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ΑΡΧΕΣ ΓΛΩΣΣΩΝ ΠΡΟΓΡΑΜΑΤΙΣΜΟΥ ΚΑΙ ΜΕΤΑΦΡΑΣΤΩΝ
ΑΝΑΦΟΡΑ ΕΡΓΑΣΙΑΣ

BNF Συντακτικού Ορισμού της Γλώσσας

```
jsonfile:          OBRACKETS {printf("{\n");} LAST{printf("\t\"last\"");} COLON
{printf(":");}OBRACKETS{printf("{\n");}ruleSTART  CBRACKETS{printf("}\n");};

                   |OBRACKETS {printf("{\n");}
CONTENT{printf("\t\"content\"");} COLON {printf(":");} OBRACES{printf("[\n");}
ruleSTART  CBRACES{printf("]\n");} COMMA{printf(",\n");}ruleTotal
CBRACKETS{printf("}\n");};


//GRAMMAR for 2.0

ruleSTART:    ruleLast

              |ruleContent

              ;



ruleLast:        ruleLast COMMA{printf(",\n");}ruleLast

                 |ruleGameId

                 | ruleDrawId

                 | ruleDrawTime

                 | ruleStatus

                 | ruleDrawBreak

                 | ruleVisualDraw

                 | rulePricePoints

                 | ruleWinningNumbers

                 | rulePrizeCategories
```

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```
                        | ruleWagerStatistics

                        ;
```

//GRAMMAR for GameId

```
ruleGameId:        GAMEID{printf("\t\"gameId\"");} COLON{printf(":");}
INT{gameidfunc(yytext); printf("\%s",yytext);};
```

//GRAMMAR for DrawId

```
ruleDrawId:        DRAWID{printf("\t\"drawId\"");} COLON{printf(":");}
INT{printf("\%s",yytext);};
```

//GRAMMAR for DrawTime

```
ruleDrawTime:            DRAWTIME{printf("\t\"drawtime\"");}
COLON{printf(":");} INT{printf("\%s",yytext);};
```

//GRAMMAR for Status

```
ruleStatus:        STATUS{printf("\t\"Status\"");} COLON{printf(":");}
STRING{printf("\%s",yytext);};
```

//GRAMMAR for DrawBreak

```
ruleDrawBreak:            DRAWBREAK{printf("\t\"Drawbreak\"");}
COLON{printf(":");} INT{printf("\%s",yytext);};
```

//GRAMMAR for VisualDraw

```
ruleVisualDraw:            VISUALDRAW{printf("\t\"visualdraw\"");}
COLON{printf(":");} INT{printf("\%s",yytext);};
```

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//GRAMMAR for PricePoints

rulePricePoints: PRICEPOINTS{printf("\t\"pricepoints\"");}
COLON{printf(":");}OBRACKETS{printf("{");} ruleAmount CBRACKETS{printf("}\n");};

//GRAMMAR for Amount

ruleAmount: AMOUNT{printf("\t\"amount\"");}COLON{printf(":");}
FLOAT{printf("\%s",yytext);};

//GRAMMAR for WinningNumbers

ruleWinningNumbers: WINNINGNUMBERS{printf("\t\"winningnumbers\"");}
COLON{printf(":");}OBRACKETS{printf("{\n");} ruleWinningNum
CBRACKETS{printf("}\n");};

//GRAMMAR for WinningNum

ruleWinningNum: ruleWinningNum COMMA{printf(",\n");}ruleWinningNum

                              |ruleList

                              |ruleBonus

                              ;

//GRAMMAR for List

ruleList: LIST{printf("\t\"list\"");}COLON{printf(":");}
OBRACES{printf("[");}ruleArray CBRACES{printf("]\n");};

ruleArray: ruleArray COMMA{printf(",");} ruleArray

                              |INT{printf("\%s",yytext);}

                              ;

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//GRAMMAR for Bonus

```
ruleBonus:          BONUS{printf("\t\"bonus\"");} COLON{printf(":");}
OBRACES{printf("[");} ruleArray CBRACES{printf("]\n");};
```

//GRAMMAR for PrizeCategories

```
rulePrizeCategories:  PRIZECATEGORIES{printf("\t\"prizecategories\"");} COLON
{printf(":");} OBRACES{printf("[\n");} rulePrizeCtgrs CBRACES{printf("]\n");};
```

//GRAMMAR for PrizeCtgrs

```
rulePrizeCtgrs:rulePrizeCtgrs COMMA{printf(",\n");} rulePrizeCtgrs

                        | OBRACKETS{printf("{\n");} rule
CBRACKETS{printf("}\n");}

                                    ;
```

```
rule: rule1 | rule2;

rule1: ID{printf("\t\"id\"");} COLON{printf(":");} INT{printf("\%s",yytext);}
COMMA{printf(",");} DIVIDENT{printf("\t\"divident\"");} COLON{printf(":");}
FLOAT{printf("\%s",yytext);} COMMA{printf(",");} WINNERS{printf("\t\"winners\"");}
COLON{printf(":");} INT{printf("\%s",yytext);} COMMA{printf(",");}
DISTRIBUTED{printf("\t\"distributed\"");} COLON{printf(":");}
FLOAT{printf("\%s",yytext);} COMMA{printf(",");} JACKPOT{printf("\t\"jackpot\"");}
COLON{printf(":");} FLOAT{printf("\%s",yytext);} COMMA{printf(",");}
FIXED{printf("\t\"fixed\"");} COLON{printf(":");} FLOAT{printf("\%s",yytext);}
COMMA{printf(",");} CATEGORYTYPE{printf("\t\"categorytype\"");}
COLON{printf(":");} INT{printf("\%s",yytext);} COMMA{printf(",");}
GAMETYPE{printf("\t\"gametype\"");} COLON{printf(":");}
STRING{printf("\%s",yytext);} rule2;
```

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```
rule2: COMMA{printf(",");}
MINIMUMDISTRIBUTED{printf("\t\"minimundistributed\"");} COLON{printf(":");}
FLOAT{printf("\%s",yytext);}

                |

                ;
```

//GRAMMAR for WagerStatistics

```
ruleWagerStatistics:    WAGERSTATISTICS{printf("\t\"wagerstatistics\"");}
COLON{printf(":");} OBRACKETS{printf("{\n");} ruleWagerst CBRACKETS{printf("}\n");}
CBRACKETS{printf("}\n");} COMMA{printf(",");} ACTIVE{printf("\t\"active\"");}
COLON{printf(":");} OBRACKETS{printf("{\n");} ruleActive CBRACKETS{printf("}\n");}

                                ;
```

```
ruleWagerStatisticss:WAGERSTATISTICS{printf("\t\"wagerstatistics\"");}
COLON{printf(":");} OBRACKETS{printf("{\n");} ruleWagerst CBRACKETS{printf("}\n");}
```

```
ruleWagerst:   ruleWagerst COMMA{printf(",");} ruleWagerst

                | ruleColumns

                | ruleWagers

                | ruleAddOn

                ;
```

//GRAMMAR for Columns

```
ruleColumns:   COLUMNS{printf("\t\"columns\"");} COLON{printf(":");}
INT{printf("\%s",yytext);};
```

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//GRAMMAR for Wagers

ruleWagers: WAGERS{printf("\t\"wagers\"");} COLON{printf(":");}
INT{printf("\%s",yytext);};

//GRAMMAR for AddOn

ruleAddOn: ADDON{printf("\t\"addon\"");} COLON{printf(":");}
OBRACES{printf("[");} CBRACES{printf("]\n");};

ruleActive: ruleActive COMMA{printf(",");} ruleActive

                        | ruleGameId

                        | ruleDrawId

                        | ruleDrawTime

                        | ruleAcStatus

                        | ruleDrawBreak

                        | ruleVisualDraw

                        | rulePricePoints

                        | ruleWinningNumbers

                        | rulePrizeCategories

                        | ruleWagerStatisticss

                        ;

ruleAcStatus: STATUS{printf("\t\"Status\"");} COLON{printf(":");}
ACTIVE{printf("\t\"active\"");};

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ruleContent: ruleContent1 COMMA{printf(",\n");} ruleContent1
COMMA{printf(",\n");} ruleContent1 COMMA{printf(",\n");} ruleContent1;

ruleContent1: OBRACKETS{printf("{\n");} ruleLastContent CBRACKETS{printf("}\n");}
;

ruleLastContent: ruleLastContent COMMA{printf(",\n");} ruleLastContent

                        | ruleGameId

                        | ruleDrawId

                        | ruleDrawTime

                        | ruleStatus

                        | ruleDrawBreak

                        | ruleVisualDraw

                        | rulePricePoints

                        | ruleWinningNumbers

                        | rulePrizeCategories

                        | ruleWagerStatisticsContent

                        ;

ruleWagerStatisticsContent: WAGERSTATISTICS{printf("\t\"wagerstatistics\"");}
COLON{printf(":");} OBRACKETS{printf("{\n");} ruleWagerst CBRACKETS{printf("}\n");}
;

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```
ruleTotal:ruleTotal COMMA{printf(",\n");}ruleTotal

                |ruleTotalPages

                |ruleTotalElements

                |ruleLaast

                |ruleNumberOfElements

                |ruleSort

                |ruleFirst

                |ruleSize

                |ruleNumber

                ;


ruleTotalPages: TOTALPAGES {printf("\t\"totalpages\"");}COLON{printf(":");}
INT{printf("\%s",yytext);};


ruleTotalElements:TOTALELEMENTS {printf("\t\"totalElements\"");}
COLON{printf(":");}INT{printf("\%s",yytext);};


ruleLaast:LAST{printf("\t\"last\"");} COLON{printf(":");} BOOLEAN
{printf("\%s",yytext);};


ruleNumberOfElements:NUMBEROFELEMENTS {printf("\t\"numberOfElements\"");}
COLON{printf(":");}INT{printf("\%s",yytext);};


ruleSort: SORT {printf("\t\"sort\"");}COLON{printf(":");}OBRACES{printf("[\n");}
OBRACKETS{printf("{\n");}ruleSort1 CBRACKETS{printf("}\n");}
CBRACES{printf("]\n");};
```

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```
ruleSort1: ruleSort1 COMMA{printf(",\n");}ruleSort1

            |ruleDirection

            |ruleProperty

            |ruleIgnoreCase

            |ruleNullHandling

            |ruleDescending

            |ruleAscending

            ;


ruleDirection: DIRECTION {printf("\t\"direction\"");}COLON{printf(":");}
STRING{printf("\%s",yytext);};


ruleProperty:  PROPERTY {printf("\t\"property\"");}COLON{printf(":");}
STRING{printf("\%s",yytext);};


ruleIgnoreCase:IGNORECASE {printf("\t\"ignoreCase\"");}COLON{printf(":");}
BOOLEAN {printf("\%s",yytext);};


ruleNullHandling:  NULLHANDLING {printf("\t\"nullHandling\"");} COLON{printf(":");}
STRING{printf("\%s",yytext);};


ruleDescending: DESCENDING {printf("\t\"descending\"");}COLON{printf(":");}
BOOLEAN {printf("\%s",yytext);};


ruleAscending: ASCENDING {printf("\t\"ascending\"");}COLON{printf(":");}
BOOLEAN {printf("\%s",yytext);};
```

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```
ruleFirst:FIRST{printf("\t\"first\"");} COLON{printf(":");} BOOLEAN
{printf("\%s",yytext);};
```

```
ruleSize: SIZE {printf("\t\"size\"");}COLON{printf(":");}INT{printf("\%s",yytext);};
```

```
ruleNumber: NUMBER {printf("\t\"number\"");}COLON{printf(":");}
INT{printf("\%s",yytext);};
```

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Κώδικας FLEX

```
1   %{
2   #include "bison.tab.h"
3   #include <stdio.h>
4   #include <stdlib.h>
5   #include <string.h>
6   #include <math.h>
7   //#define YYSTYPE char *
8   %}
9   %option noyywrap
10  %option yylineno
11
12
13
14  boolean_true    true
15  boolean_false   false
16  null_string null
17  letter  [a-zA-Z]
18  int [1-9][0-9]*|0
19  string  \"([^\\\"]|\\.)*\"
20  digit   [0-9]
21  float [0-9]+"."[0-9]+
22  sign    [+|-]{digit}+
23  unsign  {digit}+
24  real    ({sign}|{unsign})"."{digit}+
25  boolean    ("true"|"false")
26  ws          [ \t\n\r]
27  %%
28
29  :                   {return COLON;}
30  ,                   {return COMMA;}
31  \{                  {return OBRACKETS;}
32  \}                  {return CBRACKETS;}
33  \[                  {return OBRACES;}
34  \]                  {return CBRACES;}
35  [ \t\n] //ignore whitespace, tab, newline
36
37  \"last\"    {return LAST;}
38  \"content\"     {return CONTENT;}
39  \"gameId\"  {return GAMEID;}
40  \"drawId\"  {return DRAWID;}
41  \"drawTime\"  {return DRAWTIME;}
42  \"status\"  {return STATUS;}
43  \"{string}\"  {return STATUS_STRING;}
44  \"drawBreak\"  {return DRAWBREAK;}
45  \"visualDraw\"  {return VISUALDRAW;}
46  \"pricePoints\"  {return PRICEPOINTS;}
47  \"amount\"  {return AMOUNT;}
48  \"winningNumbers\"   {return WINNINGNUMBERS;}
49  \"list\"  {return LIST;}
50  \"bonus\"  {return BONUS;}
51  \"prizeCategories\"  {return PRIZECATEGORIES;}
52  \"id\"  {return ID;}
53  \"divident\"  {return DIVIDENT;}
54  \"winners\"  {return WINNERS;}
55  \"distributed\"  {return DISTRIBUTED;}
56  \"jackpot\"  {return JACKPOT;}
57  \"fixed\"  {return FIXED;}
58  \"categoryType\"  {return CATEGORYTYPE;}
59  \"gameType\"  {return GAMETYPE;}
60  \"minimumDistributed\"  {return MINIMUMDISTRIBUTED;}
61  \"wagerStatistics\"  {return WAGERSTATISTICS;}
62  \"columns\"  {return COLUMNS;}
63  \"wagers\"  {return WAGERS;}
64  \"addOn\"  {return ADDON;}
65  \"active\"  {return ACTIVE;}
66  \"totalPages\"  {return TOTALPAGES;}
67  \"totalElements\"  {return TOTALELEMENTS;}
68  \"numberOfElements\"  {return NUMBEROFELEMENTS;}
69  \"sort\"  {return SORT;}
70  \"direction\"  {return DIRECTION;}
71  \"property\"  {return PROPERTY;}
72  \"ignoreCase\"  {return IGNORECASE;}
73  \"nullHandling\"  {return NULLHANDLING;}
74  \"descending\"  {return DESCENDING;}
75  \"ascending\"  {return ASCENDING;}
76  \"first\"   {return FIRST;}
77  \"size\"  {return SIZE;}
78  \"number\"  {return NUMBER;}
79
80  {int} {return INT;}
81  {float} {return FLOAT;}
82  {string} {return STRING;}
83  {boolean} {return BOOLEAN;}
84  {ws}    {;}
85
86  %%
87
```

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Κώδικας BISON

```
bison.y
1    %{
2
3    #define _GNU_SOURCE
4    #include <stdio.h>
5    #include <math.h>
6    #include <stdlib.h>
7    #include <string.h>
8
9    void yyerror(char const *S);
10   extern int yylineno;
11   extern char* yytext;
12   extern FILE *yyin;
13   extern FILE *yyout;
14   int yylex(void);
15   %}
16   %define parse.error verbose
17
18   %define api.value.type { char* }
19   %token COLON
20   %token COMMA
21   %token OBRACKETS
22   %token CBRACKETS
23   %token OBRACES
24   %token CBRACES
25   %token LAST
26   %token GAMEID
27   %token DRAWID
28   %token DRAWTIME
29   %token STATUS
30   %token STATUS_STRING
31   %token DRAWBREAK
32   %token VISUALDRAW
33   %token PRICEPOINTS
34   %token AMOUNT
35   %token WINNINGNUMBERS
36   %token LIST
37   %token BONUS
38   %token PRIZECATEGORIES
39   %token ID
40   %token DIVIDENT
41   %token WINNERS
42   %token DISTRIBUTED
43   %token JACKPOT
44   %token FIXED
45   %token CATEGORYTYPE
46   %token GAMETYPE
47   %token MINIMUMDISTRIBUTED
48   %token WAGERSTATISTICS
49   %token COLUMNS
50   %token WAGERS
51   %token ADDON
52   %token ACTIVE
53   %token STRING
54   %token SIGN
55   %token EARL
56   %token true |
57   %token false
58   %token UNSIGN
59   %token null
60   %token FLOAT
61   %token INT
62   %token DOUBLE
63   %token CONTENT
64   %token TOTALPAGES
65   %token TOTALELEMENTS
66   %token NUMBEROFELEMENTS
67   %token DIRECTION
68   %token PROPERTY
69   %token IGNORECASE
70   %token NULLHANDLING
71   %token DESCENDING
72   %token ASCENDING
73   %token SORT
74   %token FIRST
75   %token SIZE
76   %token NUMBER
77   %token BOOLEAN
78   %type <string> STRING
79   %type <num> INT
80   %type <num> FLOAT
81   %type <num> DOUBLE
82
83
84   %start jsonfile
85   %%
```

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```
86
87  jsonfile:     OBRACKETS {printf("{\n");}  LAST{printf("\t\"last\"");} COLON {printf(":");} OBRACKETS{printf("{\n");} ruleSTART  CBRACKETS{printf("}\n");} ;
88               |OBRACKETS {printf("{\n");}  CONTENT{printf("\t\"content\"");} COLON {printf(":");} OBRACES{printf("[\n");} ruleSTART  CBRACES{printf("]\n");} COMMA{printf(",\n");} ruleTotal CBRACKETS{printf("}\n");};
89
90  //GRAMMAR for 2.0
91  ruleSTART:  ruleLast
92            |ruleContent
93            ;
94
95
96  ruleLast:       ruleLast COMMA{printf(",\n");} ruleLast
97                  |ruleGameId
98                  | ruleDrawId
99                  | ruleDrawTime
100                 | ruleStatus
101                 | ruleDrawBreak
102                 | ruleVisualDraw
103                 | rulePricePoints
104                 | ruleWinningNumbers
105                 | rulePrizeCategories
106                 | ruleWagerStatistics
107                 ;
108
109 //GRAMMAR for GameId
110 ruleGameId:    GAMEID{printf("\t\"gameId\"");} COLON{printf(":");} INT{printf("\%s",yytext);};
111
112 //GRAMMAR for DrawId
113 ruleDrawId:    DRAWID{printf("\t\"drawId\"");} COLON{printf(":");} INT{printf("\%s",yytext);};
114
115 //GRAMMAR for DrawTime
116 ruleDrawTime:      DRAWTIME{printf("\t\"drawtime\"");} COLON{printf(":");} INT{printf("\%s",yytext);};
117
118 //GRAMMAR for Status
119 ruleStatus:    STATUS{printf("\t\"Status\"");} COLON{printf(":");} STRING{printf("\%s",yytext);};
120
121 //GRAMMAR for DrawBreak
122 ruleDrawBreak:     DRAWBREAK{printf("\t\"Drawbreak\"");} COLON{printf(":");} INT{printf("\%s",yytext);};
123
124 //GRAMMAR for VisualDraw
125 ruleVisualDraw:    VISUALDRAW{printf("\t\"visualdraw\"");} COLON{printf(":");} INT{printf("\%s",yytext);};
126
127 //GRAMMAR for PricePoints
128 rulePricePoints:      PRICEPOINTS{printf("\t\"pricepoints\"");} COLON{printf(":");} OBRACKETS{printf("{");}  ruleAmount CBRACKETS{printf("}\n");};
129
130 //GRAMMAR for Amount
131 ruleAmount:    AMOUNT{printf("\t\"amount\"");} COLON{printf(":");} FLOAT{printf("\%s",yytext);};
132
133 //GRAMMAR for WinningNumbers
134 ruleWinningNumbers:    WINNINGNUMBERS{printf("\t\"winningnumbers\"");} COLON{printf(":");} OBRACKETS{printf("{\n");}  ruleWinningNum CBRACKETS{printf("}\n");};
```

```
ruleWinningNum:     ruleWinningNum COMMA{printf(",\n");} ruleWinningNum
                    |ruleList
                    |ruleBonus
                    ;

//GRAMMAR for List
ruleList:       LIST{printf("\t\"list\"");} COLON{printf(":");} OBRACES{printf("[");} ruleArray CBRACES{printf("]\n");};

ruleArray:       ruleArray   COMMA{printf(",");}  ruleArray
                |INT{printf("\%s",yytext);}
                ;
```

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```
149
150    //GRAMMAR for Bonus
151
152    ruleBonus:        BONUS{printf("\t\"bonus\"");} COLON{printf(":");} OBRACES{printf("[");} ruleArray CBRACES{printf("]\n");};
153
154    //GRAMMAR for PrizeCategories
155    rulePrizeCategories:    PRIZECATEGORIES{printf("\t\"prizecategories\"");} COLON {printf(":");} OBRACES{printf("[\n");} rulePrizeCtgrs CBRACES{printf("]\n");};
156
157    //GRAMMAR for PrizeCtgrs
158    rulePrizeCtgrs: rulePrizeCtgrs COMMA{printf(",\n");} rulePrizeCtgrs
159            | OBRACKETS{printf("{\n");}  rule CBRACKETS{printf("}\n");}
160            ;
161
162    rule: rule1 | rule2;
163    rule1: ID{printf("\t\"id\"");} COLON{printf(":");} INT{printf("\%s",yytext);} COMMA{printf(",");} DIVIDENT{printf("\t\"divident\"");} COLON{printf(":");} FLOAT{printf("\%s",yytext);} COMMA{printf(",");}
164    WINNERS{printf("\t\"winners\"");} COLON{printf(":");} INT{printf("\%s",yytext);} COMMA{printf(",");} DISTRIBUTED{printf("\t\"distributed\"");} COLON{printf(":");} FLOAT{printf("\%s",yytext);} COMMA{printf(",");}
165    JACKPOT{printf("\t\"jackpot\"");} COLON{printf(":");} FLOAT{printf("\%s",yytext);} COMMA{printf(",");} FIXED{printf("\t\"fixed\"");} COLON{printf(":");} FLOAT{printf("\%s",yytext);} COMMA{printf(",");}
166    CATEGORYTYPE{printf("\t\"categorytype\"");} COLON{printf(":");} INT{printf("\%s",yytext);} COMMA{printf(",");} GAMETYPE{printf("\t\"gametype\"");} COLON{printf(":");} STRING{printf("\%s",yytext);} rule2;
167
168    rule2: COMMA{printf(",");} MINIMUMDISTRIBUTED{printf("\t\"minimundistributed\"");} COLON{printf(":");} FLOAT{printf("\%s",yytext);}
169            |
170            ;
171
172
173    //GRAMMAR for WagerStatistics
174    ruleWagerStatistics:    WAGERSTATISTICS{printf("\t\"wagerstatistics\"");} COLON{printf(":");} OBRACKETS{printf("{\n");} ruleWagerst CBRACKETS{printf("}\n");} CBRACKETS{printf("}\n");} COMMA{printf(",");}
175    ACTIVE{printf("\t\"active\"");} COLON{printf(":");} OBRACKETS{printf("{\n");} ruleActive CBRACKETS{printf("}\n");}
176            ;
177
178    ruleWagerStatisticss:WAGERSTATISTICS{printf("\t\"wagerstatistics\"");} COLON{printf(":");} OBRACKETS{printf("{\n");} ruleWagerst CBRACKETS{printf("}\n");}
179
180    ruleWagerst:    ruleWagerst COMMA{printf(",");} ruleWagerst
181            | ruleColumns
182            | ruleWagers
183            | ruleAddOn
184            ;
185
186    //GRAMMAR for Columns
187    ruleColumns:    COLUMNS{printf("\t\"columns\"");} COLON{printf(":");} INT{printf("\%s",yytext);};
188
189    //GRAMMAR for Wagers
190    ruleWagers: WAGERS{printf("\t\"wagers\"");} COLON{printf(":");} INT{printf("\%s",yytext);};
191
192    //GRAMMAR for AddOn
193    ruleAddOn:  ADDON{printf("\t\"addon\"");} COLON{printf(":");} OBRACES{printf("[");} CBRACES{printf("]\n");};
194
195
196    ruleActive:      ruleActive COMMA{printf(",");}  ruleActive
197            | ruleGameId
198            | ruleDrawId
199            | ruleDrawTime
200            | ruleAcStatus
201            | ruleDrawBreak
202            | ruleVisualDraw
203            | rulePricePoints
204            | ruleWinningNumbers
205            | rulePrizeCategories
206            | ruleWagerStatisticss
207            ;
208
209    ruleAcStatus:        STATUS{printf("\t\"Status\"");} COLON{printf(":");} ACTIVE{printf("\t\"active\"");};
210
211    ruleContent: ruleContent1 COMMA{printf(",\n");} ruleContent1 COMMA{printf(",\n");} ruleContent1 COMMA{printf(",\n");} ruleContent1;
212
213
214    ruleContent1: OBRACKETS{printf("{\n");} ruleLastContent  CBRACKETS{printf("}\n");} ;
215
216    ruleLastContent:     ruleLastContent COMMA{printf(",\n");} ruleLastContent
217                | ruleGameId
218                | ruleDrawId
219                | ruleDrawTime
220                | ruleStatus
221                | ruleDrawBreak
222                | ruleVisualDraw
223                | rulePricePoints
224                | ruleWinningNumbers
225                | rulePrizeCategories
226                | ruleWagerStatisticsContent
227                ;
228
229
230
231    ruleWagerStatisticsContent: WAGERSTATISTICS{printf("\t\"wagerstatistics\"");} COLON{printf(":");} OBRACKETS{printf("{\n");} ruleWagerst CBRACKETS{printf("}\n");} ;
232
233    ruleTotal:ruleTotal COMMA{printf(",\n");}ruleTotal
234            |ruleTotalPages
235            |ruleTotalElements
236            |ruleLaast
237            |ruleNumberOfElements
238            |ruleSort
239            |ruleFirst
240            |ruleSize
241            |ruleNumber
242            ;
```

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```
243
244    ruleTotalPages: TOTALPAGES {printf("\t\"totalpages\"");} COLON{printf(":");} INT{printf("\%s",yytext);};
245
246    ruleTotalElements:TOTALELEMENTS {printf("\t\"totalElements\"");} COLON{printf(":");} INT{printf("\%s",yytext);};
247
248    ruleLaast:LAST{printf("\t\"last\"");} COLON{printf(":");}  BOOLEAN {printf("\%s",yytext);};
249
250    ruleNumberOfElements:NUMBEROFELEMENTS {printf("\t\"numberOfElements\"");} COLON{printf(":");} INT{printf("\%s",yytext);};
251
252    ruleSort: SORT {printf("\t\"sort\"");} COLON{printf(":");} OBRACES{printf("[\n");} OBRACKETS{printf("{\n");} ruleSort1 CBRACKETS{printf("}\n");} CBRACES{printf("]\n");};
253
254  ∨ ruleSort1: ruleSort1 COMMA{printf(",\n");} ruleSort1
255          |ruleDirection
256          |ruleProperty
257          |ruleIgnoreCase
258          |ruleNullHandling
259          |ruleDescending
260          |ruleAscending
261          ;
262
263    ruleDirection: DIRECTION {printf("\t\"direction\"");} COLON{printf(":");}  STRING{printf("\%s",yytext);};
264
265    ruleProperty:  PROPERTY {printf("\t\"property\"");} COLON{printf(":");}  STRING{printf("\%s",yytext);};
266
267    ruleIgnoreCase: IGNORECASE {printf("\t\"ignoreCase\"");} COLON{printf(":");}  BOOLEAN {printf("\%s",yytext);};
268
269    ruleNullHandling: NULLHANDLING {printf("\t\"nullHandling\"");} COLON{printf(":");}  STRING{printf("\%s",yytext);};
270
271    ruleDescending: DESCENDING {printf("\t\"descending\"");} COLON{printf(":");}  BOOLEAN {printf("\%s",yytext);};
272
273    ruleAscending: ASCENDING {printf("\t\"ascending\"");} COLON{printf(":");}  BOOLEAN {printf("\%s",yytext);};
274
275    ruleFirst:FIRST{printf("\t\"first\"");} COLON{printf(":");}  BOOLEAN {printf("\%s",yytext);};
276
277    ruleSize: SIZE {printf("\t\"size\"");} COLON{printf(":");} INT{printf("\%s",yytext);};
278
279    ruleNumber: NUMBER {printf("\t\"number\"");} COLON{printf(":");} INT{printf("\%s",yytext);};
280
281
282    %%
283    void yyerror(char const *s)
284  ∨ {
285        fprintf(stderr,"\nError: %s\nLine: %d\nToken: %s\n", s, yylineno, yytext);
286        exit(1);
287    }
288
```

```
289
290
291    int main(int argc,char *argv[]){
292
293    int token;
294    if(argc >1){
295
296        yyin=fopen(argv[1],"r");
297            if(yyin == NULL){
298
299                perror ("ERROR");
300                return -1;
301            }
302    }
303    yyparse();
304    fclose (yyin);
305    return 0;
306
307
308
309    }
```

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▪ Για τον έλεγχο της ορθότητας και την εκτέλεση του προγράμματός μας χρησιμοποιήθηκαν οι ακόλουθες εντολές:

```
eltso@DESKTOP-N39DNAQ /cygdrive/c/Users/eltso/Desktop/compiler with Cygwin
$ flex compiler.l

eltso@DESKTOP-N39DNAQ /cygdrive/c/Users/eltso/Desktop/compiler with Cygwin
$ bison -d bison.y
bison.y: warning: 9 shift/reduce conflicts [-Wconflicts-sr]
bison.y: note: rerun with option '-Wcounterexamples' to generate conflict counterexamples

eltso@DESKTOP-N39DNAQ /cygdrive/c/Users/eltso/Desktop/compiler with Cygwin
$ gcc bison.tab.c lex.yy.c -lfl

eltso@DESKTOP-N39DNAQ /cygdrive/c/Users/eltso/Desktop/compiler with Cygwin
$ ./a.exe test.lexx
```

▪ Για το πρώτο αρχείο που δίνεται στην άσκηση (arxeio1.txt) τα αποτελέσματα φαίνονται ακολούθως:

```
PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   JUPYTER
eltso@DESKTOP-N39DNAQ /cygdrive/c/Users/eltso/Desktop/compiler with Cygwin
$ ./a.exe test.lexx
{
    "last":{
    "gameId":5104,
    "drawId":2400,
    "drawtime":1662663600000,
    "Status":"results",
    "Drawbreak":1800000,
    "visualdraw":2400,
    "pricepoints":{ "amount":0.5)

    "winningnumbers":{
    "list":[36,38,37,43,24]

    "bonus":[20]
}

    "prizecategories"[
{
    "id":1, "divident":0.00,    "winners":0,    "distributed":256129.12,    "jackpot":343870.88,    "fixed":0.0,    "categorytype":0,    "gametype":"Normal",    "minimumdistributed":0.00}
{
    "id":2, "divident":39602.29,    "winners":1,    "distributed":39602.29, "jackpot":0.00, "fixed":0.0,    "categorytype":0,    "gametype":"Normal"}
{
    "id":3, "divident":2500.00,    "winners":18,    "distributed":45000.00, "jackpot":0.00, "fixed":2500.0,    "categorytype":1,    "gametype":"Normal"}
{
    "id":4, "divident":50.00,    "winners":306,    "distributed":15300.00, "jackpot":0.00, "fixed":50.0,    "categorytype":1,    "gametype":"Normal"}
{
    "id":5, "divident":50.00,    "winners":537,    "distributed":26850.00, "jackpot":0.00, "fixed":50.0,    "categorytype":1,    "gametype":"Normal"}
{
    "id":6, "divident":2.00,    "winners":10415,    "distributed":20830.00, "jackpot":0.00, "fixed":2.0,    "categorytype":1,    "gametype":"Normal"}
{
    "id":7, "divident":2.00,    "winners":5887,    "distributed":11774.00, "jackpot":0.00, "fixed":2.0,    "categorytype":1,    "gametype":"Normal"}
{
    "id":8, "divident":1.50,    "winners":28587,    "distributed":42880.50, "jackpot":0.00, "fixed":1.5,    "categorytype":1,    "gametype":"Normal"}
]
    "wagerstatistics":{
    "columns":2057262,    "wagers":372782,    "addon":[]
}
}
    "active":{
    "gameId":5104,    "drawId":2401,    "drawtime":1662922800000,    "Status":    "active",    "Drawbreak":1800000,    "visualdraw":2401,    "pricepoints":{ "amount":0.5}
    "prizecategories":[
```

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- Ένα ανεπιτυχές παράδειγμα εκτέλεσης για το συγκεκριμένο αρχείο φαίνεται στην επόμενη εικόνα. Στη συγκεκριμένη περίπτωση αφαιρέσαμε από το arxeio1.txt την λέξη active και εμφανίστηκε το ακόλουθο σφάλμα:

- Για το δεύτερο αρχείο που δίνεται στην άσκηση (arxeio2.txt) τα αποτελέσματα φαίνονται ακολούθως:

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PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   JUPYTER

{
    "gameId":5104,
    "drawId":2413,
    "drawtime":1647201600000,
    "Status":"results",
    "Drawbreak":1800000,
    "visualdraw":2413,
    "pricepoints":{ "amount":0.5}

    "winningnumbers":{
    "list":[36,44,16,31,38]

    "bonus":[8]
}

    "prizecategories"[
{
    "id":1, "divident":0.0, "winners":0,   "distributed":354740.96,   "jackpot":734665.21,   "fixed":0.0, "categorytype":0,   "gametype":"Normal",   "minimumdistributed":
0.0}
{
    "id":2, "divident":0.0, "winners":0,   "distributed":54849.51, "jackpot":0.0, "fixed":0.0,   "categorytype":0,   "gametype":"Normal"}
{
    "id":3, "divident":2500.0,   "winners":17,   "distributed":42500.0, "jackpot":0.0, "fixed":2500.0, "categorytype":1,   "gametype":"Normal"}
{
    "id":4, "divident":50.0,   "winners":271,   "distributed":13550.0, "jackpot":0.0, "fixed":50.0, "categorytype":1,   "gametype":"Normal"}
{
    "id":5, "divident":50.0,   "winners":796,   "distributed":39800.0, "jackpot":0.0, "fixed":50.0, "categorytype":1,   "gametype":"Normal"}
{
    "id":6, "divident":2.0, "winners":11150,   "distributed":22300.0, "jackpot":0.0, "fixed":2.0, "categorytype":1,   "gametype":"Normal"}
{
    "id":7, "divident":2.0, "winners":12080,   "distributed":24160.0, "jackpot":0.0, "fixed":2.0, "categorytype":1,   "gametype":"Normal"}
{
    "id":8, "divident":1.5, "winners":68804,   "distributed":103206.0, "jackpot":0.0, "fixed":1.5, "categorytype":1,   "gametype":"Normal"}
]

    "wagerstatistics":{
    "columns":2849325,   "wagers":498453,   "addon":[]
}
}
{
    "gameId":5104,
    "drawId":2412,

    "drawtime":1646042400000,
    "Status":"results",
    "Drawbreak":1800000,
    "visualdraw":2412,
    "pricepoints":{ "amount":0.5}

    "winningnumbers":{
    "list":[23,16,17,27,40]

    "bonus":[16]
}

    "prizecategories"[
{
    "id":1, "divident":0.0, "winners":0,   "distributed":238075.17,   "jackpot":519124.83,   "fixed":0.0, "categorytype":0,   "gametype":"Normal",   "minimumdistributed":
0.0}
{
    "id":2, "divident":56795.63,   "winners":2,   "distributed":35697.57, "jackpot":77893.7,   "fixed":0.0,   "categorytype":0,   "gametype":"Normal"}
{
    "id":3, "divident":2500.0,   "winners":7,   "distributed":17500.0, "jackpot":0.0, "fixed":2500.0, "categorytype":1,   "gametype":"Normal"}
{
    "id":4, "divident":50.0,   "winners":191,   "distributed":9550.0, "jackpot":0.0, "fixed":50.0, "categorytype":1,   "gametype":"Normal"}
{
    "id":5, "divident":50.0,   "winners":571,   "distributed":28550.0, "jackpot":0.0, "fixed":50.0, "categorytype":1,   "gametype":"Normal"}
{
    "id":6, "divident":2.0, "winners":9782, "distributed":19564.0, "jackpot":0.0, "fixed":2.0, "categorytype":1,   "gametype":"Normal"}
{
    "id":7, "divident":2.0, "winners":7847, "distributed":14004.0, "jackpot":0.0, "fixed":2.0, "categorytype":1,   "gametype":"Normal"}
{
    "id":8, "divident":1.5, "winners":31989,   "distributed":47983.5, "jackpot":0.0, "fixed":1.5, "categorytype":1,   "gametype":"Normal"}
]

    "wagerstatistics":{
    "columns":1854419,   "wagers":330607,   "addon":[]
}
}
{
    "gameId":5104,
    "drawId":2411,
    "drawtime":1646760000000,
    "Status":"results",
    "Drawbreak":1800000,
    "visualdraw":2411,

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```
PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   JUPYTER

    "pricepoints":{ "amount":0.5}

    "winningnumbers":{
    "list":[16,2,3,14,39]

    "bonus":[7]
}

    "prizecategories"[
{
    "id":1, "divident":0.0, "winners":0,   "distributed":191738.84,      "jackpot":408261.16,   "fixed":0.0,   "categorytype":0,      "gametype":"Normal",      "minimumdistributed":
0.0}
{
    "id":2, "divident":0.0, "winners":0,   "distributed":29646.37, "jackpot":48247.33,   "fixed":0.0,   "categorytype":0,      "gametype":"Normal")
{
    "id":3, "divident":2500.0,      "winners":11,   "distributed":27500.0,   "jackpot":0.0,   "fixed":2500.0,   "categorytype":1,      "gametype":"Normal")
{
    "id":4, "divident":50.0,      "winners":202,   "distributed":10100.0,   "jackpot":0.0,   "fixed":50.0,   "categorytype":1,      "gametype":"Normal")
{
    "id":5, "divident":50.0,      "winners":572,   "distributed":28600.0,   "jackpot":0.0,   "fixed":50.0,   "categorytype":1,      "gametype":"Normal")
{
    "id":6, "divident":2.0, "winners":8301, "distributed":16602.0,   "jackpot":0.0,   "fixed":2.0,   "categorytype":1,      "gametype":"Normal")
{
    "id":7, "divident":2.0, "winners":8441, "distributed":16882.0,   "jackpot":0.0,   "fixed":2.0,   "categorytype":1,      "gametype":"Normal")
{
    "id":8, "divident":1.5, "winners":40987,      "distributed":61480.5,   "jackpot":0.0,   "fixed":1.5,   "categorytype":1,      "gametype":"Normal")
]

    "wagerstatistics":{
    "columns":1540071,      "wagers":283493,      "addon":[]
}
}
]

    "totalpages":1,
    "totalElements":4,
    "last":true,
    "numberOfElements":7,
    "sort":[
{
    "direction":"DESC",
    "property":"id.drawId",
    "ignoreCase":false,
    "nullHandling":"NATIVE",

    "descending":true,
    "ascending":false}
]

    "first":true,
    "size":10,
    "number":0}
eltso@DESKTOP-N39ONAQ /cygdrive/c/Users/eltso/Desktop/compiler with Cygwin
$
```

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