

IWF Metadata Harvester Manual II

Generic Query Language Interpreter
Manual edition 1.0 for IWF Metadata Harvester Version 1.0
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Laurence D. Finston

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 `'dtmtype.web'`. Ctangling `'dtmtype.web'` generates `'dtmtype.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
```



```
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 `'sclrtype.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 ('variables.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

$\langle \text{program} \rangle \rightarrow \langle \text{statement list} \rangle \text{ TERMINATE}$

12.7 Statements

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

$\langle \text{statement list} \rangle \rightarrow \text{EMPTY}$
 | $\langle \text{statement list} \rangle \langle \text{statement} \rangle$
 $\langle \text{statement} \rangle \rightarrow \langle \text{declaration} \rangle \text{ SEMI_COLON}$
 | $\langle \text{assignment} \rangle \text{ SEMI_COLON}$
 | $\langle \text{command} \rangle \text{ SEMI_COLON}$

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

$\langle \text{variable name} \rangle \rightarrow \langle \text{variable segment list} \rangle$
 $\langle \text{variable segment list} \rangle \rightarrow \text{VARIABLE_TEXT_SEGMENT}$
 | $\langle \text{variable segment list} \rangle \text{ VARIABLE_TEXT_SEGMENT}$

```

    | <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

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the “copyright” line and a pointer to where the full notice is found.

```
one line to give the program's name and a brief idea of what it does.
Copyright (C) yyyy name of author
```

```
This program is free software; you can redistribute it and/or modify
it under the terms of the GNU General Public License as published by
the Free Software Foundation; either version 2 of the License, or
(at your option) any later version.
```

```
This program is distributed in the hope that it will be useful,
but WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
GNU General Public License for more details.
```

```
You should have received a copy of the GNU General Public License
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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