IWF Metadata Harvester Manual II

Generic Query Language Interpreter
Manual edition 1.0 for IWF Metadata Harvester Version 1.0
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This is the IWF Metadata Harvester User and Reference Manual II (Scantest), edition 1.0 for the IWF Metadata Harvester 1.0. This manual was last updated on 3 January 2007. IWF Metadata Harvester is a package for metadata harvesting. The author is Laurence D. Finston.

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1 Introduction

2 Utility Types

2.1 Mutex_Type

`struct Mutex_Type` is declared in '`nonwin.web`'.

2.1.1 Functions

`int Lock (void)` [Public functions]
`int Unlock (void)`
These functions currently return 0 immediately.

3 Global Variables

`Mutex_Type cerr_mutex` [Global variables]
`Mutex_Type cout_mutex`
`Mutex_Type time_mutex`
`Mutex_Type tex_mutex`
: These variables are declared in '`main.web`'. They are used in the GNU/Linux version of Scantest.

`CMutex log_strm_mutex` [Global variables]
`CMutex cerr_mutex`
`CMutex cout_mutex`
: These variables are declared in '`scantest.web`'. They are used in the Microsoft Windows of Scantest.

`unsigned short tex_file_ctr` [Global variable]
: This variable is declared in '`main.web`'. It is used in the GNU/Linux version of Scantest.

`string tex_filename_str` [Global variable]
: This variable is declared in '`main.web`'. It is used in the GNU/Linux version of Scantest.

`string copyright_tex_str` [Global variable]
: This variable is declared in '`main.web`'. It is used in the GNU/Linux version of Scantest.

`ofstream tex_file_strm` [Global variable]
: This variable is declared in '`main.web`'. It is used in the GNU/Linux version of Scantest.

`ifstream in_strm` [Global variables]
`ofstream log_strm`
: These variables are declared '`scantest.web`'. They are used in the Microsoft Windows version of Scantest.

4 Global Functions

4.1 Main Function for GNU Linux

`int main (int argc, char* argv[])` [Function]

The *main function* used in the GNU/Linux version of Scantest. It is the *entry point* of the program.

4.2 Main function for Microsoft Windows

`int _tmain (int argc,` [Function]
`TCHAR* argv[],`
`TCHAR* envp[])`

The *main function* used in the Microsoft Windows version of Scantest. It is the *entry point* of the program.

4.3 Other Functions

`void yyerror (const char* s)` [Function]

5 Date_Time_Type

Class `Date_Time_Type` is declared in '`dttmtype.web`'. Ctangling '`dttmtype.web`' generates '`dttmtype.h`'. `Date_Time_Node` is a synonym for `Date_Time_Type*`. `class Query_Type` is a `friend` of `Date_Time_Type`.

5.1 Data Members

`short* year_range_begin` [Private variables]
`short* year_range_end`
`short* year`
`unsigned short* month`
`unsigned short* day`
`unsigned short* hour`
`unsigned short* minute`
`float* second`

5.2 Functions

5.2.1 Constructor and Destructor

`void Date_Time_Type (void)` [Constructor]

`void ~Date_Time_Type (void)` [Destructor]

5.2.2 Operators

`Date_Time_Node Date_Time_Type::operator= (const Date_Time_Type&)` [Assignment operator]

5.2.3 Showing

`int show (string)` [Member Function]

5.2.4 Output

`ostream& operator<< (ostream&, Date_Time_Type&)` [Output operator]

6 Datasource_Type

Class `Datasource_Type` is declared in '`dtsrctyp.web`'. Ctangling '`dtsrctyp.web`' generates '`dtsrctyp.h`'. `Datasource_Node` is a synonym for `Datasource_Type*`.

6.1 Data Members

`unsigned short type` [Private variables]
`string name`
`void* value`
`Scanner_Node scanner_node`

`map<unsigned short, string> datasource_type_map` [Private static variable]

`unsigned short DATASOURCE_TYPE_NULL_TYPE` [Public static constants]
`unsigned short DBT_TYPE`
`unsigned short GBV_GVK_TYPE`
`unsigned short TIMMS_TYPE`
`unsigned short DATASOURCE_FILE_TYPE`

6.2 Functions

6.2.1 Constructors and Setting Functions

`void Datasource_Type (void)` [Constructor]

`int set (unsigned short` *datasource_type*, `Scanner_Node` *sscanner_node*) [Member Function]

6.2.2 Destructor

`void ~Datasource_Type (void)` [Destructor]

6.2.3 Operators

`Datasource_Node operator= (const Datasource_Type&)` [Assignment Operator]

6.2.4 Initializing Maps

`int initialize_type_maps (void)` [Static Function]

6.2.5 Showing

`int show (string, Scanner_Node)` [Function]

7 Id_Type

`struct Id_Type` is declared in '`idtype.web`'. Ctangling '`idtype.web`' generates '`idtype.h`'. `Id_Node` is a synonym for `Id_Type*`. `class Scanner_Type` is a `friend` of `Id_Type`.

7.1 Data Members

`string name` [Public variables]
`void* value`
`unsigned short type`
`unsigned short subtype`
`Scanner_Node scanner_node`
`Id_Node up`
`Id_Node left`
`Id_Node right`

`static map<unsigned short, string> subtype_map` [Public static variable]

`unsigned short TEX_STRING_TYPE` [Public static constants]
`unsigned short SQL_STRING_TYPE`
`unsigned short PQF_STRING_TYPE`

7.2 Functions

7.2.1 Constructors

`void Id_Type (void)` [Constructor]

7.2.2 Destructor

`void ~Id_Type (void)` [Destructor]

7.2.3 Initialize Maps

`int initialize_subtype_map (Scanner_Node)` [Member Function]

7.2.4 Showing

`int show (string)` [Member Function]

8 Query_Type

Class `Query_Type` is declared in '`querytyp.web`'. Ctangling '`querytyp.web`' generates '`querytyp.h`'. `Query_Node` is a synonym for `Query_Type*`.

8.1 Data Members

```
unsigned short query_type                                  [Private Variables]
unsigned short field_type
unsigned short value_type
vector<unsigned short> target_types
Id_Node id_node
bool negated
string name
void* value
Query_Node up
Query_Node and_node
Query_Node or_node
Query_Node xor_node
unsigned short match_value
Scanner_Node scanner_node
unsigned short query_ctr
```

```
map<unsigned short, string> query_type_map          [Private Static Variables]
map<unsigned short, string> field_type_map
map<unsigned short, string> value_type_map
map<unsigned short, string> target_type_map
map<unsigned short, string> match_value_map
```

```
unsigned short QUERY_TYPE_NULL_TYPE                 [Public Static Constants]
unsigned short TOP_TYPE
unsigned short AND_TYPE
unsigned short OR_TYPE
unsigned short XOR_TYPE
unsigned short ACCESS_NUMBER_FIELD
unsigned short AUTHOR_FIELD
unsigned short BIBLIOGRAPHIC_TYPE_FIELD
unsigned short CALL_NUMBER_FIELD
unsigned short CLASSIFICATION_FIELD
unsigned short COMPANY_FIELD
unsigned short CONTENT_SUMMARY_FIELD
unsigned short CONTRIBUTOR_FIELD
unsigned short CREATOR_FIELD
unsigned short DATABASE_PROVIDER_FIELD
unsigned short DESCRIPTION_FIELD
unsigned short EXEMPLAR_PRODUCTION_NUMBER_FIELD
unsigned short IDENTIFIER_FIELD
unsigned short INSTITUTION_FIELD
```

```
unsigned short LANGUAGE_FIELD
unsigned short MAIN_CANONICAL_TITLE_FIELD
unsigned short PERMUTATION_PATTERN_FIELD
unsigned short PHYSICAL_DESCRIPTION_FIELD
unsigned short PERSON_FIELD
unsigned short PUBLISHER_FIELD
unsigned short RECORD_FIELD
unsigned short REMOTE_ACCESS_FIELD
unsigned short RIGHTS_FIELD
unsigned short SOURCE_FIELD
unsigned short SUBJECT_FIELD
unsigned short SUPERORDINATE_ENTITIES_FIELD
unsigned short TITLE_FIELD
unsigned short TYPE_FIELD
unsigned short AUTHOR_SURNAME_FIELD
unsigned short AUTHOR_GIVEN_NAME_FIELD
unsigned short AUTHOR_PREFIX_FIELD
unsigned short CONTRIBUTOR_SURNAME_FIELD
unsigned short CONTRIBUTOR_GIVEN_NAME_FIELD
unsigned short CONTRIBUTOR_PREFIX_FIELD
unsigned short RECORD_ID_FIELD
unsigned short RECORD_ELN_ORIGINAL_ENTRY_FIELD
unsigned short RECORD_ELN_MOST_RECENT_CHANGE_FIELD
unsigned short RECORD_ELN_STATUS_CHANGE_FIELD
unsigned short RECORD_IDENTIFICATION_NUMBER_FIELD
unsigned short RECORD_DATE_ORIGINAL_ENTRY_FIELD
unsigned short RECORD_DATE_MOST_RECENT_CHANGE_FIELD
unsigned short RECORD_DATE_STATUS_CHANGE_FIELD
unsigned short RECORD_SOURCE_ID_FIELD
unsigned short RECORD_YEAR_APPEARANCE_BEGIN_FIELD
unsigned short RECORD_YEAR_APPEARANCE_END_FIELD
unsigned short RECORD_YEAR_APPEARANCE_RAK_WB_FIELD
unsigned short RECORD_YEAR_APPEARANCE_ORIGINAL_FIELD
unsigned short INT_TYPE
unsigned short FLOAT_TYPE
unsigned short QUERY_TYPE_STRING_TYPE
unsigned short DATE_TIME_TYPE
unsigned short LOCAL_DATABASE_TARGET
unsigned short LOCAL_SERVER_TARGET
unsigned short REMOTE_DATABASE_TARGET
unsigned short REMOTE_SERVER_TARGET
unsigned short CONTAINS_VALUE
unsigned short FREETEXT_VALUE
unsigned short LIKE_VALUE
```

`bitset<QUERY_TYPE_BITSET_SIZE> NULL_BITSET` [Public Static Variables]
`bitset<QUERY_TYPE_BITSET_SIZE> ACCESS_NUMBER_FLAG`

```
bitset<QUERY_TYPE_BITSET_SIZE> AUTHOR_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> AUTHOR_SURNAME_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> AUTHOR_GIVEN_NAME_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> AUTHOR_PREFIX_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> BIBLIOGRAPHIC_TYPE_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> CALL_NUMBER_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> CLASSIFICATION_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> COMPANY_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> CONTENT_SUMMARY_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> CONTRIBUTOR_SURNAME_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> CONTRIBUTOR_GIVEN_NAME_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> CONTRIBUTOR_PREFIX_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> CREATOR_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> CONTRIBUTOR_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> DATABASE_PROVIDER_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> DESCRIPTION_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> EXEMPLAR_PRODUCTION_NUMBER_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> IDENTIFIER_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> INSTITUTION_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> LANGUAGE_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> MAIN_CANONICAL_TITLE_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> PERMUTATION_PATTERN_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> PERSON_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> PHYSICAL_DESCRIPTION_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> PUBLISHER_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> RECORD_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> RECORD_ID_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> RECORD_ELN_ORIGINAL_ENTRY_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> RECORD_ELN_MOST_RECENT_CHANGE_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> RECORD_ELN_STATUS_CHANGE_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> RECORD_IDENTIFICATION_NUMBER_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> RECORD_DATE_ORIGINAL_ENTRY_FLAG
bitset<QUERY_TYPE_BITSET_SIZE>
        RECORD_DATE_MOST_RECENT_CHANGE_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> RECORD_DATE_STATUS_CHANGE_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> RECORD_SOURCE_ID_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> RECORD_YEAR_APPEARANCE_BEGIN_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> RECORD_YEAR_APPEARANCE_END_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> RECORD_YEAR_APPEARANCE_RAK_WB_FLAG
bitset<QUERY_TYPE_BITSET_SIZE>
        RECORD_YEAR_APPEARANCE_ORIGINAL_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> REMOTE_ACCESS_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> RIGHTS_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> SOURCE_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> SUBJECT_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> SUPERORDINATE_ENTITIES_FLAG
bitset<QUERY_TYPE_BITSET_SIZE> TITLE_FLAG
```

```
bitset<QUERY_TYPE_BITSET_SIZE> TYPE_FLAG
```

8.2 Functions

8.2.1 Constructors and Setting Functions

```
void Query_Type (void)                                          [Constructor]
```

```
int Query_Type::set (unsigned short qquery_type,                [Setting Function]
        unsigned short ffield_type,
        unsigned short vvalue_type,
        unsigned short target_type,
        bool nnegated,
        void* vvalue,
        Query_Node uup,
        Query_Node aand_node,
        Query_Node oor_node,
        Query_Node xxor_node,
        Scanner_Node sscanner_node)
```

8.2.2 Destructor

```
void ~Query_Type (void)                                         [Destructor]
```

8.2.3 Operators

```
Query_Node operator= (const Query_Type&)                        [Assignment Operator]
```

8.2.4 Initializing and Flags Maps

```
int initialize_type_maps (void)                                 [Static Member Function]
```

```
int initialize_flags (void)                                     [Static Member Function]
```

8.2.5 Set Field Specifier

```
int set_field_specifier (void* v,                               [Member Function]
        bool traverse,
        Scanner_Node sscanner_node)
```

8.2.6 Generate Strings

```
string generate_tex_string (Scanner_Node                        [Member functions]
        scanner_node,
        stringstream* tex_strm)
```

```
int generate_sql_string (Scanner_Node scanner_node,
        int database_type,
        stringstream* sql_strm,
        stringstream* select_strm,
        stringstream* from_strm,
        stringstream* where_strm_0,
        stringstream* where_strm_1,
        bool* first_select,
        bool* first_from,
        bool* first_where,
        bitset<QUERY_TYPE_BITSET_SIZE>* field_flags,
        string* return_str)
```

8.2.7 Showing Query_Type

`int show (string, Scanner_Node)` [Member Function]

9 Token_Type

`struct Token_Type` is declared in '`scnrtype.web`'.

9.1 Data Members

`unsigned int type` [Public data members]
`YYSTYPE value`

9.2 Functions

9.2.0.1 Constructors

`void Token_Type (void)` [Default constructor]
`void Token_Type (unsigned int ttype, YYSTYPE vvalue)` [Constructor]

10 Scanner_Type

Class `Scanner_Type` is declared in '`scnrtype.web`'.

10.1 Data Members

`char in_filename[128]` [Private variables]
`char log_filename[128]`
`ifstream in_strm`
`map<string, Id_Type*> id_map`
`stack<Token_Type> token_stack`
`vector<float> float_vector`

`ofstream log_strm` [Public variables]

10.2 Functions

10.2.1 Constructor

`void Scanner_Type` (*void*) [Default constructor]

10.2.2 Destructor

`void ~Scanner_Type` (*void*) [Destructor]

10.2.2.1 Initializing Maps

`int initialize_id_map (void)` [Function]

10.3 Other functions

`Id_Node lookup (char* name,` [Function]
`bool create,`
`unsigned int type)`

11 Namespace Scan_Parse

`namespace Scan_Parse` is declared in '`scanner.web`'. Ctangling '`scanner.web`' generates '`scanner.h`'.

Unless otherwise stated, the variables and datatypes described in this chapter are all declared within the namespace `Scan_Parse`.

11.1 Keyword_Type

`struct Keyword_Type` is declared in '`scanner.web`'.

`string name` [Member variables]
`int value`
`string value_name`

11.2 Constants

`unsigned int NULL_STATE` [extern constants]
`unsigned int COLLECTING_ID`
`unsigned int COLLECTING_STRING`
`unsigned int COLLECTING_INTEGER`
`unsigned int COLLECTING_FLOAT`

11.3 Variables

`map<string, Keyword_Type*> keyword_map` [Variables]
`map<unsigned int, string> token_map`

11.4 Functions

11.4.1 Map Functions

`int initialize_maps (void)` [Function]

`int show_keyword_map (Scanner_Type*)` [Function]

11.4.2 Parser Rule Functions

The functions described in this section are defined in '`prsrfncs.web`'.

11.4.2.1 Functions for Variables

`void* variable_func (void* v, char* name)` [Function]

11.4.2.2 Functions for Declarations

`Id_Node declare_variable_func (void* v,` [Function]
`const unsigned short type,`
`char* name)`

11.4.2.3 Functions for Assignments

`void* query_assignment_func_0 (void* v,` [Function]
`void* object,`
`unsigned int assignment_type,`
`unsigned int arg_0,`
`unsigned int arg_1,`
`void* value,`
`bool negate)`

`int query_assignment_func_1 (Scanner_Node scanner_node,` [Function]
`Id_Node& curr_id_node,`
`void*& field_specifier,`
`int assignment_operator,`
`int negation_optional,`
`int match_term_optional,`
`void*& v,`
`int type)`

`int datetime_assignment_func_0 (void* v,` [Function]
`Date_Time_Node& curr_date_time_node,`
`int specifier,`
`int op,`
`void* val,`
`int type)`

`int datetime_assignment_func_1 (void* v,` [Function]
`Date_Time_Node& d,`
`int op,`
`void*& vec)`

11.4.2.4 Functions for Queries Scan_Parse

`int start_local_database_query_func (void*)` [Function]

`int end_query_func (void*)` [Function]

11.4.3 The Scanning Function `yylex`

`yylex` is the *scanner* or *scanning function* that reads code in the Scantest language from plain-text *input files* and passes *tokens* to the *parser* or *parsing function* `yyparse`. See Chapter 12 [Parser], page 17.

`int yylex (YYSTYPE* value, void* parameter)` [Global function]

12 Parser

Tokens are also known as *terminal symbols*. They are the basic building blocks of the Scantest language. Tokens are returned to the function `yyparse` by the function `yylex`. See Section 11.4.3 [The Scanning Function `yylex`], page 16.

`int yyparse (void* YYPARSE_PARAM)` [Global function]

This function is generated by GNU Bison from the *parser input files*:

Main parser file ('`parser.w`')

Variables ('`variabls.w`')

Declarations ('`declrtns.w`')

Assignments ('`assign.w`')

`datasource` expressions ('`dtsrcexp.w`')

`datetime` expressions ('`dttmexp.w`')

`query` expressions ('`queryexp.w`')

`string` expressions ('`strings.w`')

Commands ('`commands.w`')

```
int int_value                                   [Union declaration for YYSTYPE]
float float_value
char string_value[2048]
void* pointer_value
```

`YYSTYPE` is the type of the *semantic value* associated with a symbol or a rule. `YYSTYPE` can be a simple type or a *union*. In Scantest, it is a `union`. Each of the tokens and non-terminal symbols described below has a semantic value whose type is one of the members of this `union`.

12.1 Punctuation

```
int_value AT_SYMBOL                                                  [Tokens]
int_value COMMA
int_value COLON
int_value HYPHEN
int_value UNDERLINE
int_value PERCENT
int_value PERIOD
int_value SEMI_COLON
int_value OPEN_PARENTHESIS
int_value CLOSE_PARENTHESIS
int_value OPEN_BRACKET
int_value CLOSE_BRACKET
```

12.2 General

`int_value CLEAR` [Token]

`No semantic value EMPTY` [Pseudo-Token]

`EMPTY` is a pseudo-token that represents the absence of a symbol on the right-hand side of a parser rule.

12.3 Grouping

`int_value START` [Tokens]
`int_value END`

12.4 Operators

12.4.1 Arithmetical Operators

`int_value PLUS` [Tokens]
`int_value MINUS`
`int_value TIMES`
`int_value DIVIDE`

12.4.2 Boolean Operators

`int_value XOR` [Tokens]
`int_value NOT`
`int_value AND_NOT`
`int_value OR_NOT`
`int_value XOR_NOT`

`int_value and_or_and_not` [Non-terminal Symbols]
`int_value or_or_or_not`
`int_value xor_or_xor_not`

12.5 Control

12.5.1 Termination

`int_value TERMINATE` [Tokens]

12.5.2 Conditionals

`int_value IF` [Tokens]
`int_value ELSE`
`int_value ELIF`
`int_value FI`

12.5.3 Loops

`int_value FOR` [Tokens]
`int_value DO`

```
int_value WHILE
int_value AND
int_value OR
```

12.6 Start Symbol

⟨program⟩ ⟶ ⟨statement list⟩ `TERMINATE`

12.7 Statements

(No semantic value) `statement_list` [Non-terminal Symbols]
(No semantic value) `statement`

⟨statement list⟩ ⟶ `EMPTY`
| ⟨statement list⟩ ⟨statement⟩
⟨statement⟩ ⟶ <declaration> `SEMI_COLON`
| <assignment> `SEMI_COLON`
| <command> `SEMI_COLON`

12.8 Data Types

`string_value STRING` [Tokens]
`int_value INTEGER`
`float_value FLOAT`

12.9 Variables

`int_value VARIABLE` [Tokens]
`string_value VARIABLE_TEXT_SEGMENT`
`pointer_value NULL_TYPE`
`pointer_value DATASOURCE_TYPE`
`pointer_value DATETIME_TYPE`
`pointer_value QUERY_TYPE`
`pointer_value STRING_TYPE`

`pointer_value variable_name` [Non-terminal Symbols]
`string_value variable_segment_list`
`float_value subscript`
`pointer_value query_variable`
`pointer_value datasource_variable`
`pointer_value string_variable`
`pointer_value datetime_variable`

⟨variable name⟩ ⟶ ⟨variable segment list⟩
⟨variable segment list⟩ ⟶ `VARIABLE_TEXT_SEGMENT`
| ⟨variable segment list⟩ `VARIABLE_TEXT_SEGMENT`

| ⟨variable segment list⟩ ⟨subscript⟩
⟨subscript⟩ ⟶ INTEGER
| FLOAT
| OPEN_BRACKET INTEGER CLOSE_BRACKET
| OPEN_BRACKET FLOAT CLOSE_BRACKET

⟨query variable⟩ ⟶ VARIABLE QUERY_TYPE
| ⟨variable name⟩ QUERY_TYPE
⟨datasource variable⟩ ⟶ VARIABLE DATASOURCE_TYPE
| ⟨variable name⟩ DATASOURCE_TYPE
⟨string variable⟩ ⟶ VARIABLE STRING_TYPE
| ⟨variable name⟩ STRING_TYPE
⟨datetime variable⟩ ⟶ VARIABLE DATETIME_TYPE
| ⟨variable name⟩ DATETIME_TYPE

12.10 Declarations

```
int_value DATASOURCE_DECLARATOR                                  [Tokens]
int_value DATETIME_DECLARATOR
int_value STRING_DECLARATOR
int_value QUERY_DECLARATOR
```

```
int_value declaration                                [Non-terminal Symbols]
int_value query_declaration
int_value datasource_declaration
int_value string_declaration
int_value datetime_declaration
string_value variable_declaration_segment_list
int_value subscript_placeholder
```

⟨declaration⟩ ⟶ ⟨query declaration⟩
| ⟨string declaration⟩
| ⟨datasource declaration⟩
| ⟨datetime declaration⟩

⟨variable declaration segment list⟩ ⟶ VARIABLE_TEXT_SEGMENT
| ⟨variable declaration segment list⟩ VARIABLE_TEXT_SEGMENT
| ⟨variable declaration segment list⟩ ⟨subscript placeholder⟩

⟨subscript placeholder⟩ ⟶ OPEN_BRACKET CLOSE_BRACKET

⟨query declaration⟩ ⟶ QUERY_DECLARATOR ⟨variable declaration segment list⟩
⟨datasource declaration⟩ ⟶ DATASOURCE_DECLARATOR ⟨variable declaration segment list⟩
⟨string declaration⟩ ⟶ STRING_DECLARATOR ⟨variable declaration segment list⟩
⟨datetime declaration⟩ ⟶ DATETIME_DECLARATOR ⟨variable declaration segment list⟩

12.11 Assignments

```
int_value ASSIGN                                        [Tokens]
int_value PLUS_ASSIGN
int_value MINUS_ASSIGN
int_value TIMES_ASSIGN
int_value DIVIDE_ASSIGN
int_value AND_ASSIGN
int_value OR_ASSIGN
int_value XOR_ASSIGN
int_value NOT_ASSIGN
```

```
int_value assignment                                    [Non-terminal Symbols]
int_value negation_optional
int_value assign_or_plus_assign
int_value assignment_operator
pointer_value query_assignment
pointer_value datasource_assignment
string_value string_assignment
pointer_value datetime_assignment
```

⟨negation optional⟩ ⟶ `EMPTY`
| `NOT`

⟨match term optional⟩ ⟶ `EMPTY`
| `CONTAINS`
| `FREETEXT`
| `LIKE`

⟨assign or plus assign⟩ ⟶ `ASSIGN`
| `PLUS_ASSIGN`

⟨assignment operator⟩ ⟶ `ASSIGN`
| `PLUS_ASSIGN`
| `OR_ASSIGN`
| `XOR_ASSIGN`
| `NOT_ASSIGN`

⟨assignment⟩ ⟶ ⟨query assignment⟩
| ⟨datasource assignment⟩
| ⟨string assignment⟩
| ⟨datetime assignment⟩

⟨field specifier⟩ ⟶ ⟨field designator⟩ ⟨field qualifier list⟩

⟨field designator⟩ ⟶ ACCESS_NUMBER
| AUTHOR
| BIBLIOGRAPHIC_TYPE
| CALL_NUMBER
| CLASSIFICATION
| COMPANY
| CONTENT_SUMMARY
| CONTRIBUTOR
| CREATOR
| DATABASE_PROVIDER
| DESCRIPTION
| EXEMPLAR_PRODUCTION_NUMBER
| IDENTIFIER
| INSTITUTION
| LANGUAGE
| MAIN_CANONICAL_TITLE
| PERMUTATION_PATTERN
| PERSON
| PHYSICAL_DESCRIPTION
| PUBLISHER
| RECORD
| REMOTE_ACCESS
| RIGHTS
| SOURCE
| SUBJECT
| SUPERORDINATE_ENTITIES
| TITLE
| TYPE

⟨field qualifier list⟩ ⟶ EMPTY
⟨field qualifier list⟩ ⟶ ⟨field qualifier list⟩ PERIOD ⟨field qualifier⟩
⟨field qualifier⟩ ⟶ ID
| SURNAME
| GIVEN_NAME
| PREFIX
| ELN_ORIGINAL_ENTRY
| ELN_MOST_RECENT_CHANGE
| ELN_STATUS_CHANGE
| IDENTIFICATION_NUMBER
| DATE_ORIGINAL_ENTRY
| DATE_MOST_RECENT_CHANGE
| DATE_STATUS_CHANGE
| SOURCE_ID

| YEAR_APPEARANCE_BEGIN
| YEAR_APPEARANCE_END
| YEAR_APPEARANCE_RAK_WB
| YEAR_APPEARANCE_ORIGINAL

⟨datasource assignment⟩ ⟶ ⟨datasource variable⟩ ASSIGN ⟨datasource expression⟩
| ⟨datasource variable⟩ ASSIGN DBT
| ⟨datasource variable⟩ ASSIGN GBV_GVK
| ⟨datasource variable⟩ ASSIGN TIMMS
| ⟨datasource variable⟩ ASSIGN DATASOURCE_FILE

⟨string assignment⟩ ⟶ ⟨string variable⟩ ASSIGN ⟨string expression⟩
| ⟨string variable⟩ ASSIGN TEX ⟨query expression⟩
| ⟨string variable⟩ ASSIGN SQL OAI ⟨query expression⟩
| ⟨string variable⟩ ASSIGN SQL PICA ⟨query expression⟩

⟨datetime assignment⟩ ⟶ ⟨datetime variable⟩ ASSIGN ⟨datetime expression⟩
| ⟨datetime variable⟩ COLON ⟨datetime specifier⟩ ⟨assignment operator⟩ INTEGER
| ⟨datetime variable⟩ COLON ⟨datetime specifier⟩ ⟨assignment operator⟩ FLOAT

⟨datetime specifier⟩ ⟶ YEAR_RANGE_BEGIN
| YEAR_RANGE_END
| YEAR
| MONTH
| DAY
| HOUR
| MINUTE
| SECOND

⟨query assignment⟩ ⟶ ⟨query variable⟩ ASSIGN ⟨query expression⟩
| ⟨query variable⟩ ⟨assign or plus assign⟩ LOCAL DATABASE
| ⟨query variable⟩ ⟨assign or plus assign⟩ LOCAL SERVER
| ⟨query variable⟩ ⟨assign or plus assign⟩ REMOTE DATABASE
| ⟨query variable⟩ ⟨assign or plus assign⟩ REMOTE SERVER
| ⟨query variable⟩ COLON ⟨field specifier⟩ ⟨assignment operator⟩
⟨negation optional⟩ ⟨match term optional⟩ ⟨query expression⟩
| ⟨query variable⟩ COLON ⟨field specifier⟩ ⟨assignment operator⟩

⟨negation optional⟩ ⟨match term optional⟩ ⟨datetime expression⟩
| ⟨query variable⟩ `COLON` ⟨field specifier⟩ ⟨assignment operator⟩
⟨negation optional⟩ ⟨match term optional⟩ ⟨query expression⟩
| ⟨query variable⟩ `COLON` ⟨field specifier⟩ ⟨assignment operator⟩
⟨negation optional⟩ ⟨match term optional⟩ ⟨datetime expression⟩

12.12 Commands

`int_value command` [Non-terminal Symbols]

⟨message or errmessage⟩ ⟶ `MESSAGE`
| `ERRMESSAGE`

⟨command⟩ ⟶ ⟨message or errmessage⟩ `STRING`
| `PAUSE`
| `SHOW` ⟨query variable⟩
| `SHOW` ⟨datasource variable⟩
| `SHOW` ⟨datetime variable⟩
| `SHOW` ⟨string expression⟩
| `OUTPUT TEX` ⟨string expression⟩

12.13 Datasource Expressions

`int_value DATASOURCE_FILE` [Tokens]
`int_value LOCAL`
`int_value REMOTE`
`int_value DATABASE`
`int_value SERVER`
`int_value DBT`
`int_value GBV_GVK`
`int_value TIMMS`

`pointer_value datasource_primary` [Non-terminal Symbols]
`pointer_value datasource_secondary`
`pointer_value datasource_tertiary`
`pointer_value datasource_expression`

⟨datasource primary⟩ ⟶ ⟨datasource variable⟩
| `OPEN_PARENTHESIS` datasource_expression `CLOSE_PARENTHESIS`
⟨datasource secondary⟩ ⟶ datasource_primary
⟨datasource tertiary⟩ ⟶ ⟨datasource secondary⟩
⟨datasource expression⟩ ⟶ ⟨datasource tertiary⟩

12.14 Datetime Expressions

```
int_value YEAR_RANGE_BEGIN                                  [Tokens]
int_value YEAR_RANGE_END
int_value YEAR
int_value MONTH
int_value DAY
int_value HOUR
int_value MINUTE
int_value SECOND
```

```
int_value datetime_specifier                                [Non-terminal Symbols]
pointer_value datetime_primary
pointer_value datetime_secondary
pointer_value datetime_tertiary
pointer_value datetime_expression
pointer_value datetime_element_list
```

⟨datetime primary⟩ ⟶ ⟨datetime variable⟩
| `OPEN_PARENTHESIS` ⟨datetime expression⟩ `CLOSE_PARENTHESIS`
| ⟨datetime element list⟩
⟨datetime secondary⟩ ⟶ ⟨datetime primary⟩
⟨datetime tertiary⟩ ⟶ ⟨datetime secondary⟩
⟨datetime expression⟩ ⟶ ⟨datetime tertiary⟩

⟨datetime element list⟩ ⟶ `INTEGER COLON`
| `FLOAT COLON`
| ⟨datetime element list⟩ `INTEGER COLON`
| ⟨datetime element list⟩ `FLOAT COLON`

12.15 Query Expressions

```
int_value CONTAINS                                          [Tokens]
int_value FREETEXT
int_value LIKE
```

```
int_value match_term_optional                               [Non-terminal Symbols]
pointer_value query_primary
pointer_value query_secondary
pointer_value query_tertiary
pointer_value query_expression
```

⟨query primary⟩ ⟶ ⟨query variable⟩
| `OPEN_PARENTHESIS` ⟨query expression⟩ `CLOSE_PARENTHESIS`
| `STRING`

| INTEGER
| FLOAT
⟨query secondary⟩ ⟶ ⟨query primary⟩
| ⟨query secondary⟩ ⟨and or and not⟩ ⟨query primary⟩
⟨query tertiary⟩ ⟶ ⟨query secondary⟩
| ⟨query tertiary⟩ ⟨xor or xor not⟩ ⟨query secondary⟩
⟨query expression⟩ ⟶ ⟨query tertiary⟩
| ⟨query expression⟩ ⟨or or or not⟩ ⟨query tertiary⟩

⟨and or and not⟩ ⟶ AND
| AND_NOT
⟨or or or not⟩ ⟶ OR
| OR_NOT
⟨xor or xor not⟩ ⟶ XOR
| ⟶ XOR_NOT

12.16 String Expressions

```
int_value OAI                                          [Tokens]
int_value PICA
int_value TEX
int_value SQL
```

```
string_value string_primary                            [Non-terminal Symbols]
string_value string_secondary
string_value string_tertiary
string_value string_expression
```

⟨string primary⟩ ⟶ ⟨string variable⟩
| STRING
| OPEN_PARENTHESIS ⟨string expression⟩ CLOSE_PARENTHESIS
⟨string secondary⟩ ⟶ ⟨string primary⟩
⟨string tertiary⟩ ⟶ ⟨string secondary⟩
⟨string expression⟩ ⟶ ⟨string tertiary⟩

12.17 Output

```
int_value OUTPUT                                       [Tokens]
int_value MESSAGE
int_value ERRMESSAGE
int_value PAUSE
int_value SHOW
```

```
int_value message_or_errmessage                        [Non-terminal Symbols]
```

12.18 Database Tables and Columns

12.18.1 General

int_value ID [Tokens]
int_value ELN_ORIGINAL_ENTRY
int_value ELN_MOST_RECENT_CHANGE
int_value ELN_STATUS_CHANGE
int_value IDENTIFICATION_NUMBER
int_value DATE_ORIGINAL_ENTRY
int_value DATE_MOST_RECENT_CHANGE
int_value DATE_STATUS_CHANGE
int_value SOURCE_ID
int_value YEAR_APPEARANCE_BEGIN
int_value YEAR_APPEARANCE_END
int_value YEAR_APPEARANCE_RAK_WB
int_value YEAR_APPEARANCE_ORIGINAL

pointer_value field_specifier [Non-terminal Symbols]
int_value field_designator
pointer_value field_qualifier_list
int_value field_qualifier

12.18.2 Names

int_value GIVEN_NAME [Tokens]
int_value PREFIX
int_value SURNAME

12.18.3 Access_Number

int_value ACCESS_NUMBER [Tokens]

12.18.4 Author

int_value AUTHOR [Tokens]
int_value AUTHOR_GIVEN_NAME
int_value AUTHOR_PREFIX
int_value AUTHOR_SURNAME

12.18.5 Bibliographic_Type

int_value BIBLIOGRAPHIC_TYPE [Tokens]

12.18.6 Call_Number

int_value CALL_NUMBER [Tokens]

12.18.7 Classification

int_value CLASSIFICATION [Tokens]

12.18.8 Company

`int_value COMPANY` [Tokens]

12.18.9 Content_Summary

`int_value CONTENT_SUMMARY` [Tokens]

12.18.10 Contributor

`int_value CONTRIBUTOR` [Tokens]
`int_value CONTRIBUTOR_GIVEN_NAME`
`int_value CONTRIBUTOR_PREFIX`
`int_value CONTRIBUTOR_SURNAME`

12.18.11 Creator

`int_value CREATOR` [Tokens]

12.18.12 Database_Provider

`int_value DATABASE_PROVIDER` [Tokens]

12.18.13 Description

`int_value DESCRIPTION` [Tokens]

12.18.14 Exemplar_Production_Number

`int_value EXEMPLAR_PRODUCTION_NUMBER` [Tokens]

12.18.15 Identifier

`int_value IDENTIFIER` [Tokens]

12.18.16 Institution

`int_value INSTITUTION` [Tokens]

12.18.17 Language

`int_value LANGUAGE` [Tokens]

12.18.18 Main_Canonical_Title

`int_value MAIN_CANONICAL_TITLE` [Tokens]

12.18.19 Permutation_Pattern

`int_value PERMUTATION_PATTERN` [Tokens]

12.18.20 Person

`int_value PERSON` [Tokens]

12.18.21 Physical_Description

`int_value PHYSICAL_DESCRIPTION` [Tokens]

12.18.22 Publisher

`int_value PUBLISHER` [Tokens]

12.18.23 Records

`int_value RECORD` [Tokens]

12.18.24 Remote_Access

`int_value REMOTE_ACCESS` [Tokens]

12.18.25 Rights

`int_value RIGHTS` [Tokens]

12.18.26 Source

`int_value SOURCE` [Tokens]

12.18.27 Subject

`int_value SUBJECT` [Tokens]

12.18.28 Superordinate_Entities

`int_value SUPERORDINATE_ENTITIES` [Tokens]

12.18.29 Title

`int_value TITLE` [Tokens]

12.18.30 Type

`int_value TYPE` [Tokens]

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END OF TERMS AND CONDITIONS

Appendix: How to Apply These Terms to Your New Programs

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```
one line to give the program's name and a brief idea of what it does.
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along with this program; if not, write to the Free Software
Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA  02110-1301, USA.
```

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

```
Gnomovision version 69, Copyright (C) year name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.
```

The hypothetical commands '`show w`' and '`show c`' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than '`show w`' and '`show c`'; they could even be mouse-clicks or menu items—whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
`Gnomovision' (which makes passes at compilers) written by James Hacker.

signature of Ty Coon, 1 April 1989
Ty Coon, President of Vice
```

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