Αρχές Γλωσσών Προγραμματισμού & Μεταφραστών

Τμήμα Μηχανικών Η/Υ & Πληροφορικής

Πανεπιστήμιο Πατρών

Ακαδημαικό Έτος 2018-2019

Εργαστηριακή Άσκηση

Χαραλαμπόπουλος Παναγιώτης

ΑΜ: 5681

Ερώτημα 1)

i) Συντακτικός ορισμός της γραμματικής της γλωσσας σε μορφή BNF

<workbook> ::= BEGIN_WORKBOOK CLOSETAG <styles> <worksheet> END_WORKBOOK CLOSETAG

   | <comments> BEGIN_WORKBOOK CLOSETAG <styles> <worksheet> END_WORKBOOK CLOSETAG

   | BEGIN_WORKBOOK CLOSETAG <styles> <worksheet> END_WORKBOOK CLOSETAG <comments>

   | <comments> BEGIN_WORKBOOK CLOSETAG <styles> <worksheet> END_WORKBOOK CLOSETAG <comments>

   | BEGIN_WORKBOOK CLOSETAG <comments> <styles> <worksheet> END_WORKBOOK CLOSETAG

   | <comments> BEGIN_WORKBOOK CLOSETAG <comments> <styles> <worksheet> END_WORKBOOK CLOSETAG

   | BEGIN_WORKBOOK CLOSETAG <comments> <styles> <worksheet> END_WORKBOOK CLOSETAG <comments>

   | <comments> BEGIN_WORKBOOK CLOSETAG <comments> <styles> <worksheet> END_WORKBOOK CLOSETAG <comments>

<styles> ::= /*empty*/

   | <styles> BEGIN_STYLES CLOSETAG <style> END_STYLES CLOSETAG <comments>

   | <styles> BEGIN_STYLES CLOSETAG <style> END_STYLES CLOSETAG

   | <styles> BEGIN_STYLES CLOSETAG <style> <comments> END_STYLES CLOSETAG <comments>

   | <styles> BEGIN_STYLES CLOSETAG <style> <comments> END_STYLES CLOSETAG

<style> ::= /*empty*/

    | <style> BEGIN_STYLE ID_EQUALS_QUOTE ID_STRING QUOTE CLOSETAG END_STYLE CLOSETAG

    | <style> <comments> BEGIN_STYLE ID_EQUALS_QUOTE ID_STRING QUOTE CLOSETAG END_STYLE CLOSETAG

    | <style> BEGIN_STYLE ID_EQUALS_QUOTE ID_STRING QUOTE CLOSETAG <comments> END_STYLE CLOSETAG

    | <style> <comments> BEGIN_STYLE ID_EQUALS_QUOTE ID_STRING QUOTE CLOSETAG <comments> END_STYLE CLOSETAG

<worksheet> ::= <worksheet_cont>

    | <worksheet> <worksheet_cont>

<worksheet_cont> ::= BEGIN_WORKSHEET <worksheet_attr> CLOSETAG <table> END_WORKSHEET CLOSETAG

    | BEGIN_WORKSHEET <worksheet_attr> CLOSETAG <table> END_WORKSHEET CLOSETAG <comments>

    | BEGIN_WORKSHEET <worksheet_attr> CLOSETAG <comments> <table> END_WORKSHEET CLOSETAG

    | BEGIN_WORKSHEET <worksheet_attr> CLOSETAG <comments> <table> END_WORKSHEET CLOSETAG <comments>

<worksheet_attr> ::= <name> <protected>

    | <protected> <name>

    | <name>

<name> ::= NAME_EQUALS_QUOTE STRING QUOTE

<protected> ::= PROTECTED_EQUALS_QUOTE BOOLEAN QUOTE

<table> ::= /*empty*/

    | <table> BEGIN_TABLE <table_attr> CLOSETAG <table_elements> END_TABLE CLOSETAG

    | <table> BEGIN_TABLE <table_attr> CLOSETAG <table_elements> END_TABLE CLOSETAG <comments>

| <table> BEGIN_TABLE <table_attr> CLOSETAG <comments> <table_elements> END_TABLE CLOSETAG

| <table> BEGIN_TABLE <table_attr> CLOSETAG <comments> <table_elements> END_TABLE CLOSETAG <comments>

<table_attr> ::= /*empty*/

    | <expcolcount>

    | <exprowcount>

    | <styleid>

    | <expcolcount> <exprowcount>

    | <exprowcount> <expcolcount>

    | <expcolcount> <styleid>

    | <styleid> <expcolcount>

    | <exprowcount> <styleid>

    | <styleid> <exprowcount>

    | <expcolcount> <exprowcount> <styleid>

    | <expcolcount> <styleid> <exprowcount>

    | <exprowcount> <expcolcount> <styleid>

    | <exprowcount> <styleid> <expcolcount>

    | <styleid> <exprowcount> <expcolcount>

    | <styleid> <expcolcount> <exprowcount>

<expcolcount> ::= EXPANDEDCOLUMNCOUNT_EQUALS_QUOTE POSITIVE_INT QUOTE

<exprowcount> ::= EXPANDEDROWCOUNT_EQUALS_QUOTE POSITIVE_INT QUOTE

<styleid> ::= STYLEID_EQUALS_QUOTE ID_STRING QUOTE

<table_elements> ::= /*empty*/

    | <column>

    | <row>

    | <column> <row>

<column> ::= BEGIN_COLUMN <column_attr> SELFCLOSINGTAG

| <column> BEGIN_COLUMN <column_attr> SELFCLOSINGTAG

| BEGIN_COLUMN <column_attr> SELFCLOSINGTAG <comments>

| <column> BEGIN_COLUMN <column_attr> SELFCLOSINGTAG <comments>

<column_attr> ::= /*empty*/

　　| <hidden>

　　| <width>

　　| <styleid>

　　| <hidden> <width>

　　| <width> <hidden>

　　| <hidden> <styleid>

　　| <styleid> <hidden>

　　| <width> <styleid>

　　| <styleid> <width>

　　| <hidden> <width> <styleid>

　　| <hidden> <styleid> <width>

　　| <width> <hidden> <styleid>

　　| <width> <styleid> <hidden>

　　| <styleid> <width> <hidden>

　　| <styleid> <hidden> <width>

<hidden> ::= HIDDEN_EQUALS_QUOTE BOOLEAN QUOTE

<width> ::= WIDTH_EQUALS_QUOTE POSITIVE_INT QUOTE

<row> ::= BEGIN_ROW <row_attr> CLOSETAG <cell> END_ROW CLOSETAG

　| <row> BEGIN_ROW <row_attr> CLOSETAG <cell> END_ROW CLOSETAG

　| BEGIN_ROW <row_attr> CLOSETAG <cell> END_ROW CLOSETAG <comments>

　| <row> BEGIN_ROW <row_attr> CLOSETAG <cell> END_ROW CLOSETAG <comments>

　| BEGIN_ROW <row_attr> CLOSETAG <comments> <cell> END_ROW CLOSETAG

　| <row> BEGIN_ROW <row_attr> CLOSETAG <comments> <cell> END_ROW CLOSETAG

　| BEGIN_ROW <row_attr> CLOSETAG <comments> <cell> END_ROW CLOSETAG <comments>

| <row> BEGIN_ROW <row_attr> CLOSETAG <comments> <cell> END_ROW CLOSETAG <comments>

<row_attr> ::= /*empty*/

    | <hidden>

    | <height>

    | <styleid>

    | <hidden> <height>

    | <height> <hidden>

    | <hidden> <styleid>

    | <styleid> <hidden>

    | <height> <styleid>

    | <styleid> <height>

    | <hidden> <height> <styleid>

    | <hidden> <styleid> <height>

    | <height> <hidden> <styleid>

    | <height> <styleid> <hidden>

    | <styleid> <height> <hidden>

    | <styleid> <hidden> <height>

<height> ::= HEIGHT_EQUALS_QUOTE POSITIVE_INT QUOTE

<cell> ::= /*empty*/

    | <cell> BEGIN_CELL <cell_attr> CLOSETAG <data> END_CELL CLOSETAG

    | <cell> BEGIN_CELL <cell_attr> CLOSETAG <data> END_CELL CLOSETAG <comments>

    | <cell> BEGIN_CELL <cell_attr> CLOSETAG <comments> <data> END_CELL CLOSETAG

    | <cell> BEGIN_CELL <cell_attr> CLOSETAG <comments> <data> END_CELL CLOSETAG <comments>

<cell_attr> ::= /*empty*/

    | <mergedown>

    | <mergeacross>

    | <styleid>

    | <mergedown> <mergeacross>

| <mergeacross> <mergedown>

　　| <mergedown> <styleid>

　　| <styleid> <mergedown>

　　| <mergeacross> <styleid>

　　| <styleid> <mergeacross>

　　| <mergedown> <mergeacross> <styleid>

　　| <mergedown> <styleid> <mergeacross>

　　| <mergeacross> <mergedown> <styleid>

　　| <mergeacross> <styleid> <mergedown>

　　| <styleid> <mergeacross> <mergedown>

　　| <styleid> <mergedown> <mergeacross>

<mergedown> ::= MERGEDOWN_EQUALS_QUOTE POSITIVE_INT QUOTE

<mergeacross> ::= MERGEACROSS_EQUALS_QUOTE POSITIVE_INT QUOTE

<data> ::= /*empty*/

　　| <data> BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG DATA_TEXT ENDOPENTAG DATA CLOSETAG

　　| <data> BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG DATA_TEXT ENDOPENTAG DATA CLOSETAG <comments>

　　| <data> BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG <comments> DATA_TEXT ENDOPENTAG DATA CLOSETAG

　　| <data> BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG DATA_TEXT <comments> ENDOPENTAG DATA CLOSETAG

　　| <data> BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG <comments> DATA_TEXT <comments> ENDOPENTAG DATA CLOSETAG

　　| <data> BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG <comments> DATA_TEXT ENDOPENTAG DATA CLOSETAG <comments>

　　| <data> BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG DATA_TEXT <comments> ENDOPENTAG DATA CLOSETAG <comments>

　　| <data> BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG <comments> DATA_TEXT <comments> ENDOPENTAG DATA CLOSETAG <comments>

<comments> ::= OPEN_COMMMENTS COMMENTS CLOSE_COMMMENTS

　　　| <comments> OPEN_COMMMENTS COMMENTS CLOSE_COMMMENTS

ii) Υλοποίηση parser με τη βοήθεια των προγραμμάτων Flex και Bison

Ο κώδικας των τελικών αρχείων περιγραφής της γλώσσας που δίνονται ως είσοδος στα Flex και Bison δίνονται παρακάτω :

Για το αρχείο Flex :

```c
%{
#include <stdbool.h>
#include "y.tab.h"
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <ctype.h>
#define STYLE 0
#define STYLEID 1
#define IS_EXPROWCOUNT 0
#define IS_EXPCOLCOUNT 1

typedef struct {
  char **array;
  size_t used;
  size_t size;
} Array;

void initialize_array(Array *a,int  size);
void free_array(Array *a);
void insert_array(Array *a, char *str);
void remove_spaces(char* source);
void yyerror (char *s);
int styleid_error=0;
Array ssid;
int counter = 1 ;
int flag;
int row_num=0;
int col_num=0;
int exprowcount_num=0;
int expcolcount_num=0;
```

```
int exprowcount_exist=0;
int expcolcount_exist=0;
int flag_2;
char * datatype;
%}
%option noyywrap
%option yylineno
quote \"
boolean (True|False|true|false|0|1)
ws [ \t\r\n]
whitespaces [ \t\r\n]+
positive_int [1-9]([0-9])*
str [^\"<&/\\?*\[\]:]*
id_str [^\"<&/\\?*\[\]:]*


data_type (Number|DateTime|Boolean|String)
%x comments
%x inside_boolean
%x inside_pos_int
%x inside_str
%x inside_id_str
%x inside_data_type
%x inside_data_tag
%x inside_data_content
%x comments_ins
%%

"<"{whitespaces}?"ss:Workbook"  {char* src = strdup(yytext);
remove_spaces(src);printf("%s",src); return BEGIN_WORKBOOK;}
"<"{whitespaces}?"ss:Worksheet" {char* src = strdup(yytext);
remove_spaces(src);printf("\n\t%s",src); return
BEGIN_WORKSHEET;}
"<"{whitespaces}?"ss:Styles"    {char* src = strdup(yytext);
remove_spaces(src);printf("\n\t%s",src); return
BEGIN_STYLES;}
```

```
"<"{whitespaces}?"ss:Style"      {char* src = strdup(yytext);
remove_spaces(src);printf("\n\t\t%s",src); return
BEGIN_STYLE;}
"<"{whitespaces}?"ss:Table"      {char* src = strdup(yytext);
remove_spaces(src);printf("\n\t\t%s",src); return
BEGIN_TABLE;}
"<"{whitespaces}?"ss:Column"     {char* src = strdup(yytext);
remove_spaces(src);printf("\n\t\t\t%s",src);col_num++;
return BEGIN_COLUMN; }
"<"{whitespaces}?"ss:Row"        {char* src = strdup(yytext);
remove_spaces(src);printf("\n\t\t\t%s",src);row_num++;
return BEGIN_ROW; }
"<"{whitespaces}?"ss:Cell"       {char* src = strdup(yytext);
remove_spaces(src);printf("\n\t\t\t\t%s",src); return
BEGIN_CELL;}
"<"{whitespaces}?"ss:Data"       {char* src = strdup(yytext);
remove_spaces(src);printf("\n\t\t\t\t\t%s",src); return
BEGIN_DATA;}
"</"{whitespaces}?"ss:Workbook"  {char* src =
strdup(yytext);  remove_spaces(src);printf("\n%s",src);
return END_WORKBOOK;}
"</"{whitespaces}?"ss:Worksheet" {char* src =
strdup(yytext);  remove_spaces(src);printf("\n\t%s",src);
return END_WORKSHEET;}
"</"{whitespaces}?"ss:Styles"    {char* src =
strdup(yytext);  remove_spaces(src);printf("\n\t%s",src);
return END_STYLES;}
"</"{whitespaces}?"ss:Style"     {char* src =
strdup(yytext);  remove_spaces(src);printf("%s",src); return
END_STYLE;}
"</"{whitespaces}?"ss:Table"     {char* src =
strdup(yytext);  remove_spaces(src);printf("\n\t\t%s",src);

if (exprowcount_exist) {
  if (exprowcount_num != row_num) {
```

```
        fprintf(stdout, "\n\n---- ERROR FOUND.
ss:ExpandedRowCount VALUE MUST AGREE WITH THE NUMBER OF ROWS
----");
        return *yytext;
    }
}
if (expcolcount_exist) {
    if (expcolcount_num != col_num) {
        fprintf(stdout, "\n\n---- ERROR FOUND.
ss:ExpandedColumnCount VALUE MUST AGREE WITH THE NUMBER OF
COLUMNS ----");
        return *yytext;
    }
}
row_num=0;col_num=0;exprowcount_num=0;expcolcount_num=0;expr
owcount_exist=0;expcolcount_exist=0;
return END_TABLE;
}
"</"{whitespaces}?"ss:Row"        {char* src =
strdup(yytext);
remove_spaces(src);printf("\n\t\t\t%s",src); return
END_ROW;}
"</"{whitespaces}?"ss:Cell"       {char* src =
strdup(yytext);
remove_spaces(src);printf("\n\t\t\t\t%s",src); return
END_CELL;}
"ss:Data"      {printf("%s",yytext); return DATA;}
">"            {printf("%s",yytext); return CLOSETAG;}
"/>"           {printf("%s",yytext); return SELFCLOSINGTAG;}
"ss:ID"{whitespaces}?"="{whitespaces}?{quote} {flag = STYLE
;BEGIN(inside_id_str);
char* src = strdup(yytext);  remove_spaces(src);printf("
%s",src); return ID_EQUALS_QUOTE;}
"ss:Name"{whitespaces}?"="{whitespaces}?{quote}
{BEGIN(inside_str);
char* src = strdup(yytext);  remove_spaces(src);printf("
%s",src); return NAME_EQUALS_QUOTE;}
```

```
"ss:Protected"{whitespaces}?"="{whitespaces}?{quote}/{boolea
n} {BEGIN(inside_boolean);
char* src = strdup(yytext);  remove_spaces(src);printf("
%s",src); return PROTECTED_EQUALS_QUOTE;}
"ss:StyleID"{whitespaces}?"="{whitespaces}?{quote}/{id_str}
{flag = STYLEID ; BEGIN(inside_id_str);
char* src = strdup(yytext);  remove_spaces(src);printf("
%s",src); return STYLEID_EQUALS_QUOTE;}
"ss:Hidden"{whitespaces}?"="{whitespaces}?{quote}/{boolean}
{BEGIN(inside_boolean);
char* src = strdup(yytext);  remove_spaces(src);printf("
%s",src); return HIDDEN_EQUALS_QUOTE;}
"ss:ExpandedRowCount"{whitespaces}?"="{whitespaces}?{quote}/
{positive_int} {exprowcount_exist = 1;flag_2 =
IS_EXPROWCOUNT;BEGIN(inside_pos_int);
char* src = strdup(yytext);  remove_spaces(src);printf("
%s",src); return EXPANDEDROWCOUNT_EQUALS_QUOTE;}
"ss:ExpandedColumnCount"{whitespaces}?"="{whitespaces}?{quot
e}/{positive_int} {expcolcount_exist = 1;flag_2 =
IS_EXPCOLCOUNT; BEGIN(inside_pos_int);
char* src = strdup(yytext);  remove_spaces(src);printf("
%s",src); return EXPANDEDCOLUMNCOUNT_EQUALS_QUOTE;}
"ss:Width"{whitespaces}?"="{whitespaces}?{quote}/{positive_i
nt} {BEGIN(inside_pos_int);
char* src = strdup(yytext);  remove_spaces(src);printf("
%s",src); return WIDTH_EQUALS_QUOTE;}
"ss:Height"{whitespaces}?"="{whitespaces}?{quote}/{positive_
int} {BEGIN(inside_pos_int);
char* src = strdup(yytext);  remove_spaces(src);printf("
%s",src); return HEIGHT_EQUALS_QUOTE;}
"ss:MergeAcross"{whitespaces}?"="{whitespaces}?{quote}/{posi
tive_int} {BEGIN(inside_pos_int);
char* src = strdup(yytext);  remove_spaces(src);printf("
%s",src); return MERGEACROSS_EQUALS_QUOTE;}
"ss:MergeDown"{whitespaces}?"="{whitespaces}?{quote}/{positi
ve_int} {BEGIN(inside_pos_int);
```

```
char* src = strdup(yytext);  remove_spaces(src);printf("
%s",src); return MERGEDOWN_EQUALS_QUOTE;}
"ss:Type"{whitespaces}?"="{whitespaces}?{quote}/{data_type}
{BEGIN(inside_data_type);
char* src = strdup(yytext);  remove_spaces(src);printf("
%s",src); return TYPE_EQUALS_QUOTE;}

"<!--" {BEGIN(comments); printf("%s",yytext);
return OPEN_COMMMENTS;}
<comments>([^-]|-[^-])* {
      printf("%s",yytext);
      yylval.str = strdup(yytext);
      return COMMENTS;
}
<comments>"--" { return *yytext; }
<comments>"-->" {BEGIN(INITIAL);
  printf("%s",yytext);
return CLOSE_COMMMENTS; }

<inside_id_str>{id_str} {
      if (flag == STYLE ) {
        if (counter == 1) {

          initialize_array(&ssid,strlen(strdup(yytext)));
          insert_array(&ssid,strdup(yytext));
          counter++;
        }
        else {
          int equals = 0;
          for (int i =0;i<ssid.size;i++) {
            if (!strcmp(ssid.array[i],strdup(yytext))) {
              equals = 1;
            }
          }
          if (!equals) {
            insert_array(&ssid,strdup(yytext));
          } else {
```

```
            fprintf(stdout, "\n\n---- ERROR FOUND. ss:ID
VALUE MUST BE UNIQUE ----");
            free_array(&ssid);
            return *yytext;
        }
      }
    }
    else if(flag == STYLEID) {
      int equals1 = 0;
      for (int i =0;i<ssid.size;i++) {
        if (!strcmp(ssid.array[i],strdup(yytext))) {
          equals1 = 1;
        }
      }
      if (!equals1) {
        fprintf(stdout, "\n\n---- ERROR FOUND. ss:ID WITH
ss:StyleID VALUE NOT FOUND ----");
        free_array(&ssid);
        return *yytext;
      }


    }
    printf("%s",yytext);
    yylval.str = strdup(yytext);
    return ID_STRING;
}
<inside_id_str>[<&/\\?*\[\]:] { return *yytext; }
<inside_id_str>{quote} {BEGIN(INITIAL);printf("%s",yytext);
return QUOTE;}

<inside_str>{str} {
    printf("%s",yytext);
    yylval.str = strdup(yytext);
    return STRING;
}
<inside_str>[<&/\\?*\[\]:] { return *yytext; }
```

```
<inside_str>{quote} {BEGIN(INITIAL);printf("%s",yytext);
return QUOTE;  }

<inside_boolean>{boolean}/{quote} {
      printf("%s",yytext);
      yylval.boolean = strdup(yytext);
      return BOOLEAN;
}
<inside_boolean>{quote} {BEGIN(INITIAL);printf("%s",yytext);
return QUOTE; }

<inside_pos_int>{positive_int}/{quote} {
      if (flag_2 == IS_EXPROWCOUNT) {
        exprowcount_num = atoi(strdup(yytext));

      }
      else if (flag_2 == IS_EXPCOLCOUNT) {
        expcolcount_num = atoi(strdup(yytext));
      }

      printf("%s",yytext);
      yylval.num = atoi(strdup(yytext));
      return POSITIVE_INT;
}
<inside_pos_int>{quote} {BEGIN(INITIAL);printf("%s",yytext);
return QUOTE;  }

<inside_data_type>{data_type}/{quote} {
      printf("%s",yytext);
      datatype = strdup(yytext);
      yylval.str = strdup(yytext);
      return DATA_TYPE;
}
<inside_data_type>{quote}
{BEGIN(inside_data_tag);printf("%s",yytext);
return QUOTE; }
```

```
<inside_data_tag>{whitespaces}?">" {
BEGIN(inside_data_content);printf("%s",yytext);
      return CLOSETAG;
}
<inside_data_tag>[^> \t\r\n] {  return *yytext;
}

<inside_data_content>"<!--"
{BEGIN(comments_ins);printf("%s",yytext);
return OPEN_COMMMENTS;}
<comments_ins>([^-]|-[^-])* {
      printf("%s",yytext);
      yylval.str = strdup(yytext);
      return COMMENTS;
}
<comments_ins>"--" { return *yytext; }
<comments_ins>"-->"
{BEGIN(inside_data_content);printf("%s",yytext);    return
CLOSE_COMMMENTS; }

<inside_data_content>{str} {
      printf("%s",yytext);
      yylval.str = strdup(yytext);
      return DATA_TEXT;
}
<inside_data_content>"</"
{BEGIN(INITIAL);printf("%s",yytext);
return ENDOPENTAG; }

{ws}            ;
. { return *yytext;}

%%
void initialize_array(Array *a,int  size) {
  a->array = malloc(sizeof(char*));
  a->used = 0;
  a->size = 1;
```

```c
    a->array[a->used] = malloc((size+1) * sizeof(char));
}

void insert_array(Array *a, char *str) {
  if (a->used == a->size) {
    a->size +=1;
    a->array = realloc(a->array, a->size * sizeof(char*));
    a->array[a->used] = malloc((strlen(str)+1) *
sizeof(char));
  }
    a->array[a->used++] = str;
}

void free_array(Array *a) {
  free(a->array);
  a->array = NULL;
  a->used = a->size = 0;
}

void remove_spaces(char* source)
{
  char* i = source;
  char* j = source;
  while(*j != 0)
  {
    *i = *j++;
    if(!isspace(*i))
      i++;
  }
  *i = 0;
}
```

Σχόλια:

Σαν αποδεκτές τιμές τύπου Boolean ορίζονται οι «True» , «False» , «true» , «false» , «0» και
«1»

Σαν αποδεκτές τιμές τύπου String (δηλ τα str και id_str) οριζονται ολες οι τιμες εκτός των « " » , «<» , «&» , «/» , «\» , «?» , «*» , «[», «]» , « : » όπως οριζεται στο προτυπο xml .

Για το αρχείο Bison :

```
%{
#include <stdbool.h>
#include <stdlib.h>
#include <stdio.h>
#include <string.h>

void yyerror(char *);
extern int yylineno;
extern int yylex();
extern char* yytext;
extern FILE *yyin;
extern FILE *yyout;
bool error_found = 0;

%}
%union {
   int num;
   char *str;
   bool boolean;
}

%token DATA ENDOPENTAG CLOSETAG  BEGIN_WORKBOOK
BEGIN_WORKSHEET BEGIN_STYLES BEGIN_STYLE BEGIN_TABLE
BEGIN_COLUMN BEGIN_ROW BEGIN_CELL BEGIN_DATA
%token END_WORKBOOK END_WORKSHEET END_STYLES END_STYLE
END_TABLE END_ROW END_CELL
%token SELFCLOSINGTAG ID_EQUALS_QUOTE NAME_EQUALS_QUOTE
PROTECTED_EQUALS_QUOTE STYLEID_EQUALS_QUOTE
%token HIDDEN_EQUALS_QUOTE EXPANDEDROWCOUNT_EQUALS_QUOTE
EXPANDEDCOLUMNCOUNT_EQUALS_QUOTE
%token WIDTH_EQUALS_QUOTE HEIGHT_EQUALS_QUOTE
MERGEACROSS_EQUALS_QUOTE MERGEDOWN_EQUALS_QUOTE
```

```
%token TYPE_EQUALS_QUOTE OPEN_COMMMENTS CLOSE_COMMMENTS
QUOTE
%token <str> COMMENTS  ID_STRING  STRING DATA_TYPE DATA_TEXT
%token <num> POSITIVE_INT
%token <boolean> BOOLEAN
%locations
%%
workbook : BEGIN_WORKBOOK CLOSETAG styles  worksheet
END_WORKBOOK CLOSETAG |
comments BEGIN_WORKBOOK CLOSETAG  styles  worksheet
END_WORKBOOK CLOSETAG |
BEGIN_WORKBOOK CLOSETAG  styles  worksheet  END_WORKBOOK
CLOSETAG comments |
comments BEGIN_WORKBOOK CLOSETAG  styles  worksheet
END_WORKBOOK CLOSETAG comments |
BEGIN_WORKBOOK CLOSETAG comments styles  worksheet
END_WORKBOOK CLOSETAG |
comments BEGIN_WORKBOOK CLOSETAG comments  styles  worksheet
END_WORKBOOK CLOSETAG |
BEGIN_WORKBOOK CLOSETAG comments styles  worksheet
END_WORKBOOK CLOSETAG comments |
comments BEGIN_WORKBOOK CLOSETAG comments styles  worksheet
END_WORKBOOK CLOSETAG comments
styles : /*empty*/ |
styles BEGIN_STYLES CLOSETAG  style  END_STYLES CLOSETAG
comments |
styles BEGIN_STYLES CLOSETAG  style  END_STYLES CLOSETAG |
styles BEGIN_STYLES CLOSETAG  style comments END_STYLES
CLOSETAG comments |
styles BEGIN_STYLES CLOSETAG  style comments END_STYLES
CLOSETAG
style : /*empty*/  |
style BEGIN_STYLE ID_EQUALS_QUOTE ID_STRING QUOTE CLOSETAG
END_STYLE CLOSETAG |
style comments BEGIN_STYLE ID_EQUALS_QUOTE ID_STRING QUOTE
CLOSETAG  END_STYLE CLOSETAG |
```

```
style BEGIN_STYLE ID_EQUALS_QUOTE ID_STRING QUOTE CLOSETAG
comments  END_STYLE CLOSETAG |
style comments BEGIN_STYLE ID_EQUALS_QUOTE ID_STRING QUOTE
CLOSETAG comments END_STYLE CLOSETAG
worksheet : worksheet_cont |
worksheet worksheet_cont
worksheet_cont : BEGIN_WORKSHEET worksheet_attr CLOSETAG
table END_WORKSHEET CLOSETAG  |
BEGIN_WORKSHEET worksheet_attr CLOSETAG table END_WORKSHEET
CLOSETAG comments  |
BEGIN_WORKSHEET worksheet_attr CLOSETAG comments table
END_WORKSHEET CLOSETAG |
BEGIN_WORKSHEET worksheet_attr CLOSETAG comments table
END_WORKSHEET CLOSETAG comments
worksheet_attr : name protected | protected name | name
name : NAME_EQUALS_QUOTE STRING QUOTE
protected : PROTECTED_EQUALS_QUOTE BOOLEAN QUOTE
table : /*empty*/  |  table  BEGIN_TABLE table_attr CLOSETAG
table_elements END_TABLE CLOSETAG  |
table  BEGIN_TABLE table_attr CLOSETAG table_elements
END_TABLE CLOSETAG comments  |
table  BEGIN_TABLE table_attr CLOSETAG comments
table_elements END_TABLE CLOSETAG   |
table  BEGIN_TABLE table_attr CLOSETAG comments
table_elements END_TABLE CLOSETAG comments
table_attr : /*empty*/   | expcolcount  | exprowcount  |
styleid  | expcolcount exprowcount  | exprowcount
expcolcount   |
expcolcount styleid | styleid expcolcount  | exprowcount
styleid  | styleid exprowcount  | expcolcount exprowcount
styleid  |
expcolcount styleid exprowcount  | exprowcount expcolcount
styleid  | exprowcount styleid expcolcount  |
styleid exprowcount expcolcount  | styleid expcolcount
exprowcount
expcolcount : EXPANDEDCOLUMNCOUNT_EQUALS_QUOTE POSITIVE_INT
QUOTE
```

```
exprowcount : EXPANDEDROWCOUNT_EQUALS_QUOTE POSITIVE_INT
QUOTE
styleid : STYLEID_EQUALS_QUOTE ID_STRING QUOTE
table_elements : /*empty*/  |column | row | column row
column : BEGIN_COLUMN column_attr SELFCLOSINGTAG | column
BEGIN_COLUMN column_attr SELFCLOSINGTAG |
BEGIN_COLUMN column_attr SELFCLOSINGTAG comments | column
BEGIN_COLUMN column_attr SELFCLOSINGTAG comments
column_attr : /*empty*/  | hidden | width | styleid | hidden
width | width hidden |
hidden styleid | styleid hidden | width styleid | styleid
width | hidden width styleid |
hidden styleid width | width hidden styleid | width styleid
hidden |
styleid width hidden | styleid hidden width
hidden : HIDDEN_EQUALS_QUOTE BOOLEAN QUOTE
width : WIDTH_EQUALS_QUOTE POSITIVE_INT QUOTE
row : BEGIN_ROW row_attr CLOSETAG cell END_ROW CLOSETAG |
row BEGIN_ROW row_attr CLOSETAG cell END_ROW CLOSETAG |
BEGIN_ROW row_attr CLOSETAG cell END_ROW CLOSETAG comments |
row BEGIN_ROW row_attr CLOSETAG cell END_ROW CLOSETAG
comments |
BEGIN_ROW row_attr CLOSETAG comments cell END_ROW CLOSETAG |
row BEGIN_ROW row_attr CLOSETAG comments cell END_ROW
CLOSETAG |
BEGIN_ROW row_attr CLOSETAG comments cell END_ROW CLOSETAG
comments | row BEGIN_ROW row_attr CLOSETAG comments cell
END_ROW CLOSETAG comments
row_attr : /*empty*/ | hidden | height | styleid | hidden
height | height hidden |
hidden styleid | styleid hidden | height styleid | styleid
height | hidden height styleid |
hidden styleid height | height hidden styleid | height
styleid hidden |
styleid height hidden | styleid hidden height
height : HEIGHT_EQUALS_QUOTE POSITIVE_INT QUOTE
```

```
cell : /*empty*/ | cell BEGIN_CELL cell_attr CLOSETAG data
END_CELL CLOSETAG |
cell BEGIN_CELL cell_attr CLOSETAG data END_CELL CLOSETAG
comments |
cell BEGIN_CELL cell_attr CLOSETAG comments data END_CELL
CLOSETAG |
cell BEGIN_CELL cell_attr CLOSETAG comments data END_CELL
CLOSETAG comments
cell_attr : /*empty*/ | mergedown | mergeacross | styleid |
mergedown mergeacross | mergeacross mergedown |
mergedown styleid | styleid mergedown | mergeacross styleid
| styleid mergeacross | mergedown mergeacross styleid |
mergedown styleid mergeacross | mergeacross mergedown
styleid | mergeacross styleid mergedown |
styleid mergeacross mergedown | styleid mergedown
mergeacross
mergedown : MERGEDOWN_EQUALS_QUOTE POSITIVE_INT QUOTE
mergeacross : MERGEACROSS_EQUALS_QUOTE POSITIVE_INT QUOTE
data : /*empty*/ | data BEGIN_DATA TYPE_EQUALS_QUOTE
DATA_TYPE QUOTE CLOSETAG DATA_TEXT ENDOPENTAG DATA CLOSETAG
|
data BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG
DATA_TEXT ENDOPENTAG DATA CLOSETAG comments |
data BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG
comments DATA_TEXT ENDOPENTAG DATA CLOSETAG |
data BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG
DATA_TEXT comments ENDOPENTAG DATA CLOSETAG |
data BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG
comments DATA_TEXT comments ENDOPENTAG DATA CLOSETAG |
data BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG
comments DATA_TEXT ENDOPENTAG DATA CLOSETAG comments |
data BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG
DATA_TEXT comments ENDOPENTAG DATA CLOSETAG comments |
data BEGIN_DATA TYPE_EQUALS_QUOTE DATA_TYPE QUOTE CLOSETAG
comments DATA_TEXT comments ENDOPENTAG DATA CLOSETAG
comments
comments : OPEN_COMMMENTS COMMMENTS CLOSE_COMMMENTS |
```

```
comments OPEN_COMMMENTS COMMENTS CLOSE_COMMMENTS
%%

void yyerror(char *s) {
    error_found = 1;
    fprintf(stdout, "\n\n---- STOPPED. PARSING WAS
UNSUCCESSFUL. FOUND ERROR AT LINE #%d. %s ----
\n\n",yylineno, s);


}

int main (int argc, char **argv)
{
  ++argv; --argc;
  if ( argc > 0 )
        yyin = fopen( argv[0], "r" );
  else
        yyin = stdin;

  yyparse ();
  if(!error_found) {
        printf("\n\n---- PARSING SUCCESSFULLY COMPLETED. THE
PROGRAM IS VALID. ----\n\n");
  }
  return 0;
}
```

Επιπλέον δημιουργήθηκε ένα αρχείο makefile για την διευκόλυνση του compilation το οποίο παρουσιάζεται παρακάτω :

```
default:
    bison -d -y bison.y
    flex flex.l
    gcc -c y.tab.c lex.yy.c
    gcc y.tab.o lex.yy.o -o parser
```

Για είσοδο το αρχείο inp1.txt :

```
<ss:Workbook>
    <ss:Styles>
        <ss:Style ss:ID="s123"></ss:Style>
        <ss:Style ss:ID="x123"></ss:Style>
    </ss:Styles>
    <ss:Worksheet ss:Name="sheet1">
        <ss:Table ss:ExpandedColumnCount="2">
            <ss:Column ss:StyleID="s123"/>
            <ss:Column ss:StyleID="s123"/>
            <ss:Row>
                <ss:Cell>
                    <ss:Data ss:Type="Number">1234</ss:Data>
                </ss:Cell>
                <ss:Cell>
                    <ss:Data ss:Type="String">string
data</ss:Data>
                </ss:Cell>
            </ss:Row>
        </ss:Table>
    </ss:Worksheet>
</ss:Workbook>
```

Screenshot Αποτελεσμάτων :

Για είσοδο το αρχείο inp2.txt :

```xml
<ss:Workbook>
  <ss:Styles>
    <ss:Style ss:ID="s1">
    </ss:Style>
    <ss:Style  ss:ID="s2">
    </ss:Style>
  </ss:Styles>
  <ss:Worksheet  ss:Name="sheet1" >
    <ss:Table ss:StyleID="s1">
      <ss:Column ss:StyleID="s1"/>
      <ss:Column ss:StyleID ="s1"/>
      <ss:Row>
        <ss:Cell>
          <ss:Data ss:Type="Number">1233</ss:Data>
        </ss:Cell>
        <ss:Cell>
          <ss:Data ss:Type="String">string data</ss:Data>
        </ss:Cell>
      </ss:Row>
      <ss:Row>
      </ss:Row>
    </ss:Table>
    <ss:Table  ss:StyleID="s2">
    </ss:Table>
  </ss:Worksheet>
  <ss:Worksheet  ss:Name="sheet2" ss:Protected="True" >
    <ss:Table ss:StyleID="s2">
      <ss:Column ss:StyleID="s2"/>
      <ss:Column ss:StyleID ="s2"/>
      <ss:Row>
        <ss:Cell>
          <ss:Data ss:Type="Number">1233</ss:Data>
        </ss:Cell>
        <ss:Cell>
          <ss:Data ss:Type="String">string data</ss:Data>
```

```
        </ss:Cell>
      </ss:Row>
      <ss:Row>
      </ss:Row>
    </ss:Table>
    <ss:Table  ss:StyleID="s1">
    </ss:Table>
  </ss:Worksheet>
</ss:Workbook>
```

Screenshot Αποτελεσμάτων :

```
paradox@paradox  ~/latest_check   ./parser inp2.txt
<ss:Workbook>
        <ss:Styles>
                <ss:Style ss:ID="s1"></ss:Style>
                <ss:Style ss:ID="s2"></ss:Style>
        </ss:Styles>
        <ss:Worksheet ss:Name="sheet1">
                <ss:Table ss:StyleID="s1">
                        <ss:Column ss:StyleID="s1"/>
                        <ss:Column ss:StyleID="s1"/>
                        <ss:Row>
                                <ss:Cell>
                                        <ss:Data ss:Type="Number">1233</ss:Data>
                                </ss:Cell>
                                <ss:Cell>
                                        <ss:Data ss:Type="String">string data</ss:Data>
                                </ss:Cell>
                        </ss:Row>
                        <ss:Row>
                        </ss:Row>
                </ss:Table>
                <ss:Table ss:StyleID="s2">
                </ss:Table>
        </ss:Worksheet>
        <ss:Worksheet ss:Name="sheet2" ss:Protected="True">
                <ss:Table ss:StyleID="s2">
                        <ss:Column ss:StyleID="s2"/>
                        <ss:Column ss:StyleID="s2"/>
                        <ss:Row>
                                <ss:Cell>
                                        <ss:Data ss:Type="Number">1233</ss:Data>
                                </ss:Cell>
                                <ss:Cell>
                                        <ss:Data ss:Type="String">string data</ss:Data>
                                </ss:Cell>
                        </ss:Row>
                        <ss:Row>
                        </ss:Row>
                </ss:Table>
                <ss:Table ss:StyleID="s1">
                </ss:Table>
        </ss:Worksheet>
</ss:Workbook>

---- PARSING SUCCESSFULLY COMPLETED. THE PROGRAM IS VALID. ----

paradox@paradox  ~/latest_check
```

Για είσοδο το αρχείο inp3.txt :

Εδώ παραλείφθηκε το open tag του ss:Styles οποτε αναμένεται να εμφανιστεί μήνυμα λάθους.

```xml
<ss:Workbook>
    <ss:Style ss:ID="s1">
    </ss:Style>
    <ss:Style  ss:ID="s2">
    </ss:Style>
  </ss:Styles>
  <ss:Worksheet  ss:Name="sheet1" >
    <ss:Table ss:StyleID="s1">
      <ss:Column ss:StyleID="s1"/>
      <ss:Column ss:StyleID ="s1"/>
      <ss:Row>
        <ss:Cell>
          <ss:Data ss:Type="Number">1233</ss:Data>
        </ss:Cell>
        <ss:Cell>
          <ss:Data ss:Type="String">string data</ss:Data>
        </ss:Cell>
      </ss:Row>
      <ss:Row>
      </ss:Row>
    </ss:Table>
    <ss:Table  ss:StyleID="s2">
    </ss:Table>
  </ss:Worksheet>
  <ss:Worksheet  ss:Name="sheet2" ss:Protected="True" >
    <ss:Table ss:StyleID="s2">
      <ss:Column ss:StyleID="s2"/>
      <ss:Column ss:StyleID ="s2"/>
      <ss:Row>
        <ss:Cell>
          <ss:Data ss:Type="Number">1233</ss:Data>
        </ss:Cell>
        <ss:Cell>
          <ss:Data ss:Type="String">string data</ss:Data>
        </ss:Cell>
```

```
        </ss:Row>
        <ss:Row>
        </ss:Row>
      </ss:Table>
      <ss:Table  ss:StyleID="s1">
      </ss:Table>
    </ss:Worksheet>
</ss:Workbook>
```

Screenshot Αποτελεσμάτων :

```
paradox@paradox  ~/latest_check  ./parser inp3.txt
<ss:Workbook>
              <ss:Style

---- STOPPED. PARSING WAS UNSUCCESSFUL. FOUND ERROR AT LINE #3. syntax error ----

paradox@paradox  ~/latest_check  |
```

Για είσοδο το αρχείο inp4.txt :

Εδώ τέθηκε το ss:Protected="a" οποτε αναμένεται να εμφανιστεί μήνυμα λάθους.

```
<ss:Workbook>
  <ss:Styles>
    <ss:Style ss:ID="s1">
    </ss:Style>
    <ss:Style  ss:ID="s2">
    </ss:Style>
  </ss:Styles>
  <ss:Worksheet  ss:Name="sheet1" >
    <ss:Table ss:StyleID="s1">
      <ss:Column ss:StyleID="s1"/>
      <ss:Column ss:StyleID ="s1"/>
      <ss:Row>
        <ss:Cell>
          <ss:Data ss:Type="Number">1233</ss:Data>
        </ss:Cell>
        <ss:Cell>
          <ss:Data ss:Type="String">string data</ss:Data>
        </ss:Cell>
      </ss:Row>
```

```
      <ss:Row>
      </ss:Row>
    </ss:Table>
    <ss:Table  ss:StyleID="s2">
    </ss:Table>
  </ss:Worksheet>
  <ss:Worksheet  ss:Name="sheet2" ss:Protected="a" >
    <ss:Table ss:StyleID="s2">
      <ss:Column ss:StyleID="s2"/>
      <ss:Column ss:StyleID ="s2"/>
      <ss:Row>
        <ss:Cell>
          <ss:Data ss:Type="Number">1233</ss:Data>
        </ss:Cell>
        <ss:Cell>
          <ss:Data ss:Type="String">string data</ss:Data>
        </ss:Cell>
      </ss:Row>
      <ss:Row>
      </ss:Row>
    </ss:Table>
    <ss:Table  ss:StyleID="s1">
    </ss:Table>
  </ss:Worksheet>
</ss:Workbook>
```

Screenshot Αποτελεσμάτων :

Στην επομενη σελιδα

```
paradox@paradox  ~/latest_check  ./parser inp4.txt
<ss:Workbook>
    <ss:Styles>
        <ss:Style ss:ID="s1"></ss:Style>
        <ss:Style ss:ID="s2"></ss:Style>
    </ss:Styles>
    <ss:Worksheet ss:Name="sheet1">
        <ss:Table ss:StyleID="s1">
            <ss:Column ss:StyleID="s1"/>
            <ss:Column ss:StyleID="s1"/>
            <ss:Row>
                <ss:Cell>
                    <ss:Data ss:Type="Number">1233</ss:Data>
                </ss:Cell>
                <ss:Cell>
                    <ss:Data ss:Type="String">string data</ss:Data>
                </ss:Cell>
            </ss:Row>
            <ss:Row>
            </ss:Row>
        </ss:Table>
        <ss:Table ss:StyleID="s2">
        </ss:Table>
    </ss:Worksheet>
    <ss:Worksheet ss:Name="sheet2"

---- STOPPED. PARSING WAS UNSUCCESSFUL. FOUND ERROR AT LINE #26. syntax error ----

paradox@paradox  ~/latest_check  |
```

Ερώτημα 2)

i)Η εξοδος του προγραμματος για την περιπτωση που το κειμενο εισοδου χρησιμοποιεί μοναδικές τιμές στα ss:ID φάνηκε στο screenshot για εισοδο το inp1.txt

Εδώ παρουσιαζονται τα αποτελεσματα για κείμενο εισόδου το οποίο δεν χρησιμοποιει μοναδικες τιμές στα ss:ID

Για είσοδο το αρχείο inp5.txt :

```
<ss:Workbook>
    <ss:Styles>
        <ss:Style ss:ID="s123"></ss:Style>
        <ss:Style ss:ID="s123"></ss:Style>
    </ss:Styles>
    <ss:Worksheet ss:Name="sheet1">
        <ss:Table ss:ExpandedColumnCount="2">
            <ss:Column ss:StyleID="s123"/>
            <ss:Column ss:StyleID="s123"/>
            <ss:Row>
                <ss:Cell>
                    <ss:Data ss:Type="Number">1234</ss:Data>
                </ss:Cell>
```

```
                <ss:Cell>
                    <ss:Data ss:Type="String">string
data</ss:Data>
                </ss:Cell>
            </ss:Row>
        </ss:Table>
    </ss:Worksheet>
</ss:Workbook>
```

Screenshot Αποτελεσμάτων :

```
paradox@paradox  ~/latest_check  ./parser inp5.txt
<ss:Workbook>
        <ss:Styles>
                <ss:Style ss:ID="s123"></ss:Style>
                <ss:Style ss:ID="

---- ERROR FOUND. ss:ID VALUE MUST BE UNIQUE ----

---- STOPPED. PARSING WAS UNSUCCESSFUL. FOUND ERROR AT LINE #4. syntax error ----

paradox@paradox  ~/latest_check  |
```

ii) Η εξοδος του προγραμματος για την περιπτωση που το κειμενο εισοδου χρησιμοποιεί τιμές στα ss:StyleID ιδιες με αυτές στα ss:ID φάνηκε στο screenshot για εισοδο το inp1.txt

Εδώ παρουσιαζονται τα αποτελεσματα για κείμενο εισόδου το οποίο δεν χρησιμοποιει στα ss:StyleID ιδιες τιμές με τα ss:ID

Για είσοδο το αρχείο inp6.txt :

```
<ss:Workbook>
    <ss:Styles>
        <ss:Style ss:ID="s123"></ss:Style>
        <ss:Style ss:ID="x123"></ss:Style>
    </ss:Styles>
    <ss:Worksheet ss:Name="sheet1">
        <ss:Table ss:ExpandedColumnCount="2">
            <ss:Column ss:StyleID="s"/>
            <ss:Column ss:StyleID="s123"/>
            <ss:Row>
                <ss:Cell>
                    <ss:Data ss:Type="Number">1234</ss:Data>
                </ss:Cell>
                <ss:Cell>
```

```
                      <ss:Data ss:Type="String">string
data</ss:Data>
                  </ss:Cell>
              </ss:Row>
          </ss:Table>
      </ss:Worksheet>
</ss:Workbook>
```

Screenshot Αποτελεσμάτων :

iii) Η εξοδος του προγραμματος για την περιπτωση όπου η τιμή του ss:ExpandedColumnCount συμφωνεί με τον αριθμό των <ss:Column/> φάνηκε στο screenshot για εισοδο το inp1.txt

Εδώ παρουσιαζονται τα αποτελεσματα για κείμενο εισόδου στο οποίο η τιμή του ss:ExpandedColumnCount δεν συμφωνεί με τον αριθμό των <ss:Column/>

Για είσοδο το αρχείο inp7.txt :

```
<ss:Workbook>
    <ss:Styles>
        <ss:Style ss:ID="s123"></ss:Style>
        <ss:Style ss:ID="x123"></ss:Style>
    </ss:Styles>
    <ss:Worksheet ss:Name="sheet1">
        <ss:Table ss:ExpandedColumnCount="1">
            <ss:Column ss:StyleID="s123"/>
            <ss:Column ss:StyleID="s123"/>
            <ss:Row>
                <ss:Cell>
                    <ss:Data ss:Type="Number">1234</ss:Data>
```

```
                </ss:Cell>
                <ss:Cell>
                    <ss:Data ss:Type="String">string
data</ss:Data>
                </ss:Cell>
            </ss:Row>
        </ss:Table>
    </ss:Worksheet>
</ss:Workbook>
```

Screenshot Αποτελεσμάτων :


```
paradox@paradox  ~/latest_check  ./parser inp7.txt
<ss:Workbook>
        <ss:Styles>
                <ss:Style ss:ID="s123"></ss:Style>
                <ss:Style ss:ID="x123"></ss:Style>
        </ss:Styles>
        <ss:Worksheet ss:Name="sheet1">
                <ss:Table ss:ExpandedColumnCount="1">
                        <ss:Column ss:StyleID="s123"/>
                        <ss:Column ss:StyleID="s123"/>
                        <ss:Row>
                                <ss:Cell>
                                        <ss:Data ss:Type="Number">1234</ss:Data>
                                </ss:Cell>
                                <ss:Cell>
                                        <ss:Data ss:Type="String">string data</ss:Data>
                                </ss:Cell>
                        </ss:Row>
                </ss:Table

---- ERROR FOUND. ss:ExpandedColumnCount VALUE MUST AGREE WITH THE NUMBER OF COLUMNS ----

---- STOPPED. PARSING WAS UNSUCCESSFUL. FOUND ERROR AT LINE #18. syntax error ----

paradox@paradox  ~/latest_check
```

Για είσοδο το αρχείο inp10.txt :

Εδώ εχουν δωθει σωστες τιμες στα ss:ExpandedColumnCount και ss:ExpandedRowCount στο πρώτο <ss:Table> αλλα λάθος τιμη για το ss:ExpandedColumnCount στο δευτερο <ss:Table>

```
<ss:Workbook>
    <ss:Styles>
        <ss:Style ss:ID="s123"></ss:Style>
        <ss:Style ss:ID="x123"></ss:Style>
    </ss:Styles>
    <ss:Worksheet ss:Name="sheet1">
        <ss:Table ss:ExpandedColumnCount="2"
ss:ExpandedRowCount="1">
            <ss:Column ss:StyleID="s123"/>
```

```
            <ss:Column ss:StyleID="s123"/>
            <ss:Row>
                <ss:Cell>
                    <ss:Data ss:Type="Number">1234</ss:Data>
                </ss:Cell>
                <ss:Cell>
                    <ss:Data ss:Type="String">string
data</ss:Data>
                </ss:Cell>
            </ss:Row>
        </ss:Table>
        <ss:Table ss:ExpandedColumnCount="1"
ss:ExpandedRowCount="1">
            <ss:Column ss:StyleID="s123"/>
            <ss:Column ss:StyleID="s123"/>
            <ss:Row>
                <ss:Cell>
                    <ss:Data ss:Type="Number">1234</ss:Data>
                </ss:Cell>
                <ss:Cell>
                    <ss:Data ss:Type="String">string
data</ss:Data>
                </ss:Cell>
            </ss:Row>
        </ss:Table>
    </ss:Worksheet>
</ss:Workbook>
```

Screenshot Αποτελεσμάτων :

Στην επομενη σελιδα

```
paradox@paradox  ~/latest_check  ./parser inp10.txt
<ss:Workbook>
        <ss:Styles>
                <ss:Style ss:ID="s123"></ss:Style>
                <ss:Style ss:ID="x123"></ss:Style>
        </ss:Styles>
        <ss:Worksheet ss:Name="sheet1">
                <ss:Table ss:ExpandedColumnCount="2" ss:ExpandedRowCount="1">
                        <ss:Column ss:StyleID="s123"/>
                        <ss:Column ss:StyleID="s123"/>
                        <ss:Row>
                                <ss:Cell>
                                        <ss:Data ss:Type="Number">1234</ss:Data>
                                </ss:Cell>
                                <ss:Cell>
                                        <ss:Data ss:Type="String">string data</ss:Data>
                                </ss:Cell>
                        </ss:Row>
                </ss:Table>
                <ss:Table ss:ExpandedColumnCount="1" ss:ExpandedRowCount="1">
                        <ss:Column ss:StyleID="s123"/>
                        <ss:Column ss:StyleID="s123"/>
                        <ss:Row>
                                <ss:Cell>
                                        <ss:Data ss:Type="Number">1234</ss:Data>
                                </ss:Cell>
                                <ss:Cell>
                                        <ss:Data ss:Type="String">string data</ss:Data>
                                </ss:Cell>
                        </ss:Row>
                </ss:Table

---- ERROR FOUND. ss:ExpandedColumnCount VALUE MUST AGREE WITH THE NUMBER OF COLUMNS ----

---- STOPPED. PARSING WAS UNSUCCESSFUL. FOUND ERROR AT LINE #30. syntax error ----

paradox@paradox  ~/latest_check  
```

iv) Αρχικά παρουσιάζεται παραδειγμα όπου η τιμή του ss:ExpandedRowCount συμφωνεί με τον αριθμό των <ss:Row>

Για είσοδο το αρχείο inp9.txt :

```
<ss:Workbook>
    <ss:Styles>
        <ss:Style ss:ID="s123"></ss:Style>
        <ss:Style ss:ID="x123"></ss:Style>
    </ss:Styles>
    <ss:Worksheet ss:Name="sheet1">
        <ss:Table ss:ExpandedColumnCount="2"
ss:ExpandedRowCount="1">
            <ss:Column ss:StyleID="s123"/>
            <ss:Column ss:StyleID="s123"/>
            <ss:Row>
                <ss:Cell>
                    <ss:Data ss:Type="Number">1234</ss:Data>
```

```
                </ss:Cell>
                <ss:Cell>
                    <ss:Data ss:Type="String">string
data</ss:Data>
                </ss:Cell>
            </ss:Row>
        </ss:Table>
    </ss:Worksheet>
</ss:Workbook>
```

Screenshot Αποτελεσμάτων :


```
paradox@paradox   ~/latest_check   ./parser inp9.txt
<ss:Workbook>
        <ss:Styles>
                <ss:Style ss:ID="s123"></ss:Style>
                <ss:Style ss:ID="x123"></ss:Style>
        </ss:Styles>
        <ss:Worksheet ss:Name="sheet1">
                <ss:Table ss:ExpandedColumnCount="2" ss:ExpandedRowCount="1">
                        <ss:Column ss:StyleID="s123"/>
                        <ss:Column ss:StyleID="s123"/>
                        <ss:Row>
                                <ss:Cell>
                                        <ss:Data ss:Type="Number">1234</ss:Data>
                                </ss:Cell>
                                <ss:Cell>
                                        <ss:Data ss:Type="String">string data</ss:Data>
                                </ss:Cell>
                        </ss:Row>
                </ss:Table>
        </ss:Worksheet>
</ss:Workbook>

---- PARSING SUCCESSFULLY COMPLETED. THE PROGRAM IS VALID. ----

paradox@paradox   ~/latest_check   |
```

Παρακάτω παρουσιαζονται τα αποτελεσματα για κείμενο εισόδου στο οποίο η τιμή του ss:ExpandedRowCount δεν συμφωνεί με τον αριθμό των <ss:Row>

Για είσοδο το αρχείο inp8.txt :

```
<ss:Workbook>
    <ss:Styles>
        <ss:Style ss:ID="s123"></ss:Style>
        <ss:Style ss:ID="x123"></ss:Style>
    </ss:Styles>
    <ss:Worksheet ss:Name="sheet1">
        <ss:Table ss:ExpandedColumnCount="2"
ss:ExpandedRowCount="5">
            <ss:Column ss:StyleID="s123"/>
```

```
                <ss:Column ss:StyleID="s123"/>
                <ss:Row>
                    <ss:Cell>
                        <ss:Data ss:Type="Number">1234</ss:Data>
                    </ss:Cell>
                    <ss:Cell>
                        <ss:Data ss:Type="String">string
data</ss:Data>
                    </ss:Cell>
                </ss:Row>
            </ss:Table>
        </ss:Worksheet>
</ss:Workbook>
```

Screenshot Αποτελεσμάτων :

```
paradox@paradox  ~/latest_check  ./parser inp8.txt
<ss:Workbook>
        <ss:Styles>
                <ss:Style ss:ID="s123"></ss:Style>
                <ss:Style ss:ID="x123"></ss:Style>
        </ss:Styles>
        <ss:Worksheet ss:Name="sheet1">
                <ss:Table ss:ExpandedColumnCount="2" ss:ExpandedRowCount="5">
                        <ss:Column ss:StyleID="s123"/>
                        <ss:Column ss:StyleID="s123"/>
                        <ss:Row>
                                <ss:Cell>
                                        <ss:Data ss:Type="Number">1234</ss:Data>
                                </ss:Cell>
                                <ss:Cell>
                                        <ss:Data ss:Type="String">string data</ss:Data>
                                </ss:Cell>
                        </ss:Row>
                </ss:Table

---- ERROR FOUND. ss:ExpandedRowCount VALUE MUST AGREE WITH THE NUMBER OF ROWS ----

---- STOPPED. PARSING WAS UNSUCCESSFUL. FOUND ERROR AT LINE #18. syntax error ----

paradox@paradox  ~/latest_check  |
```

Για είσοδο το αρχείο inp11.txt :

Εδώ εχουν δωθει σωστες τιμες στα ss:ExpandedColumnCount και ss:ExpandedRowCount στο πρώτο <ss:Table> αλλα λάθος τιμη για το ss:ExpandedRowCount στο δευτερο <ss:Table>

```
<ss:Workbook>
    <ss:Styles>
        <ss:Style ss:ID="s123"></ss:Style>
        <ss:Style ss:ID="x123"></ss:Style>
```

```
    </ss:Styles>
    <ss:Worksheet ss:Name="sheet1">
        <ss:Table ss:ExpandedColumnCount="2"
ss:ExpandedRowCount="1">
            <ss:Column ss:StyleID="s123"/>
            <ss:Column ss:StyleID="s123"/>
            <ss:Row>
                <ss:Cell>
                    <ss:Data ss:Type="Number">1234</ss:Data>
                </ss:Cell>
                <ss:Cell>
                    <ss:Data ss:Type="String">string
data</ss:Data>
                </ss:Cell>
            </ss:Row>
        </ss:Table>
        <ss:Table ss:ExpandedColumnCount="2"
ss:ExpandedRowCount="2">
            <ss:Column ss:StyleID="s123"/>
            <ss:Column ss:StyleID="s123"/>
            <ss:Row>
                <ss:Cell>
                    <ss:Data ss:Type="Number">1234</ss:Data>
                </ss:Cell>
                <ss:Cell>
                    <ss:Data ss:Type="String">string
data</ss:Data>
                </ss:Cell>
            </ss:Row>
        </ss:Table>
    </ss:Worksheet>
</ss:Workbook>
```

Screenshot Αποτελεσμάτων :

Στην επομενη σελιδα

```
paradox@paradox  ~/latest_check  ./parser inp11.txt
<ss:Workbook>
        <ss:Styles>
                <ss:Style ss:ID="s123"></ss:Style>
                <ss:Style ss:ID="x123"></ss:Style>
        </ss:Styles>
        <ss:Worksheet ss:Name="sheet1">
                <ss:Table ss:ExpandedColumnCount="2" ss:ExpandedRowCount="1">
                        <ss:Column ss:StyleID="s123"/>
                        <ss:Column ss:StyleID="s123"/>
                        <ss:Row>
                                <ss:Cell>
                                        <ss:Data ss:Type="Number">1234</ss:Data>
                                </ss:Cell>
                                <ss:Cell>
                                        <ss:Data ss:Type="String">string data</ss:Data>
                                </ss:Cell>
                        </ss:Row>
                </ss:Table>
                <ss:Table ss:ExpandedColumnCount="2" ss:ExpandedRowCount="2">
                        <ss:Column ss:StyleID="s123"/>
                        <ss:Column ss:StyleID="s123"/>
                        <ss:Row>
                                <ss:Cell>
                                        <ss:Data ss:Type="Number">1234</ss:Data>
                                </ss:Cell>
                                <ss:Cell>
                                        <ss:Data ss:Type="String">string data</ss:Data>
                                </ss:Cell>
                        </ss:Row>
                </ss:Table>

---- ERROR FOUND. ss:ExpandedRowCount VALUE MUST AGREE WITH THE NUMBER OF ROWS ----

---- STOPPED. PARSING WAS UNSUCCESSFUL. FOUND ERROR AT LINE #30. syntax error ----

paradox@paradox  ~/latest_check 
```