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
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
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

This variable is declared in ‘main.web’. It is used in the GNU/Linux version of Scantest.

string tex_filename_str

This variable is declared in ‘main.web’. It is used in the GNU/Linux version of Scantest.

string copyright_tex_str

This variable is declared in ‘main.web’. It is used in the GNU/Linux version of Scantest.

ofstream tex_file strm

This variable is declared in ‘main.web’. It is used in the GNU/Linux version of Scantest.

ifstream in strm

ifstream 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

```c
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

```c
int _tmain (int argc,
            TCHAR* argv[],
            TCHAR* envp[]) [Function]
    The main function used in the Microsoft Windows version of Scantest. It is the entry point of the program.
```

4.3 Other Functions

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

5 Date_Time_Type

Class Date_Time_Type is declared in ‘dtmtime.web’. CTangling ‘dtmtime.web’ generates ‘dtmtime.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
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 Data source Type

Class Data source Type is declared in ‘dtsrcTyp_web’. C-tangling ‘dtsrcTyp_web’ generates ‘dtsrcTyp.h’. Data source Node is a synonym for Data source Type.

6.1 Data Members

unsigned short type [Private variables]
string name
void* value
Scanner_Node scanner_node
map<unsigned short, string> data source_type_map [Private static variable]
unsigned short DATA SOURCE_TYPE NULL_TYPE [Public static constants]
unsigned short DBT_TYPE
unsigned short GBV_GVK_TYPE
unsigned short TIMMS_TYPE
unsigned short DATA SOURCE_FILE_TYPE

6.2 Functions

6.2.1 Constructors and Setting Functions

void Data source_Type (void) [Constructor]
int set (unsigned short data source_type, Scanner_Node scanner_node) [Member Function]

6.2.2 Destructor

void ~Data source_Type (void) [Destructor]

6.2.3 Operators

Data source_Node operator= (const Data source_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`. Clangling `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`  
`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'. Compiling '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 EXEMPLARY_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_ELNORIGINAL_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_DATEORIGINAL_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_APPEARANCEORIGINAL_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
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_ELNORIGINALENTRY_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_DATEORIGINALENTRY_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
8.2 Functions

8.2.1 Constructors and Setting Functions

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

int Query_Type::set (unsigned short query_type,
                      unsigned short field_type,
                      unsigned short value_type,
                      unsigned short target_type,
                      bool negated,
                      void* vvalue,
                      Query_Node uup,
                      Query_Node and_node,
                      Query_Node oor_node,
                      Query_Node xor_node,
                      Scanner_Node scanner_node)
```

8.2.2 Destructor

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

8.2.3 Operators

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

8.2.4 Initializing and Flags Maps

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

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

8.2.5 Set Field Specifier

```c
int set_fieldSpecifier (void* v,
                         bool traverse,
                         Scanner_Node scanner_node)
```

8.2.6 Generate Strings

```c
string generate_tex_string (Scanner_Node 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  
Yystype value

[Public data members]

9.2 Functions

9.2.0.1 Constructors

void Token_Type (void)  
void Token_Type (unsigned int ttype, Yystype vvalue)

[Default constructor]  
[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,
  bool create,
  unsigned int type) [Function]
11 Namespace Scan_Parse

namespace Scan_Parse is declared in ‘scanner.web’. Compiling ‘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
int value
string value_name

11.2 Constants

unsigned int NULL_STATE
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
map<unsigned int, string> token_map

11.4 Functions

11.4.1 Map Functions

int initialize_maps (void)
int show_keyword_map (Scanner_Type*)

11.4.2 Parser Rule Functions

The functions described in this section are defined in ‘prsfncts.web’.

11.4.2.1 Functions for Variables

void* variable_func (void* v, char* name)

11.4.2.2 Functions for Declarations

Id_Node declare_variable_func (void* v,
const unsigned short type,
char* name)
11.4.2.3 Functions for Assignments

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

```c
int query_assignment_func_1 (Scanner_Node scanner_node,
    Id_Node& curr_id_node,
    void*& fieldSpecifier,
    int assignment_operator,
    int negationOptional,
    int match_termOptional,
    void*& v,
    int type)
```

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

```c
int datetime_assignment_func_1 (void* v,
    Date_Time_Node& d,
    int op,
    void*& vec)
```

11.4.2.4 Functions for Queries Scan_Parse

```c
int start_local_database_query_func (void*)
```

```c
int end_query_func (void*)
```

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 `yparse`. See Chapter 12 [Parser], page 17.

```c
int yylex (YSTYPE* value, void* parameter)
```

[Global function]
Chapter 12: Parser

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.

```c
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 (‘decrtns.w’)
- Assignments (‘assign.w’)
- datasource expressions (‘dtsrcexp.w’)
- datetime expressions (‘dttmexp.w’)
- query expressions (‘queryexp.w’)
- string expressions (‘strings.w’)
- Commands (‘commands.w’)
```

```c
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

```c
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
12.6 Start Symbol

\[(\text{program}) \rightarrow (\text{statement list}) \text{ TERMINATE}\]

12.7 Statements

\[(\text{No semantic value}) \text{ statement_list} \quad \text{[Non-terminal Symbols]}\]
\[(\text{No semantic value}) \text{ statement} \quad \text{[Non-terminal Symbols]}\]

\[(\text{statement list}) \rightarrow \text{ EMPTY} \]
\[\quad | \ (\text{statement list}) (\text{statement}) \]
\[(\text{statement}) \rightarrow \text{ <declaration>} \text{ SEMI_COLON} \]
\[\quad | \text{ <assignment>} \text{ SEMI_COLON} \]
\[\quad | \text{ <command>} \text{ SEMI_COLON} \]

12.8 Data Types

\text{string_value STRING} \quad \text{[Tokens]}\]
\text{int_value INTEGER} \quad \text{[Tokens]}\]
\text{float_value FLOAT} \quad \text{[Tokens]}\]

12.9 Variables

\text{int_value VARIABLE} \quad \text{[Tokens]}\]
\text{string_value VARIABLE_TEXT_SEGMENT} \quad \text{[Non-terminal Symbols]}\]
\text{pointer_value NULL_TYPE} \quad \text{[Non-terminal Symbols]}\]
\text{pointer_value DATASOURCE_TYPE} \quad \text{[Non-terminal Symbols]}\]
\text{pointer_value DATETIME_TYPE} \quad \text{[Non-terminal Symbols]}\]
\text{pointer_value QUERY_TYPE} \quad \text{[Non-terminal Symbols]}\]
\text{pointer_value STRING_TYPE} \quad \text{[Non-terminal Symbols]}\]
\text{pointer_value variable_name} \quad \text{[Non-terminal Symbols]}\]
\text{string_value variable_segment_list} \quad \text{[Non-terminal Symbols]}\]
\text{float_value subscript} \quad \text{[Non-terminal Symbols]}\]
\text{pointer_value query_variable} \quad \text{[Non-terminal Symbols]}\]
\text{pointer_value datasource_variable} \quad \text{[Non-terminal Symbols]}\]
\text{pointer_value string_variable} \quad \text{[Non-terminal Symbols]}\]
\text{pointer_value datetime_variable} \quad \text{[Non-terminal Symbols]}\]

\[(\text{variable name}) \rightarrow (\text{variable segment list}) \quad \text{[Non-terminal Symbols]}\]
\[(\text{variable segment list}) \rightarrow \text{ VARIABLE_TEXT_SEGMENT} \]
\[\quad | \ (\text{variable segment list}) \text{ VARIABLE_TEXT_SEGMENT} \]
12.10 Declarations

int_value  DATASOURCE_DECLARATOR
int_value  DATETIME_DECLARATOR
int_value  STRING_DECLARATOR
int_value  QUERY_DECLARATOR

int_value declaration
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
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

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
  | ELM_ORIGINAL_ENTRY
  | ELM_MOST_RECENT_CHANGE
  | ELM_STATUS_CHANGE
  | IDENTIFICATION_NUMBER
  | DATE_ORIGINAL_ENTRY
  | DATE_MOST_RECENT_CHANGE
  | DATE_STATUS_CHANGE
  | SOURCE_ID
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(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)
12.12 Commands

\texttt{int\_value\ command} \quad [\text{Non-terminal Symbols}]

\texttt{(message or errmsg)} \rightarrow \texttt{MESSAGE} \\
\texttt{| \quad ERRMESSAGE}

\texttt{(command)} \rightarrow \texttt{(message or errmsg)} \texttt{STRING} \\
\texttt{| \quad \texttt{PAUSE}} \\
\texttt{| \quad \texttt{SHOW} \ (query variable)} \\
\texttt{| \quad \texttt{SHOW} \ (datasource variable)} \\
\texttt{| \quad \texttt{SHOW} \ (datetime variable)} \\
\texttt{| \quad \texttt{SHOW} \ (string expression)} \\
\texttt{| \quad \texttt{OUTPUT} \ \texttt{TEX} \ (string expression)}

12.13 Datasource Expressions

\texttt{int\_value\ DATASOURCE\_FILE} \quad [\text{Tokens}]
\texttt{int\_value\ LOCAL}
\texttt{int\_value\ REMOTE}
\texttt{int\_value\ DATABASE}
\texttt{int\_value\ SERVER}
\texttt{int\_value\ DBT}
\texttt{int\_value\ GBV\_GVK}
\texttt{int\_value\ TIMMS}

\texttt{pointer\_value\ datasource\_primary} \quad [\text{Non-terminal Symbols}]
\texttt{pointer\_value\ datasource\_secondary}
\texttt{pointer\_value\ datasource\_tertiary}
\texttt{pointer\_value\ datasource\_expression}

\texttt{(datasource\_primary)} \rightarrow \texttt{(datasource\_variable)} \\
\texttt{| \quad \texttt{OPEN\_PARENTHESIS} \texttt{datasource\_expression} \texttt{CLOSE\_PARENTHESIS}}
\texttt{(datasource\_secondary)} \rightarrow \texttt{datasource\_primary}
\texttt{(datasource\_tertiary)} \rightarrow \texttt{(datasource\_secondary)}
\texttt{(datasource\_expression)} \rightarrow \texttt{(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

\[
\begin{align*}
\langle \text{datetime primary} \rangle & \rightarrow \langle \text{datetime variable} \rangle \\
& \quad | \ OPEN\_PARENTHESIS \langle \text{datetime expression} \rangle \ CLOSE\_PARENTHESIS \\
& \quad | \langle \text{datetime element list} \rangle \\
\langle \text{datetime secondary} \rangle & \rightarrow \langle \text{datetime primary} \rangle \\
\langle \text{datetime tertiary} \rangle & \rightarrow \langle \text{datetime secondary} \rangle \\
\langle \text{datetime expression} \rangle & \rightarrow \langle \text{datetime tertiary} \rangle \\
\langle \text{datetime element list} \rangle & \rightarrow \text{INTEGER COLON} \\
& \quad | \text{FLOAT COLON} \\
& \quad | \langle \text{datetime element list} \rangle \text{INTEGER COLON} \\
& \quad | \langle \text{datetime element list} \rangle \text{FLOAT COLON}
\end{align*}
\]

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

\[
\begin{align*}
\langle \text{query primary} \rangle & \rightarrow \langle \text{query variable} \rangle \\
& \quad | \ OPEN\_PARENTHESIS \langle \text{query expression} \rangle \ CLOSE\_PARENTHESIS \\
& \quad | \text{STRING}
\end{align*}
\]
| 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 not⟩ ⟨query tertiary⟩

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

### 12.16 String Expressions

int_value OAI
int_value PICA
int_value TEX
int_value SQL

string_value string_primary

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
int_value MESSAGE
int_value ERRMESSAGE
int_value PAUSE
int_value SHOW

int_value message_or_errmessage
12.18 Database Tables and Columns

12.18.1 General

int_value ID
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

int_value field_designator

pointer_value field_qualifier_list
int_value field_qualifier

12.18.2 Names

int_value GIVEN_NAME
int_value PREFIX
int_value SURNAME

12.18.3 Access_Number

int_value ACCESS NUMBER

12.18.4 Author

int_value AUTHOR
int_value AUTHOR GIVEN NAME
int_value AUTHOR PREFIX
int_value AUTHOR SURNAME

12.18.5 Bibliographic_Type

int_value BIBLIOGRAPHIC TYPE

12.18.6 Call_Number

int_value CALL NUMBER

12.18.7 Classification

int_value CLASSIFICATION
12.18.8 Company

int_value COMPANY

12.18.9 Content_Summary

int_value CONTENT_SUMMARY

12.18.10 Contributor

int_value CONTRIBUTOR
int_value CONTRIBUTOR_GIVEN_NAME
int_value CONTRIBUTOR_PREFIX
int_value CONTRIBUTOR_SURNAME

12.18.11 Creator

int_value CREATOR

12.18.12 Database_Provider

int_value DATABASE_PROVIDER

12.18.13 Description

int_value DESCRIPTION

12.18.14 Exemplar_Production_Number

int_value EXEMPLAR_PRODUCTION_NUMBER

12.18.15 Identifier

int_value IDENTIFIER

12.18.16 Institution

int_value INSTITUTION

12.18.17 Language

int_value LANGUAGE

12.18.18 Main_Canonical_Title

int_value MAIN_CANONICAL_TITLE

12.18.19 Permutation_Pattern

int_value PERMUTATION_PATTERN

12.18.20 Person

int_value PERSON
12.18.21 Physical_Description
int_value PHYSICAL_DESCRIPTION [Tokens]

12.18.22 Publisher
int_value PUBLISHER [Tokens]

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int_value RECORD [Tokens]

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int_value REMOTE_ACCESS [Tokens]

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int_value RIGHTS [Tokens]

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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]

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int_value TYPE [Tokens]
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