_list : memref COMMA input_list {$1::$3}
50:
               | memref
                                         {[$1]}
51:
```

\$cmps112-wm/Assignments/asg2-ocaml-interp/code-interp parser.mly

```
52:
53: memref
               : IDENT
                                          {Absyn.Variable $1}
54:
               | IDENT LSUB expr RSUB
                                          {Absyn.Arrayref ($1, $3)}
55:
                                          {Absyn.Binary ($2, $1, $3)}
56: relexpr
               : expr RELOP expr
                                          {Absyn.Binary ($2, $1, $3)}
57:
               | expr EQUAL expr
58:
                                          {Absyn.Binary ($2, $1, $3)}
59: expr
               : expr ADDOP term
60:
                                          {$1}
               | term
61:
62: term
               : term MULOP factor
                                          {Absyn.Binary ($2, $1, $3)}
63:
               | factor
64:
                                          {Absyn.Binary ($2, $1, $3)}
65: factor
               : primary POWOP factor
66:
                                          {$1}
               | primary
67:
68: primary
               : LPAR expr RPAR
                                          {$2}
69:
               | ADDOP primary
                                          {Absyn.Unary ($1, $2)}
70:
                                          {Absyn.Number (float_of_string $1)}
               | NUMBER
71:
                                          {Absyn.Memref $1}
               | memref
72:
               | IDENT LPAR expr RPAR
                                          {Absyn.Unary ($1, $3)}
73:
```

```
1: (* $Id: scanner.mll,v 1.1 2019-01-24 15:47:38-08 - - $ *)
 2:
 3: {
 4:
 5: let lexerror lexbuf =
 6:
        Etc.syntax_error (Lexing.lexeme_start_p lexbuf)
 7:
                 ["invalid character `" ^ (Lexing.lexeme lexbuf) ^ "'"]
 8:
 9: let newline lexbuf =
10:
        let incr pos =
11:
            {pos with Lexing.pos_lnum = pos.Lexing.pos_lnum + 1;
12:
                       Lexing.pos_bol = pos.Lexing.pos_cnum}
13:
        in (lexbuf.Lexing.lex_start_p <- incr lexbuf.Lexing.lex_start_p;</pre>
14:
             lexbuf.Lexing.lex_curr_p <- incr lexbuf.Lexing.lex_curr_p)</pre>
15:
16: let lexeme = Lexing.lexeme
17:
18: }
19:
20: let letter
                       = ['a'-'z' 'A'-'Z' ' ']
21: let digit
                       = ['0'-'9']
                      = (digit+ '.'? digit* | '.' digit+)
22: let fraction
23: let exponent
                       = (['E' 'e'] ['+' '-']? digit+)
24:
                       = (' #' [^{'} n']*)
25: let comment
26: let ident
                       = (letter (letter | digit)*)
27: let number = (fraction exponent?)
28: let string = '"' [^'\n' '"']* '"'
29:
```

```
30:
31: rule token
                      = parse
                    { Parser.EOF }
32:
        | eof
         | [' ' '\t'] { token lexbuf }
33:
         | comment { token lexbuf }
| "\n" { newline lexbuf; Parser.EOL }
34:
         | "\n"
35:
         | ":"
36:
                           { Parser.COLON }
         j ","
37:
                           { Parser.COMMA }
         | "("
                           { Parser.LPAR }
38:
         | ")"
                           { Parser.RPAR }
39:
                         { Parser.LSUB }
{ Parser.RSUB }
{ Parser.EQUAL (lexeme lexbuf) }
{ Parser.RELOP (lexeme lexbuf) }
{ Parser.RELOP (lexeme lexbuf) }
{ Parser.RELOP (lexeme lexbuf) }
         | "["
40:
         | "]"
41:
         | "="
42:
         | "<>"
43:
         | "<"
44:
         | "<="
45:
         | ">"
46:
                           { Parser.RELOP (lexeme lexbuf) }
                          { Parser.RELOP (lexeme lexbuf) }
{ Parser.RELOP (lexeme lexbuf) }
{ Parser.ADDOP (lexeme lexbuf) }
{ Parser.ADDOP (lexeme lexbuf) }
         | ">="
47:
         | "+"
48:
         | "-"
49:
                          { Parser.MULOP (lexeme lexbuf) }
         "*"
50:
         | "/"
51:
                          { Parser.MULOP (lexeme lexbuf) }
           /
"%"
"^"
52:
                           { Parser.MULOP (lexeme lexbuf) }
                           { Parser.POWOP (lexeme lexbuf) }
53:
         | "dim"
54:
                          { Parser.DIM }
         | "goto"
| "if"
55:
                          { Parser.GOTO }
         | "if"
56:
                           { Parser.IF }
         | "input"
57:
                          { Parser.INPUT }
         | "let"
                           { Parser.LET }
58:
                          { Parser.PRINT }
         | "print"
59:
                           { Parser.NUMBER (lexeme lexbuf) }
60:
         number
         | string
                          { Parser.STRING (lexeme lexbuf) } { Parser.IDENT (lexeme lexbuf) }
61:
62:
         | ident
63:
                          { lexerror lexbuf; token lexbuf }
         I _
64:
```

```
1: # $Id: Makefile, v 1.8 2019-01-25 16:48:22-08 - - $
 2:
 3: #
 4: # General useful macros
 6:
 7: MKFILE
             = Makefile
 8: MAKEFLAGS += --no-builtin-rules
9: DEPSFILE = ${MKFILE}.deps
10: NOINCLUDE = ci clean spotless
11: NEEDINCL = ${filter ${NOINCLUDE}}, ${MAKECMDGOALS}}
12: GMAKE = ${MAKE} --no-print-directory
13:
14: #
15: # File macros
16: #
17:
18: EXECBIN
              = sbinterp
              = etc.cmo parser.cmo scanner.cmo tables.cmo \
19: OBJCMO
20:
                 dumper.cmo interp.cmo main.cmo
21: OBJCMI
              = ${OBJCMO:.cmo=.cmi} absyn.cmi
22: OBJBIN
              = ${OBJCMO:.cmo=.o}
23: MLSOURCE
               = absyn.mli etc.mli etc.ml tables.mli tables.ml \
24:
                 dumper.mli dumper.ml interp.mli interp.ml main.ml
25: GENSOURCE = dumper.mli tables.mli parser.mli parser.ml scanner.ml
26: GENFILES = ${GENSOURCE} parser.output ${DEPSFILE}
27: OTHERFILES = ${MKFILE} ${DEPSFILE} using .ocamlinit
28: ALLSOURCES = ${MLSOURCE} parser.mly scanner.mll ${OTHERFILES}
29: LISTING
              = Listing.ps
30:
31: #
32: # General targets
33: #
34:
35: all : ${EXECBIN}
37: ${EXECBIN} : ${OBJCMO}
           ocamlc str.cma ${OBJCMO} -o ${EXECBIN}
39:
40: %.cmi : %.mli
41:
           ocamlc -c $<
42:
43: %.cmo : %.ml
44:
           ocamlc -c $<
45:
46: %.ml : %.mll
47:
           ocamllex $<
48:
49: %.mli %.ml : %.mly
50:
           ocamlyacc -v $<
51:
```

96:

```
52:
53: MAKEMLI
               = (echo "(* Generated: $$(date) *)"; ocamlc -i $<) >$@
55: tables.mli : tables.ml absyn.cmi
            ${call MAKEMLI}
57:
58: dumper.mli : dumper.ml absyn.cmi
59:
            ${call MAKEMLI}
60:
61: #
62: # Misc targets
63: #
64:
65: clean :
            - rm ${OBJCMI} ${OBJCMO} ${OBJBIN} ${GENSOURCE}
66:
68: spotless : clean
            - rm ${EXECBIN} ${GENFILES} ${LISTING} ${LISTING:.ps=.pdf}
69:
70:
71: ci : ${ALLSOURCES}
72:
            - checksource ${ALLSOURCES}
73:
            cid + ${ALLSOURCES}
74:
75: deps : ${MLSOURCE} ${GENSOURCE}
76:
            @ echo "# Generated: $$(date)" >${DEPSFILE}
            ocamldep ${MLSOURCE} ${GENSOURCE} >>${DEPSFILE}
77:
79: ${DEPSFILE} : tables.mli
80:
            @touch ${DEPSFILE}
81:
            ${GMAKE} deps
82:
83: lis : ${ALLSOURCES}
84:
            mkpspdf ${LISTING} ${ALLSOURCES}
85:
86: again :
87:
            ${GMAKE} spotless
88:
            ${GMAKE} deps
89:
            ${GMAKE} ci
90:
            ${GMAKE} all
91:
            ${GMAKE} lis
92:
93: ifeq "${NEEDINCL}" ""
94: include ${DEPSFILE}
95: endif
```

\$cmps112-wm/Assignments/asg2-ocaml-interp/code-interp Makefile.deps

```
1: # Generated: Tue Jan 29 17:30:47 PST 2019
 2: absyn.cmi:
 3: etc.cmi :
 4: etc.cmo : etc.cmi
 5: etc.cmx : etc.cmi
 6: tables.cmi : absyn.cmi
7: tables.cmo : absyn.cmi tables.cmi
 8: tables.cmx : absyn.cmi tables.cmi
 9: dumper.cmi : absyn.cmi
10: dumper.cmo : absyn.cmi dumper.cmi
11: dumper.cmx : absyn.cmi dumper.cmi
12: interp.cmi : absyn.cmi
13: interp.cmo : tables.cmi etc.cmi dumper.cmi absyn.cmi interp.cmi
14: interp.cmx : tables.cmx etc.cmx dumper.cmx absyn.cmi interp.cmi
15: main.cmo : scanner.cmo parser.cmi interp.cmi etc.cmi
16: main.cmx : scanner.cmx parser.cmx interp.cmx etc.cmx
17: dumper.cmi : absyn.cmi
18: tables.cmi : absyn.cmi
19: parser.cmi : absyn.cmi
20: parser.cmo : etc.cmi absyn.cmi parser.cmi
21: parser.cmx : etc.cmx absyn.cmi parser.cmi
22: scanner.cmo : parser.cmi etc.cmi
23: scanner.cmx : parser.cmx etc.cmx
```

```
1: let rcs = "(* $Id: using, v 1.3 2019-01-24 17:15:07-08 - - $ *)";;
 3: print_endline rcs;;
 4:
 5: #load "str.cma";;
 6:
 7: #mod_use "absyn.mli";;
 8: #mod_use "etc.ml";;
 9:
10: #mod_use "parser.ml";;
11: #mod_use "scanner.ml";;
12:
13: #mod_use "tables.ml";;
14: #mod_use "dumper.ml";;
15:
16: #mod_use "interp.ml";;
17: #mod_use "main.ml";;
18:
19: open Interp;;
20: open Main;;
21:
22: want_dump := true;;
23:
```

```
1: let rcs = "(* $Id: .ocamlinit,v 1.6 2019-01-24 18:40:26-08 - - $ *)";;
 3: print_endline rcs;;
 4:
 5: #load "str.cma";;
 6:
 7: #mod_use "absyn.mli";;
 8: #mod_use "etc.ml";;
 9:
10: #mod_use "parser.ml";;
11: #mod_use "scanner.ml";;
12:
13: #mod_use "tables.ml";;
14: #mod_use "dumper.ml";;
15:
16: #mod_use "interp.ml";;
17: #mod_use "main.ml";;
18:
19: open Interp;;
20: open Main;;
21:
22: want_dump := true;;
23:
```