

Flex and Bison for Android XML

Χαρίτων Κικίδης 1094595
Βασιλική Νασιέλη 1090034
Αναστασία Σουλελέ 1084612

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1 Ερώτημα 1

1.1 BNF

```
1 <LinearLayout> ::= "<LinearLayout" "android:layout_width" "=" ( <string> | <positive_integer> )
2 "android:layout_height" "=" ( <string> | <positive_integer> ) [ "android:id" "=" <string> ] [ "android:orientation" "=" <string> ]
3 ">" <LayoutContent>+ "</LinearLayout>"
4 <LayoutContent> ::= <TextView> | <ImageView> | <Button> | <RadioButton> | <ProgressBar> | <LinearLayout>
5 <RelativeLayout> ::= "<RelativeLayout" "android:layout_width" "=" ( <string> | <positive_integer> )
6 "android:layout_height" "=" ( <string> | <positive_integer> ) [ "android:id" "=" <string> ] ">" <RelativeLayoutContent> "</RelativeLayout>"
7 <RelativeLayoutContent> ::= <TextView> | <ImageView> | <Button> | <RadioButton> | <ProgressBar> | <RelativeLayout>
8 <TextView> ::= "<TextView" "android:layout_width" "=" <string> "android:layout_height" "=" <string>
9 "android:text" "=" <string> [ "android:id" "=" <string> ] [ "android:textColor" "=" <string> ] ">" <TextViewContent> "</TextView>"
10 <TextViewContent> ::= <emptyTag>
11 <ImageView> ::= "<ImageView" "android:layout_width" "=" ( <string> | <positive_integer> )
12 "android:layout_height" "=" ( <string> | <positive_integer> ) "android:src" "=" <string> [ "android:id" "=" <string> ]
13 [ "android:padding" "=" <positive_integer> ] ">" <ImageViewContent> "</ImageView>"
14 <ImageViewContent> ::= <emptyTag>
15 <Button> ::= "<Button" "android:layout_width" "=" ( <string> | <positive_integer> )
16 "android:layout_height" "=" ( <string> | <positive_integer> ) "android:text" "=" <string> [ "android:id" "=" <string> ]
17 [ "android:padding" "=" <positive_integer> ] ">" <ButtonContent> "</Button>"
18 <ButtonContent> ::= <emptyTag>
19 <RadioGroup> ::= "<RadioGroup" "android:layout_width" "=" ( <string> | <positive_integer> )
20 "android:layout_height" "=" ( <string> | <positive_integer> ) <RadioButton> [ "android:id" "=" <string> ] [ "android:checkedButton" "=" <string> ]
21 ">" <RadioGroupContent> "</RadioGroup>"
22 <RadioGroupContent> ::= <emptyTag>
23 <RadioButton> ::= "<RadioButton" "android:layout_width" "=" ( <string> | <positive_integer> )
24 "android:layout_height" "=" ( <string> | <positive_integer> ) "android:text" "=" <string> [ "android:id" "=" <string> ]
25 ">" <RadioButtonContent> "</RadioButton>"
26 <RadioButtonContent> ::= <emptyTag>
27 <ProgressBar> ::= "<ProgressBar" "android:layout_width" "=" ( <string> | <positive_integer> )
28 "android:layout_height" "=" ( <string> | <positive_integer> ) [ "android:id" "=" <string> ] [ "android:max" "=" <positive_integer> ]
29 [ "android:progress" "=" <positive_integer> ] ">" <ProgressBarContent> "</ProgressBar>"
30 <ProgressBarContent> ::= <emptyTag>
31 <Comment> ::= "<!--" (character - "-")* "-->"
32 <emptyTag> ::= "<emptyTag>" "</emptyTag>"
33 <string> ::= "'" <character>* "'" | '"' <character>* '"'
34 <character> ::= <letter> | <digit> | <specialChar>
35 <positive_integer> ::= <digit> {1,}
36 <letter> ::= 'A' | 'B' | 'C' | ... | 'Z' | 'a' | 'b' | 'c' | ... | 'z'
37 <digit> ::= '0' | '1' | '2' | ... | '9'
38 <special> ::= ' ' | '!' | '"' | '#' | '<' | '&' | ... | '}'
```

1.2 Flex Bison: Lexer and Grammar Android XML.

1.2.1 Αρχείο Εισόδου: Android XML

```
1 <LinearLayout
2   android:layout_width="match_parent"
3   android:layout_height="match_parent"
4   android:orientation="vertical">
5
6 <TextView
7   android:layout_width="20"
8   android:layout_height="20"
9   android:id="TV1"
10  android:text="Dummy text"/>
11
12 <RadioGroup
13   android:layout_width="wrap_content"
14   android:layout_height="wrap_content">
15
16 <RadioButton
17   android:layout_width="wrap_content"
18   android:layout_height="wrap_content"
19   android:id="RB2"
20   android:text="Option 2"/>
21
22 </RadioGroup>
23
24 <!--This is a comment, ignore me! -->
25
26 <RelativeLayout
27   android:layout_width="match_parent"
28   android:layout_height="wrap_content">
29
30
31   <ImageView
32     android:layout_width="wrap_content"
33     android:layout_height="wrap_content"
34     android:src="image_name"
35     android:padding="50"/>
36
37   </RelativeLayout>
38
39 </LinearLayout>
40
```

1.2.2 Εντολές Εκτέλεσης

Ανήκουν στο `bash script`.

- **Bison command:**
`bison -d grammar.y`
- **Flex command:**
`flex lexical.l`
- **GCC commands:**
`– gcc -c lex.yy.c -o lex.yy.o`
`– gcc -c grammar.tab.c -o grammar.tab.o`
- **Linking:**
`gcc lex.yy.o grammar.tab.o -o myParser.exe`
- **Run the parser:**
`./myParser.exe CodeXML.xml`

1.2.3 Παραδοχές/Σχόλια:

****Σημείωση:** Η υλοποίηση της εργασίας, έγινε με βάση την δομή του παραδείγματος του κώδικα XML (με βάση την σειρά των στοιχείων).

Parsing/Output:

Κάθε φορά που τρέχουμε το πρόγραμμα, στην έξοδο βλέπουμε κάθε **Token** το οποίο συναντάται από τον parser, καθώς και την γραμμή στην οποία ανήκει (στο αρχείο XML). Για τις εκτυπώσεις αυτές έχουμε δημιουργήσει τις αντίστοιχες συναρτήσεις στον λεκτικό αναλυτή.

Comments:

Τα σχόλια της γλώσσας τα χειριστήκαμε μέσα στον λεκτικό αναλυτή, συγκεκριμένα ορίσαμε ένα STATE_COMMENT το οποίο ξεκίνα την σάρωση του σχολίου μόλις συναντήσει την ακολουθία "<!--" και ολοκληρώνει στο "-->". Φυσικά χειριστήκαμε και την περίπτωση που το σχόλιο είναι άκυρο, δηλαδή περιέχει "--", όπου και καταλήγουμε σε error.

grammar.y

Στον συντακτικό αναλυτή, έχουμε ορίσει την δομή που πρέπει να ακολουθεί το input file, και σε κάθε περίπτωση τα αντίστοιχα μηνύματα/errors που καλούνται από τους ελέγχους που γίνονται στα στοιχεία της γλώσσας.

1.2.4 Παράδειγμα Εκτέλεσης:

- **Successful Syntax Analysis:**

```
TOKEN FOUND: <LinearLayout | LINE: 1
TOKEN FOUND: android:layout_width= | LINE: 2
TOKEN FOUND: "match_parent" | LINE: 2
TOKEN FOUND: android:layout_height= | LINE: 3
TOKEN FOUND: "match_parent" | LINE: 3
TOKEN FOUND: android:orientation= | LINE: 4
TOKEN FOUND: "vertical" | LINE: 4
android:orientation= "vertical"
TOKEN FOUND: > | LINE: 4
TOKEN FOUND: <TextView | LINE: 5
TOKEN FOUND: android:layout_width= | LINE: 6
TOKEN FOUND: "20" | LINE: 6
TOKEN FOUND: android:layout_height= | LINE: 7
TOKEN FOUND: "20" | LINE: 7
TOKEN FOUND: android:id= | LINE: 8
TOKEN FOUND: "9" | LINE: 8
android:id= 9
TOKEN FOUND: android:text= | LINE: 9
TOKEN FOUND: "Dummy text" | LINE: 9
android:text= "Dummy text"
TOKEN FOUND: /> | LINE: 9
TOKEN FOUND: <RadioGroup | LINE: 10
TOKEN FOUND: android:layout_width= | LINE: 11
TOKEN FOUND: "wrap_content" | LINE: 11
TOKEN FOUND: android:layout_height= | LINE: 12
TOKEN FOUND: "wrap_content" | LINE: 12
TOKEN FOUND: > | LINE: 12
TOKEN FOUND: <RadioButton | LINE: 13
TOKEN FOUND: android:layout_width= | LINE: 14
TOKEN FOUND: "wrap_content" | LINE: 14
TOKEN FOUND: android:layout_height= | LINE: 15
TOKEN FOUND: "wrap_content" | LINE: 15
TOKEN FOUND: android:id= | LINE: 16
TOKEN FOUND: "RB2" | LINE: 16
android:id= "RB2"
TOKEN FOUND: android:text= | LINE: 17
TOKEN FOUND: "Option 2" | LINE: 17
android:text= "Option 2"
TOKEN FOUND: /> | LINE: 17
TOKEN FOUND: </RadioGroup> | LINE: 18
This is a comment, ignore me! COMMENT FOUND: --> | LINE: 19
TOKEN FOUND: <RelativeLayout | LINE: 20
TOKEN FOUND: android:layout_width= | LINE: 21
TOKEN FOUND: "match_parent" | LINE: 21
TOKEN FOUND: android:layout_height= | LINE: 22
TOKEN FOUND: "wrap_content" | LINE: 22
TOKEN FOUND: > | LINE: 22
TOKEN FOUND: <ImageView | LINE: 23
TOKEN FOUND: android:layout_width= | LINE: 24
TOKEN FOUND: "wrap_content" | LINE: 24
TOKEN FOUND: android:layout_height= | LINE: 25
TOKEN FOUND: "wrap_content" | LINE: 25
TOKEN FOUND: android:src= | LINE: 26
TOKEN FOUND: "image_name" | LINE: 26
android:src= "image_name"
TOKEN FOUND: android:padding= | LINE: 27
TOKEN FOUND: "50" | LINE: 27
```

```
android:padding= 50
TOKEN FOUND: /> | LINE: 27
TOKEN FOUND: </RelativeLayout> | LINE: 28
TOKEN FOUND: </LinearLayout> | LINE: 29
TOKEN FOUND: | LINE: 29
Syntax Analysis completed successfully.
```

- **Comment Error:**

```
TOKEN FOUND: <LinearLayout | LINE: 1
TOKEN FOUND: android:layout_width= | LINE: 2
TOKEN FOUND: "match_parent" | LINE: 2
TOKEN FOUND: android:layout_height= | LINE: 3
TOKEN FOUND: "match_parent" | LINE: 3
TOKEN FOUND: android:orientation= | LINE: 4
TOKEN FOUND: "vertical" | LINE: 4
android:orientation= "vertical"
TOKEN FOUND: > | LINE: 4
TOKEN FOUND: <TextView | LINE: 5
TOKEN FOUND: android:layout_width= | LINE: 6
TOKEN FOUND: "20" | LINE: 6
TOKEN FOUND: android:layout_height= | LINE: 7
TOKEN FOUND: "20" | LINE: 7
TOKEN FOUND: android:id= | LINE: 8
TOKEN FOUND: "9" | LINE: 8
android:id= "9"
TOKEN FOUND: android:text= | LINE: 9
TOKEN FOUND: "Dummy text" | LINE: 9
android:text= "Dummy text"
TOKEN FOUND: /> | LINE: 9
TOKEN FOUND: <RadioGroup | LINE: 10
TOKEN FOUND: android:layout_width= | LINE: 11
TOKEN FOUND: "wrap_content" | LINE: 11
TOKEN FOUND: android:layout_height= | LINE: 12
TOKEN FOUND: "wrap_content" | LINE: 12
TOKEN FOUND: > | LINE: 12
TOKEN FOUND: <RadioButton | LINE: 13
TOKEN FOUND: android:layout_width= | LINE: 14
TOKEN FOUND: "wrap_content" | LINE: 14
TOKEN FOUND: android:layout_height= | LINE: 15
TOKEN FOUND: "wrap_content" | LINE: 15
TOKEN FOUND: android:id= | LINE: 16
TOKEN FOUND: "RB2" | LINE: 16
android:id= "RB2"
TOKEN FOUND: android:text= | LINE: 17
TOKEN FOUND: "Option 2" | LINE: 17
android:text= "Option 2"
TOKEN FOUND: /> | LINE: 17
TOKEN FOUND: </RadioGroup> | LINE: 18
Invalid comment on line 19: comment contains '--'
This is a -- comment, ignore me! -> ERROR at line 19 caused by -- : Wrong token
TOKEN FOUND: <RelativeLayout | LINE: 20
TOKEN FOUND: android:layout_width= | LINE: 21
TOKEN FOUND: "match_parent" | LINE: 21
TOKEN FOUND: android:layout_height= | LINE: 22
TOKEN FOUND: "wrap_content" | LINE: 22
TOKEN FOUND: > | LINE: 22
TOKEN FOUND: <ImageView | LINE: 23
TOKEN FOUND: android:layout_width= | LINE: 24
TOKEN FOUND: "wrap_content" | LINE: 24
TOKEN FOUND: android:layout_height= | LINE: 25
TOKEN FOUND: "wrap_content" | LINE: 25
TOKEN FOUND: android:src= | LINE: 26
TOKEN FOUND: "image_name" | LINE: 26
android:src= "image_name"
TOKEN FOUND: android:padding= | LINE: 27
```

```
TOKEN FOUND: android:padding= | LINE: 27
TOKEN FOUND: "50" | LINE: 27
android:padding= "50"
TOKEN FOUND: /> | LINE: 27
TOKEN FOUND: </RelativeLayout> | LINE: 28
TOKEN FOUND: </LinearLayout> | LINE: 29
TOKEN FOUND: | LINE: 29
Syntax Analysis failed due to 1 errors
```

- **LinearLayout Syntax Error:**

```
TOKEN FOUND: <LinearLayout | LINE: 1
TOKEN FOUND: android:layout_width= | LINE: 2
TOKEN FOUND: "match_parent" | LINE: 2
TOKEN FOUND: android:layout_height= | LINE: 3
TOKEN FOUND: "match_parent" | LINE: 3
TOKEN FOUND: android:orientation= | LINE: 4
TOKEN FOUND: "vertical" | LINE: 4
android:orientation= "vertical"
TOKEN FOUND: > | LINE: 4
TOKEN FOUND: <TextView | LINE: 5
TOKEN FOUND: android:layout_width= | LINE: 6
TOKEN FOUND: "20" | LINE: 6
TOKEN FOUND: android:layout_height= | LINE: 7
TOKEN FOUND: "20" | LINE: 7
TOKEN FOUND: android:id= | LINE: 8
TOKEN FOUND: "9" | LINE: 8
android:id= 9
TOKEN FOUND: android:text= | LINE: 9
TOKEN FOUND: "Dummy text" | LINE: 9
android:text= "Dummy text"
TOKEN FOUND: /> | LINE: 9
TOKEN FOUND: <RadioGroup | LINE: 10
TOKEN FOUND: android:layout_width= | LINE: 11
TOKEN FOUND: "wrap_content" | LINE: 11
TOKEN FOUND: android:layout_height= | LINE: 12
TOKEN FOUND: "wrap_content" | LINE: 12
TOKEN FOUND: > | LINE: 12
TOKEN FOUND: <RadioButton | LINE: 13
TOKEN FOUND: android:layout_width= | LINE: 14
TOKEN FOUND: "wrap_content" | LINE: 14
TOKEN FOUND: android:layout_height= | LINE: 15
TOKEN FOUND: "wrap_content" | LINE: 15
TOKEN FOUND: android:id= | LINE: 16
TOKEN FOUND: "RB2" | LINE: 16
android:id= "RB2"
TOKEN FOUND: android:text= | LINE: 17
TOKEN FOUND: "Option 2" | LINE: 17
android:text= "Option 2"
TOKEN FOUND: /> | LINE: 17
TOKEN FOUND: </RadioGroup> | LINE: 18
This is a comment, ignore me! COMMENT FOUND: --> | LINE: 19
UNRECOGNIZED_CHAR: <
UNRECOGNIZED_CHAR: R
UNRECOGNIZED_CHAR: e
UNRECOGNIZED_CHAR: l
UNRECOGNIZED_CHAR: a
UNRECOGNIZED_CHAR: t
UNRECOGNIZED_CHAR: i
UNRECOGNIZED_CHAR: v
UNRECOGNIZED_CHAR: e
UNRECOGNIZED_CHAR: L
UNRECOGNIZED_CHAR: a
UNRECOGNIZED_CHAR: y
UNRECOGNIZED_CHAR: o
UNRECOGNIZED_CHAR: t
TOKEN FOUND: android:layout_width= | LINE: 21
-> ERROR at line 21 caused by android:layout_width= : syntax error, unexpected T_ANDROID_LAYOUT_WIDTH, expecting T_END_LINEAR_LAYOUT
```


- **Padding Syntax Error:**

```
TOKEN FOUND: "match_parent" | LINE: 2
TOKEN FOUND: android:layout_height= | LINE: 3
TOKEN FOUND: "match_parent" | LINE: 3
TOKEN FOUND: android:orientation= | LINE: 4
TOKEN FOUND: "vertical" | LINE: 4
android:orientation= "vertical"
TOKEN FOUND: > | LINE: 4
TOKEN FOUND: <TextView | LINE: 5
TOKEN FOUND: android:layout_width= | LINE: 6
TOKEN FOUND: "20" | LINE: 6
TOKEN FOUND: android:layout_height= | LINE: 7
TOKEN FOUND: "20" | LINE: 7
TOKEN FOUND: android:id= | LINE: 8
TOKEN FOUND: "9" | LINE: 8
android:id= 9
TOKEN FOUND: android:text= | LINE: 9
TOKEN FOUND: "Dummy text" | LINE: 9
android:text= "Dummy text"
TOKEN FOUND: /> | LINE: 9
TOKEN FOUND: <RadioGroup | LINE: 10
TOKEN FOUND: android:layout_width= | LINE: 11
TOKEN FOUND: "wrap_content" | LINE: 11
TOKEN FOUND: android:layout_height= | LINE: 12
TOKEN FOUND: "wrap_content" | LINE: 12
TOKEN FOUND: > | LINE: 12
TOKEN FOUND: <RadioButton | LINE: 13
TOKEN FOUND: android:layout_width= | LINE: 14
TOKEN FOUND: "wrap_content" | LINE: 14
TOKEN FOUND: android:layout_height= | LINE: 15
TOKEN FOUND: "wrap_content" | LINE: 15
TOKEN FOUND: android:id= | LINE: 16
TOKEN FOUND: "RB2" | LINE: 16
android:id= "RB2"
TOKEN FOUND: android:text= | LINE: 17
TOKEN FOUND: "Option 2" | LINE: 17
android:text= "Option 2"
TOKEN FOUND: /> | LINE: 17
TOKEN FOUND: </RadioGroup> | LINE: 18
This is a comment, ignore me! COMMENT FOUND: --> | LINE: 19
TOKEN FOUND: <RelativeLayout | LINE: 20
TOKEN FOUND: android:layout_width= | LINE: 21
TOKEN FOUND: "match_parent" | LINE: 21
TOKEN FOUND: android:layout_height= | LINE: 22
TOKEN FOUND: "wrap_content" | LINE: 22
TOKEN FOUND: > | LINE: 22
TOKEN FOUND: <ImageView | LINE: 23
TOKEN FOUND: android:layout_width= | LINE: 24
TOKEN FOUND: "wrap_content" | LINE: 24
TOKEN FOUND: android:layout_height= | LINE: 25
TOKEN FOUND: "wrap_content" | LINE: 25
TOKEN FOUND: android:src= | LINE: 26
TOKEN FOUND: "image_name" | LINE: 26
android:src= "image_name"
TOKEN FOUND: android:padding= | LINE: 27
TOKEN FOUND: "test" | LINE: 27
-> ERROR at line 27 caused by "test" : syntax error, unexpected T_STRING, expecting T_POSITIVE_INTEGER
Syntax Analysis failed due to 1 errors
```

- **2 Syntax Errors:**

```
TOKEN FOUND: "match_parent" | LINE: 2
TOKEN FOUND: android:layout_height= | LINE: 3
TOKEN FOUND: "match_parent" | LINE: 3
TOKEN FOUND: android:orientation= | LINE: 4
TOKEN FOUND: "vertical" | LINE: 4
android:orientation= "vertical"
TOKEN FOUND: > | LINE: 4
TOKEN FOUND: <TextView | LINE: 5
TOKEN FOUND: android:layout_width= | LINE: 6
TOKEN FOUND: "20" | LINE: 6
TOKEN FOUND: android:layout_height= | LINE: 7
TOKEN FOUND: "20" | LINE: 7
TOKEN FOUND: android:id= | LINE: 8
TOKEN FOUND: "9" | LINE: 8
android:id= 9
TOKEN FOUND: android:text= | LINE: 9
TOKEN FOUND: "Dummy text" | LINE: 9
android:text= "Dummy text"
TOKEN FOUND: /> | LINE: 9
TOKEN FOUND: <RadioGroup | LINE: 10
TOKEN FOUND: android:layout_width= | LINE: 11
TOKEN FOUND: "wrap_content" | LINE: 11
TOKEN FOUND: android:layout_height= | LINE: 12
TOKEN FOUND: "wrap_content" | LINE: 12
TOKEN FOUND: > | LINE: 12
TOKEN FOUND: <RadioButton | LINE: 13
TOKEN FOUND: android:layout_width= | LINE: 14
TOKEN FOUND: "wrap_content" | LINE: 14
TOKEN FOUND: android:layout_height= | LINE: 15
TOKEN FOUND: "wrap_content" | LINE: 15
TOKEN FOUND: android:id= | LINE: 16
TOKEN FOUND: "RB2" | LINE: 16
android:id= "RB2"
TOKEN FOUND: android:text= | LINE: 17
TOKEN FOUND: "Option 2" | LINE: 17
android:text= "Option 2"
TOKEN FOUND: /> | LINE: 17
TOKEN FOUND: </RadioGroup> | LINE: 18
Invalid comment on line 19: comment contains '--'
This is a -- comment, ignore me! -> ERROR at line 19 caused by -- : Wrong token
UNRECOGNIZED_CHAR: <
UNRECOGNIZED_CHAR: R
UNRECOGNIZED_CHAR: e
UNRECOGNIZED_CHAR: l
UNRECOGNIZED_CHAR: a
UNRECOGNIZED_CHAR: t
UNRECOGNIZED_CHAR: i
UNRECOGNIZED_CHAR: v
UNRECOGNIZED_CHAR: e
UNRECOGNIZED_CHAR: L
UNRECOGNIZED_CHAR: a
UNRECOGNIZED_CHAR: y
UNRECOGNIZED_CHAR: u
UNRECOGNIZED_CHAR: t
TOKEN FOUND: android:layout_width= | LINE: 21
-> ERROR at line 21 caused by android:layout_width= : syntax error, unexpected T_ANDROID_LAYOUT_WIDTH, expecting T_END_LINEAR_LAYOUT
Syntax Analysis failed due to 2 errors
```

2 Ερώτημα 2

2.1 a.

- Wrong ID positive integer:

```
TOKEN FOUND: <LinearLayout | LINE: 1
TOKEN FOUND: android:layout_width= | LINE: 2
TOKEN FOUND: "match_parent" | LINE: 2
TOKEN FOUND: android:layout_height= | LINE: 3
TOKEN FOUND: "match_parent" | LINE: 3
TOKEN FOUND: android:orientation= | LINE: 4
TOKEN FOUND: "vertical" | LINE: 4
android:orientation= = "vertical"
TOKEN FOUND: > | LINE: 4
TOKEN FOUND: <TextView | LINE: 5
TOKEN FOUND: android:layout_width= | LINE: 6
TOKEN FOUND: "20dp" | LINE: 6
TOKEN FOUND: android:layout_height= | LINE: 7
TOKEN FOUND: "20dp" | LINE: 7
Invalid value for android:layout_height: "20dp"
TOKEN FOUND: android:id= | LINE: 8
TOKEN FOUND: "9" | LINE: 8
android:id= = 9
TOKEN FOUND: android:text= | LINE: 9
TOKEN FOUND: "Dummy text" | LINE: 9
android:text= = "Dummy text"
TOKEN FOUND: /> | LINE: 9
TOKEN FOUND: <RadioGroup | LINE: 10
TOKEN FOUND: android:layout_width= | LINE: 11
TOKEN FOUND: "wrap_content" | LINE: 11
TOKEN FOUND: android:layout_height= | LINE: 12
TOKEN FOUND: "wrap_content" | LINE: 12
TOKEN FOUND: > | LINE: 12
TOKEN FOUND: <RadioButton | LINE: 13
TOKEN FOUND: android:layout_width= | LINE: 14
TOKEN FOUND: "wrap_content" | LINE: 14
TOKEN FOUND: android:layout_height= | LINE: 15
TOKEN FOUND: "wrap_content" | LINE: 15
TOKEN FOUND: android:id= | LINE: 16
TOKEN FOUND: "9" | LINE: 16
android:id= = 9
-> ERROR at line 16 caused by "9" : The android:id value is not unique.
TOKEN FOUND: android:text= | LINE: 17
TOKEN FOUND: "Option 2" | LINE: 17
android:text= = "Option 2"
TOKEN FOUND: /> | LINE: 17
TOKEN FOUND: </RadioGroup> | LINE: 18
This is a comment, ignore me! COMMENT FOUND: --> | LINE: 19
TOKEN FOUND: <RelativeLayout | LINE: 20
TOKEN FOUND: android:layout_width= | LINE: 21
TOKEN FOUND: "match_parent" | LINE: 21
TOKEN FOUND: android:layout_height= | LINE: 22
TOKEN FOUND: "wrap_content" | LINE: 22
TOKEN FOUND: > | LINE: 22
TOKEN FOUND: <ImageView | LINE: 23
TOKEN FOUND: android:layout_width= | LINE: 24
TOKEN FOUND: "wrap_content" | LINE: 24
TOKEN FOUND: android:layout_height= | LINE: 25
TOKEN FOUND: "wrap_content" | LINE: 25
```

```
TOKEN FOUND: wrap_content | LINE: 24
TOKEN FOUND: android:layout_height= | LINE: 25
TOKEN FOUND: "wrap_content" | LINE: 25
TOKEN FOUND: android:src= | LINE: 26
TOKEN FOUND: "image_name" | LINE: 26
android:src= = "image_name"
TOKEN FOUND: android:padding= | LINE: 27
TOKEN FOUND: "50" | LINE: 27
android:padding= = '0'
TOKEN FOUND: /> | LINE: 27
TOKEN FOUND: <ProgressBar | LINE: 28
TOKEN FOUND: android:layout_width= | LINE: 29
TOKEN FOUND: "match_parent" | LINE: 29
TOKEN FOUND: android:layout_height= | LINE: 30
TOKEN FOUND: "wrap_content" | LINE: 30
TOKEN FOUND: android:id= | LINE: 31
TOKEN FOUND: "Test" | LINE: 31
android:id= = "Test"
TOKEN FOUND: android:max= | LINE: 32
TOKEN FOUND: "80" | LINE: 32
android:max= = 80
TOKEN FOUND: android:progress= | LINE: 33
TOKEN FOUND: "10" | LINE: 33
android:progress= = 10
TOKEN FOUND: /> | LINE: 33
TOKEN FOUND: </RelativeLayout> | LINE: 34
TOKEN FOUND: </LinearLayout> | LINE: 35
TOKEN FOUND: | LINE: 36
Syntax Analysis failed due to 1 errors
```

- Wrong ID string:

```
TOKEN FOUND: <LinearLayout | LINE: 1
TOKEN FOUND: android:layout_width= | LINE: 2
TOKEN FOUND: "match_parent" | LINE: 2
TOKEN FOUND: android:layout_height= | LINE: 3
TOKEN FOUND: "match_parent" | LINE: 3
TOKEN FOUND: android:orientation= | LINE: 4
TOKEN FOUND: "vertical" | LINE: 4
android:orientation= "vertical"
TOKEN FOUND: > | LINE: 4
TOKEN FOUND: <TextView | LINE: 5
TOKEN FOUND: android:layout_width= | LINE: 6
TOKEN FOUND: "28dp" | LINE: 6
TOKEN FOUND: android:layout_height= | LINE: 7
TOKEN FOUND: "28dp" | LINE: 7
Invalid value for android:layout_height: "28dp"
TOKEN FOUND: android:id= | LINE: 8
TOKEN FOUND: "RB1" | LINE: 8
android:id= "RB1"
TOKEN FOUND: android:text= | LINE: 9
TOKEN FOUND: "Dummy text" | LINE: 9
android:text= "Dummy text"
TOKEN FOUND: /> | LINE: 9
TOKEN FOUND: <RadioGroup | LINE: 10
TOKEN FOUND: android:layout_width= | LINE: 11
TOKEN FOUND: "wrap_content" | LINE: 11
TOKEN FOUND: android:layout_height= | LINE: 12
TOKEN FOUND: "wrap_content" | LINE: 12
TOKEN FOUND: > | LINE: 12
TOKEN FOUND: <RadioButton | LINE: 13
TOKEN FOUND: android:layout_width= | LINE: 14
TOKEN FOUND: "wrap_content" | LINE: 14
TOKEN FOUND: android:layout_height= | LINE: 15
TOKEN FOUND: "wrap_content" | LINE: 15
TOKEN FOUND: android:id= | LINE: 16
TOKEN FOUND: "RB1" | LINE: 16
android:id= "RB1"
-> ERROR at line 16 caused by "RB1" : The android:id value is not unique.
TOKEN FOUND: android:text= | LINE: 17
TOKEN FOUND: "Option 2" | LINE: 17
android:text= "Option 2"
TOKEN FOUND: /> | LINE: 17
TOKEN FOUND: </RadioGroup> | LINE: 18
This is a comment, ignore me! COMMENT FOUND: --> | LINE: 19
TOKEN FOUND: <RelativeLayout | LINE: 20
TOKEN FOUND: android:layout_width= | LINE: 21
TOKEN FOUND: "match_parent" | LINE: 21
TOKEN FOUND: android:layout_height= | LINE: 22
TOKEN FOUND: "wrap_content" | LINE: 22
TOKEN FOUND: > | LINE: 22
TOKEN FOUND: <ImageView | LINE: 23
TOKEN FOUND: android:layout_width= | LINE: 24
```

```
TOKEN FOUND: <ImageView | LINE: 23
TOKEN FOUND: android:layout_width= | LINE: 24
TOKEN FOUND: "wrap_content" | LINE: 24
TOKEN FOUND: android:layout_height= | LINE: 25
TOKEN FOUND: "wrap_content" | LINE: 25
TOKEN FOUND: android:src= | LINE: 26
TOKEN FOUND: "image_name" | LINE: 26
android:src= "image_name"
TOKEN FOUND: android:padding= | LINE: 27
TOKEN FOUND: "50" | LINE: 27
android:padding= "50"
TOKEN FOUND: /> | LINE: 27
TOKEN FOUND: <ProgressBar | LINE: 28
TOKEN FOUND: android:layout_width= | LINE: 29
TOKEN FOUND: "match_parent" | LINE: 29
TOKEN FOUND: android:layout_height= | LINE: 30
TOKEN FOUND: "wrap_content" | LINE: 30
TOKEN FOUND: android:id= | LINE: 31
TOKEN FOUND: "Test" | LINE: 31
android:id= "Test"
TOKEN FOUND: android:max= | LINE: 32
TOKEN FOUND: "80" | LINE: 32
android:max= 80
TOKEN FOUND: android:progress= | LINE: 33
TOKEN FOUND: "10" | LINE: 33
android:progress= 10
TOKEN FOUND: /> | LINE: 33
TOKEN FOUND: </RelativeLayout> | LINE: 34
TOKEN FOUND: </LinearLayout> | LINE: 35
TOKEN FOUND: | LINE: 36
Syntax Analysis failed due to 1 errors
```

2.2 b.

- **Width and Height:**

```
TOKEN FOUND: <LinearLayout | LINE: 1
TOKEN FOUND: android:layout_width= | LINE: 2
TOKEN FOUND: "something_else" | LINE: 2
Invalid value for android:layout width: "something_else"
TOKEN FOUND: android:layout_height= | LINE: 3
TOKEN FOUND: "match_parent" | LINE: 3
TOKEN FOUND: android:orientation= | LINE: 4
```

```
TOKEN FOUND: "match_parent" | LINE: 3
TOKEN FOUND: android:orientation= | LINE: 4
TOKEN FOUND: "vertical" | LINE: 4
android:orientation= "vertical"
TOKEN FOUND: > | LINE: 4
TOKEN FOUND: <TextView | LINE: 5
TOKEN FOUND: android:layout_width= | LINE: 6
TOKEN FOUND: "20" | LINE: 6
TOKEN FOUND: android:layout_height= | LINE: 7
TOKEN FOUND: "other value" | LINE: 7
Invalid value for android:layout height: "other_value"
TOKEN FOUND: android:id= | LINE: 8
TOKEN FOUND: "RB1" | LINE: 8
android:id= "RB1"
TOKEN FOUND: android:text= | LINE: 9
TOKEN FOUND: "Dummy text" | LINE: 9
android:text= "Dummy text"
TOKEN FOUND: /> | LINE: 9
```

2.3 c.

- Wrong padding:

```
UNRECOGNIZED_CHAR: "  
TOKEN FOUND: android:layout_height= | LINE: 3  
TOKEN FOUND: "match_parent" | LINE: 3  
TOKEN FOUND: android:orientation= | LINE: 4  
TOKEN FOUND: "vertical" | LINE: 4  
android:orientation= "vertical"  
TOKEN FOUND: > | LINE: 4  
TOKEN FOUND: <TextView | LINE: 5  
TOKEN FOUND: android:layout_width= | LINE: 6  
TOKEN FOUND: "20" | LINE: 6  
TOKEN FOUND: android:layout_height= | LINE: 7  
TOKEN FOUND: "20" | LINE: 7  
TOKEN FOUND: android:id= | LINE: 8  
TOKEN FOUND: "9" | LINE: 8  
android:id= 9  
TOKEN FOUND: android:text= | LINE: 9  
TOKEN FOUND: "Dummy text" | LINE: 9  
android:text= "Dummy text"  
TOKEN FOUND: /> | LINE: 9  
TOKEN FOUND: <RadioGroup | LINE: 10  
TOKEN FOUND: android:layout_width= | LINE: 11  
TOKEN FOUND: "wrap_content" | LINE: 11  
TOKEN FOUND: android:layout_height= | LINE: 12  
TOKEN FOUND: "wrap_content" | LINE: 12  
TOKEN FOUND: > | LINE: 12  
TOKEN FOUND: <RadioButton | LINE: 13  
TOKEN FOUND: android:layout_width= | LINE: 14  
TOKEN FOUND: "wrap_content" | LINE: 14  
TOKEN FOUND: android:layout_height= | LINE: 15  
TOKEN FOUND: "wrap_content" | LINE: 15  
TOKEN FOUND: android:id= | LINE: 16  
TOKEN FOUND: "RB2" | LINE: 16  
android:id= "RB2"  
TOKEN FOUND: android:text= | LINE: 17  
TOKEN FOUND: "Option 2" | LINE: 17  
android:text= "Option 2"  
TOKEN FOUND: /> | LINE: 17  
TOKEN FOUND: </RadioGroup> | LINE: 18  
This is a comment, ignore me! COMMENT FOUND: --> | LINE: 19  
TOKEN FOUND: <RelativeLayout | LINE: 20  
TOKEN FOUND: android:layout_width= | LINE: 21  
TOKEN FOUND: "match_parent" | LINE: 21  
TOKEN FOUND: android:layout_height= | LINE: 22  
TOKEN FOUND: "wrap_content" | LINE: 22  
TOKEN FOUND: > | LINE: 22  
TOKEN FOUND: <ImageView | LINE: 23  
TOKEN FOUND: android:layout_width= | LINE: 24  
TOKEN FOUND: "wrap_content" | LINE: 24  
TOKEN FOUND: android:layout_height= | LINE: 25  
TOKEN FOUND: "wrap_content" | LINE: 25  
TOKEN FOUND: android:src= | LINE: 26  
TOKEN FOUND: "image_name" | LINE: 26  
android:src= "image_name"  
TOKEN FOUND: android:padding= | LINE: 27  
TOKEN FOUND: "TEST" | LINE: 27  
-> ERROR at line 27 caused by "TEST" : syntax error, unexpected T_STRING, expecting T_POSITIVE_INTEGER  
Syntax Analysis failed due to 1 errors
```

27

android:padding="TEST"/>

2.4 d.

- **Checked Button value doesn't match Radio Button id:**

```
-> ERROR at line 29 caused by </RadioGroup> : CHECKED BUTTON VALUE ISN'T IN THE USED RadioButton IDs LIST
This is a comment, ignore me! COMMENT FOUND: --> | LINE: 30
TOKEN FOUND: <RelativeLayout | LINE: 31
TOKEN FOUND: android:layout_width= | LINE: 32
TOKEN FOUND: "match_parent" | LINE: 32
TOKEN FOUND: android:layout_height= | LINE: 33
TOKEN FOUND: "wrap_content" | LINE: 33
TOKEN FOUND: > | LINE: 33
TOKEN FOUND: <ImageView | LINE: 34
TOKEN FOUND: android:layout_width= | LINE: 35
TOKEN FOUND: "wrap_content" | LINE: 35
TOKEN FOUND: android:layout_height= | LINE: 36
TOKEN FOUND: "wrap_content" | LINE: 36
TOKEN FOUND: android:src= | LINE: 37
TOKEN FOUND: "image_name" | LINE: 37
android:src= "image_name"
TOKEN FOUND: android:padding= | LINE: 38
TOKEN FOUND: "50" | LINE: 38
android:padding= ''0''
TOKEN FOUND: /> | LINE: 38
TOKEN FOUND: <ProgressBar | LINE: 39
TOKEN FOUND: android:layout_width= | LINE: 40
TOKEN FOUND: "match_parent" | LINE: 40
TOKEN FOUND: android:layout_height= | LINE: 41
TOKEN FOUND: "wrap_content" | LINE: 41
TOKEN FOUND: android:id= | LINE: 42
TOKEN FOUND: "Test" | LINE: 42
android:id= "Test"
TOKEN FOUND: android:max= | LINE: 43
TOKEN FOUND: "80" | LINE: 43
android:max= 80
TOKEN FOUND: android:progress= | LINE: 44
TOKEN FOUND: "10" | LINE: 44
android:progress= 10
TOKEN FOUND: /> | LINE: 44
TOKEN FOUND: </RelativeLayout> | LINE: 45
TOKEN FOUND: </LinearLayout> | LINE: 46
TOKEN FOUND: | LINE: 46
Syntax Analysis failed due to 1 errors
```

- **Checked Button value matches Radio Button id:**

```
TOKEN FOUND: android:text= | LINE: 28
TOKEN FOUND: "Option 2" | LINE: 28
android:text= "Option 2"
TOKEN FOUND: /> | LINE: 28
TOKEN FOUND: </RadioGroup> | LINE: 29
The values are the same!

This is a comment, ignore me! COMMENT FOUND: --> | LINE: 30
TOKEN FOUND: <RelativeLayout | LINE: 31
TOKEN FOUND: android:layout_width= | LINE: 32
TOKEN FOUND: "match_parent" | LINE: 32
TOKEN FOUND: android:layout_height= | LINE: 33
TOKEN FOUND: "wrap_content" | LINE: 33
TOKEN FOUND: > | LINE: 33
TOKEN FOUND: <ImageView | LINE: 34
TOKEN FOUND: android:layout_width= | LINE: 35
TOKEN FOUND: "wrap_content" | LINE: 35
TOKEN FOUND: android:layout_height= | LINE: 36
TOKEN FOUND: "wrap_content" | LINE: 36
TOKEN FOUND: android:src= | LINE: 37
TOKEN FOUND: "image_name" | LINE: 37
android:src= "image_name"
TOKEN FOUND: android:padding= | LINE: 38
TOKEN FOUND: "50" | LINE: 38
android:padding= ''0''
TOKEN FOUND: /> | LINE: 38
TOKEN FOUND: <ProgressBar | LINE: 39
TOKEN FOUND: android:layout_width= | LINE: 40
TOKEN FOUND: "match_parent" | LINE: 40
TOKEN FOUND: android:layout_height= | LINE: 41
TOKEN FOUND: "wrap_content" | LINE: 41
TOKEN FOUND: android:id= | LINE: 42
TOKEN FOUND: "Test" | LINE: 42
android:id= "Test"
TOKEN FOUND: android:max= | LINE: 43
TOKEN FOUND: "80" | LINE: 43
android:max= 80
TOKEN FOUND: android:progress= | LINE: 44
TOKEN FOUND: "10" | LINE: 44
android:progress= 10
TOKEN FOUND: /> | LINE: 44
TOKEN FOUND: </RelativeLayout> | LINE: 45
TOKEN FOUND: </LinearLayout> | LINE: 46
TOKEN FOUND: | LINE: 46
Syntax Analysis completed successfully.
```

Input xml file (for d):

```
1 <LinearLayout
2   android:layout_width="match_parent"
3   android:layout_height="match_parent"
4   android:orientation="vertical">
5 <TextView
6   android:layout_width="20"
7   android:layout_height="20"
8   android:id="@+id/RB1"
9   android:text="Dummy text"/>
10 <RadioGroup
11   android:layout_width="wrap_content"
12   android:layout_height="wrap_content"
13   android:checkedButton="@+id/RB6">    //RB3 to match
14   <RadioButton
15     android:layout_width="wrap_content"
16     android:layout_height="wrap_content"
17     android:id="@+id/RB2"
18     android:text="Option 1"/>
19   <RadioButton
20     android:layout_width="wrap_content"
21     android:layout_height="wrap_content"
22     android:id="@+id/RB3"
23     android:text="Option 2"/>
24   <RadioButton
25     android:layout_width="wrap_content"
26     android:layout_height="wrap_content"
27     android:id="@+id/RB5"
28     android:text="Option 2"/>
29 </RadioGroup>
30 <!--This is a comment, ignore me! -->
31 <RelativeLayout
32   android:layout_width="match_parent"
33   android:layout_height="wrap_content">
34   <ImageView
35     android:layout_width="wrap_content"
36     android:layout_height="wrap_content"
37     android:src="@drawable/image_name"
38     android:padding="50"/>
39   <ProgressBar
40     android:layout_width="match_parent"
41     android:layout_height="wrap_content"
42     android:id="@+id/Test"
43     android:max="80"
44     android:progress="10"/>
45 </RelativeLayout>
46 </LinearLayout>
```


2.5 e.

- Wrong Progress:

```
TOKEN FOUND: <LinearLayout | LINE: 1
TOKEN FOUND: android:layout_width= | LINE: 2
TOKEN FOUND: "match_parent" | LINE: 2
TOKEN FOUND: android:layout_height= | LINE: 3
TOKEN FOUND: "match_parent" | LINE: 3
TOKEN FOUND: android:orientation= | LINE: 4
TOKEN FOUND: "vertical" | LINE: 4
android:orientation= "vertical"
TOKEN FOUND: > | LINE: 4
TOKEN FOUND: <TextView | LINE: 5
TOKEN FOUND: android:layout_width= | LINE: 6
TOKEN FOUND: "20dp" | LINE: 6
TOKEN FOUND: android:layout_height= | LINE: 7
TOKEN FOUND: "20dp" | LINE: 7
Invalid value for android:layout_height: "20dp"
TOKEN FOUND: android:id= | LINE: 8
TOKEN FOUND: "9" | LINE: 8
android:id= 9
TOKEN FOUND: android:text= | LINE: 9
TOKEN FOUND: "Dummy text" | LINE: 9
android:text= "Dummy text"
TOKEN FOUND: /> | LINE: 9
TOKEN FOUND: <RadioGroup | LINE: 10
TOKEN FOUND: android:layout_width= | LINE: 11
TOKEN FOUND: "wrap_content" | LINE: 11
TOKEN FOUND: android:layout_height= | LINE: 12
TOKEN FOUND: "wrap_content" | LINE: 12
TOKEN FOUND: > | LINE: 12
TOKEN FOUND: <RadioButton | LINE: 13
TOKEN FOUND: android:layout_width= | LINE: 14
TOKEN FOUND: "wrap_content" | LINE: 14
TOKEN FOUND: android:layout_height= | LINE: 15
TOKEN FOUND: "wrap_content" | LINE: 15
TOKEN FOUND: android:id= | LINE: 16
TOKEN FOUND: "RB2" | LINE: 16
android:id= "RB2"
TOKEN FOUND: android:text= | LINE: 17
TOKEN FOUND: "Option 2" | LINE: 17
android:text= "Option 2"
TOKEN FOUND: /> | LINE: 17
TOKEN FOUND: </RadioGroup> | LINE: 18
This is a comment, ignore me! COMMENT FOUND: --> | LINE: 19
TOKEN FOUND: <RelativeLayout | LINE: 20
TOKEN FOUND: android:layout_width= | LINE: 21
TOKEN FOUND: "match_parent" | LINE: 21
TOKEN FOUND: android:layout_height= | LINE: 22
TOKEN FOUND: "wrap_content" | LINE: 22
TOKEN FOUND: > | LINE: 22
TOKEN FOUND: <ImageView | LINE: 23
TOKEN FOUND: android:layout_width= | LINE: 24
```

```
TOKEN FOUND: android:layout_width= | LINE: 24
TOKEN FOUND: "wrap_content" | LINE: 24
TOKEN FOUND: android:layout_height= | LINE: 25
TOKEN FOUND: "wrap_content" | LINE: 25
TOKEN FOUND: android:src= | LINE: 26
TOKEN FOUND: "image_name" | LINE: 26
android:src= "image_name"
TOKEN FOUND: android:padding= | LINE: 27
TOKEN FOUND: "50" | LINE: 27
android:padding= '0'
TOKEN FOUND: /> | LINE: 27
TOKEN FOUND: <ProgressBar | LINE: 28
TOKEN FOUND: android:layout_width= | LINE: 29
TOKEN FOUND: "match_parent" | LINE: 29
TOKEN FOUND: android:layout_height= | LINE: 30
TOKEN FOUND: "wrap_content" | LINE: 30
TOKEN FOUND: android:id= | LINE: 31
TOKEN FOUND: "Test" | LINE: 31
android:id= "Test"
TOKEN FOUND: android:max= | LINE: 32
TOKEN FOUND: "80" | LINE: 32
android:max= '0'
TOKEN FOUND: android:progress= | LINE: 33
TOKEN FOUND: "100" | LINE: 33
-> ERROR at line 33 caused by "100" : Invalid android:progress value
TOKEN FOUND: /> | LINE: 33
TOKEN FOUND: </RelativeLayout> | LINE: 34
TOKEN FOUND: </LinearLayout> | LINE: 35
TOKEN FOUND: | LINE: 36
Syntax Analysis failed due to 1 errors
```

3 Ερώτημα 3

Δημιουργήσαμε το στοιχείο: `radio_button_child_count`, το οποίο αναφέρεται στο πλήθος στοιχείων `<RadioButton>`. Υλοποιήσαμε συναρτήσεις οι οποίες αυξάνουν την τιμή του `child_count` κάθε φορά που συναντιέται στοιχείο `<RadioButton>`. Στην τιμή του `child_count_rge`, αποθηκεύεται ο θετικός ακέραιος που συναντιέται από τον parser στο στοιχείο `radio_button_child_count`.

XML INPUT:

```
1 <LinearLayout
2   android:layout_width="match_parent"
3   android:layout_height="match_parent"
4   android:orientation="vertical">
5 <TextView
6   android:layout_width="20"
7   android:layout_height="20"
8   android:id="RB1"
9   android:text="Dummy text"/>
10 <RadioGroup
11   android:layout_width="wrap_content"
12   android:layout_height="wrap_content"
13   android:checkedButton="RB3"
14   radio_button_child_count="3">
15   <RadioButton
16     android:layout_width="wrap_content"
17     android:layout_height="wrap_content"
18     android:id="RB2"
19     android:text="Option 1"/>
20   <RadioButton
21     android:layout_width="wrap_content"
22     android:layout_height="wrap_content"
23     android:id="RB3"
24     android:text="Option 2"/>
25   <RadioButton
26     android:layout_width="wrap_content"
27     android:layout_height="wrap_content"
28     android:id="RB5"
29     android:text="Option 2"/>
30 </RadioGroup>
31 <!--This is a comment, ignore me! -->
32 <RelativeLayout
33   android:layout_width="match_parent"
34   android:layout_height="wrap_content">
35   <ImageView
36     android:layout_width="wrap_content"
37     android:layout_height="wrap_content"
38     android:src="image_name"
39     android:padding="50"/>
40   <ProgressBar
41     android:layout_width="match_parent"
42     android:layout_height="wrap_content"
43     android:id="Test"
44     android:max="80"
45     android:progress="10"/>
```

```
46     </RelativeLayout>
47 </LinearLayout>
```

- **Wrong child count:**

```
cumulative count: 4
-> ERROR at line 30 caused by </RadioGroup> : Invalid number of children. Expected 3 children for <RadioGroup>.
This is a comment, ignore me! COMMENT FOUND: --> | LINE: 31
TOKEN FOUND: <RelativeLayout | LINE: 32
TOKEN FOUND: android:layout_width= | LINE: 33
TOKEN FOUND: "match_parent" | LINE: 33
TOKEN FOUND: android:layout_height= | LINE: 34
TOKEN FOUND: "wrap_content" | LINE: 34
TOKEN FOUND: > | LINE: 34
TOKEN FOUND: <ImageView | LINE: 35
TOKEN FOUND: android:layout_width= | LINE: 36
TOKEN FOUND: "wrap_content" | LINE: 36
TOKEN FOUND: android:layout_height= | LINE: 37
TOKEN FOUND: "wrap_content" | LINE: 37
TOKEN FOUND: android:src= | LINE: 38
TOKEN FOUND: "image_name" | LINE: 38
android:src= "image_name"
TOKEN FOUND: android:padding= | LINE: 39
TOKEN FOUND: "50" | LINE: 39
android:padding= "50"
TOKEN FOUND: /> | LINE: 39
TOKEN FOUND: <ProgressBar | LINE: 40
TOKEN FOUND: android:layout_width= | LINE: 41
TOKEN FOUND: "match_parent" | LINE: 41
TOKEN FOUND: android:layout_height= | LINE: 42
TOKEN FOUND: "wrap_content" | LINE: 42
TOKEN FOUND: android:id= | LINE: 43
TOKEN FOUND: "Test" | LINE: 43
android:id= "Test"
TOKEN FOUND: android:max= | LINE: 44
TOKEN FOUND: "80" | LINE: 44
android:max= 80
TOKEN FOUND: android:progress= | LINE: 45
TOKEN FOUND: "10" | LINE: 45
android:progress= 10
TOKEN FOUND: /> | LINE: 45
TOKEN FOUND: </RelativeLayout> | LINE: 46
TOKEN FOUND: </LinearLayout> | LINE: 47
TOKEN FOUND: | LINE: 47
Syntax Analysis failed due to 1 errors
```

- **Correct child count:**

```
The number of children is correct!

This is a comment, ignore me! COMMENT FOUND: --> | LINE: 31
TOKEN FOUND: <RelativeLayout | LINE: 32
TOKEN FOUND: android:layout_width= | LINE: 33
TOKEN FOUND: "match_parent" | LINE: 33
TOKEN FOUND: android:layout_height= | LINE: 34
TOKEN FOUND: "wrap_content" | LINE: 34
TOKEN FOUND: > | LINE: 34
TOKEN FOUND: <ImageView | LINE: 35
TOKEN FOUND: android:layout_width= | LINE: 36
TOKEN FOUND: "wrap_content" | LINE: 36
TOKEN FOUND: android:layout_height= | LINE: 37
TOKEN FOUND: "wrap_content" | LINE: 37
TOKEN FOUND: android:src= | LINE: 38
TOKEN FOUND: "image_name" | LINE: 38
android:src= "image_name"
TOKEN FOUND: android:padding= | LINE: 39
TOKEN FOUND: "50" | LINE: 39
android:padding= "50"
TOKEN FOUND: /> | LINE: 39
TOKEN FOUND: <ProgressBar | LINE: 40
TOKEN FOUND: android:layout_width= | LINE: 41
TOKEN FOUND: "match_parent" | LINE: 41
TOKEN FOUND: android:layout_height= | LINE: 42
TOKEN FOUND: "wrap_content" | LINE: 42
TOKEN FOUND: android:id= | LINE: 43
TOKEN FOUND: "Test" | LINE: 43
android:id= "Test"
TOKEN FOUND: android:max= | LINE: 44
TOKEN FOUND: "80" | LINE: 44
android:max= 80
TOKEN FOUND: android:progress= | LINE: 45
TOKEN FOUND: "10" | LINE: 45
android:progress= 10
TOKEN FOUND: /> | LINE: 45
TOKEN FOUND: </RelativeLayout> | LINE: 46
TOKEN FOUND: </LinearLayout> | LINE: 47
TOKEN FOUND: | LINE: 47
Syntax Analysis completed successfully.
```

4 Final Code

LEX FILE (lexical.l)

```
1 %{
2 /* libraries */
3 #include "grammar.tab.h"
4 #include "token.h"
5 #include <stdio.h>
6 #include <stdlib.h>
7 #include <string.h>
8 #include <unistd.h>
9 #include <math.h>
10 #include <stdbool.h>
11
12 extern int flag_err_type;
13 extern void yyerror(char *message);
14
15 /*Define variables and functions*/
16 int lineno=1;
17 int line_init=-1;K
18
19 /*      errors      */
20 char str_buf[256];
21 char* str_buf_ptr;
22
23
24
25 %}
26
27
28 %option noyywrap
29 %option case-sensitive
30 %option yylineno
31
32 /* Initial States */
33 %x STATE_COMMENT SKIP_COMMENT
34 %x STATE_INLINE_COMMENT
35 %x STATE_STRING
36
37 /*Sublexical analyze*/
38 %x STRING
39
40
41
42 /*Keywords*/
43 LETTER      [a-zA-Z]
44 LETTERS     [LETTER]+
45 DIGIT       [0-9]
46 NZDIGIT     [1-9]{DIGIT}*
47 ALPHANUM    ({LETTER}|{DIGIT})
48 ALPHANUM_   ({ALPHANUM}|_)
```

```

49 ASCII      [ !"#$%&'()*+,-./:;<=>?@[\^_`{|}~]
50 WHITESPACE [ \t]
51
52 %%
53
54 "<LinearLayout"      { token_print(T_LINEAR_LAYOUT); yylval.strval=strdup(yytext); return T_LINEAR_LAYOUT;}
55 "<RelativeLayout"    { token_print(T_RELATIVE_LAYOUT); yylval.strval=strdup(yytext); return T_RELATIVE_LAYOUT;}
56 "<TextView"          { token_print(T_TEXT_VIEW); yylval.strval=strdup(yytext); return T_TEXT_VIEW;}
57 "<ImageView"         { token_print(T_IMAGE_VIEW); yylval.strval=strdup(yytext); return T_IMAGE_VIEW;}
58 "<Button"            { token_print( T_BUTTON); yylval.strval=strdup(yytext); return T_BUTTON;}
59 "<RadioButton"       { token_print( T_RADIO_BUTTON); yylval.strval=strdup(yytext); return T_RADIO_BUTTON;}
60 "<RadioGroup"        { token_print( T_RADIO_GROUP); yylval.strval=strdup(yytext); return T_RADIO_GROUP;}
61 "<ProgressBar"      { token_print( T_PROGRESS_BAR); yylval.strval=strdup(yytext); return T_PROGRESS_BAR;}
62 ">"                { token_print( T_END_TAG); yylval.strval=strdup(yytext); return T_END_TAG;}
63 ">"                { token_print( T_SLASH_END_TAG); yylval.strval=strdup(yytext); return T_SLASH_END_TAG;}
64
65 "</LinearLayout>"    { token_print(T_END_LINEAR_LAYOUT); yylval.strval=strdup(yytext); return T_END_LINEAR_LAYOUT;}
66 "</RelativeLayout>" { token_print(T_END_RELATIVE_LAYOUT); yylval.strval=strdup(yytext); return T_END_RELATIVE_LAYOUT;}
67 "</TextView>"        { token_print(T_END_TEXT_VIEW); yylval.strval=strdup(yytext); return T_END_TEXT_VIEW;}
68 "</ImageView>"       { token_print(T_END_IMAGE_VIEW); yylval.strval=strdup(yytext); return T_END_IMAGE_VIEW;}
69 "</Button>"          { token_print(T_END_BUTTON); yylval.strval=strdup(yytext); return T_END_BUTTON;}
70 "</RadioButton>"     { token_print(T_END_RADIO_BUTTON); yylval.strval=strdup(yytext); return T_END_RADIO_BUTTON;}
71 "</RadioGroup>"      { token_print(T_END_RADIO_GROUP); yylval.strval=strdup(yytext); return T_END_RADIO_GROUP;}
72 "</ProgressBar>"    { token_print(T_END_PROGRESS_BAR); yylval.strval=strdup(yytext); return T_END_PROGRESS_BAR;}
73
74 "android:layout_width=" {token_print(T_ANDROID_LAYOUT_WIDTH);yylval.strval=strdup(yytext);return T_ANDROID_LAYOUT_WIDTH;}
75 "android:layout_height=" {token_print(T_ANDROID_LAYOUT_HEIGHT); yylval.strval=strdup(yytext); return T_ANDROID_LAYOUT_HEIGHT;}
76 "android:id="           {token_print(T_ANDROID_ID); yylval.strval=strdup(yytext); return T_ANDROID_ID;}
77 "android:text="         {token_print(T_ANDROID_TEXT); yylval.strval=strdup(yytext); return T_ANDROID_TEXT;}
78 "android:orientation="  {token_print(T_ANDROID_ORIENTATION); yylval.strval=strdup(yytext); return T_ANDROID_ORIENTATION;}
79 "android:src="          {token_print(T_ANDROID_SRC); yylval.strval=strdup(yytext); return T_ANDROID_SRC;}
80 "android:padding="      {token_print(T_ANDROID_PADDING); yylval.strval=strdup(yytext); return T_ANDROID_PADDING;}
81 "android:textColor="    {token_print(T_ANDROID_TEXTCOLOR); yylval.strval=strdup(yytext); return T_ANDROID_TEXTCOLOR;}
82 "android:checkedButton=" {token_print(T_ANDROID_CHECKEDBUTTON); yylval.strval=strdup(yytext); return T_ANDROID_CHECKEDBUTTON;}
83 "android:progress="     {token_print(T_ANDROID_PROGRESS); yylval.strval=strdup(yytext); return T_ANDROID_PROGRESS;}
84 "android:max="          {token_print(T_ANDROID_MAX); yylval.strval=strdup(yytext); return T_ANDROID_MAX;}
85 "radio_button_child_count=" {token_print(T_RADIO_BUTTON_CHILD_COUNT); yylval.strval = strdup(yytext); return T_RADIO_BUTTON_CHILD_COUNT; }
86
87
88
89 "\ [1-9] [0-9]*\"      { token_print(T_POSITIVE_INTEGER); yylval.strval=strdup(yytext); return T_POSITIVE_INTEGER;}
90 "\ [a-zA-Z0-9_\-\.]*\" { token_print(T_STRING); yylval.strval=strdup(yytext); return T_STRING;}
91 \' [a-zA-Z0-9_\-\.]*\' { token_print(T_STRING_SINGLE_QUOTE); yylval.strval=strdup(yytext); return T_STRING_SINGLE_QUOTE;}
92 "\ [a-zA-Z0-9_\-\.]*" " [a-zA-Z0-9_\-\.]*\" { token_print(T_STRING_DQ_SPACE); yylval.strval=strdup(yytext); return T_STRING_DQ_SPACE;}
93
94
95
96
97
98
99 "."                  { token_print(T_DOT); yylval.strval=strdup(yytext); return T_DOT;}
100 ","                 { token_print(T_COMMA); yylval.strval=strdup(yytext); return T_COMMA;}

```

```

101 " =" { token_print(T_ASSIGN); yylval.strval=strdup(yytext); return T_ASSIGN;}
102 " : " { token_print(T_COLON); yylval.strval=strdup(yytext); return T_COLON;}
103 " [ " { token_print(T_LBRACK); yylval.strval=strdup(yytext); return T_LBRACK;}
104 " ] " { token_print(T_RBRACK); yylval.strval=strdup(yytext); return T_RBRACK;}
105 " / " { token_print(T_SLASH); yylval.strval=strdup(yytext); return T_SLASH;}
106 " ! " { token_print(T_EXCLAMATION); yylval.strval=strdup(yytext); return T_EXCLAMATION ;}
107 " - " { token_print(T_DASH); yylval.strval=strdup(yytext); return T_DASH;}
108 " { " { token_print(T_LBRACES); yylval.strval=strdup(yytext); return T_LBRACES;}
109 " } " { token_print(T_RBRACES); yylval.strval=strdup(yytext); return T_RBRACES;}
110 " @ " { token_print(T_AT); yylval.strval=strdup(yytext); return T_AT;}
111 " ? " { token_print(T_QUESTION_MARK); yylval.strval=strdup(yytext); return T_QUESTION_MARK ;}
112 " _ " { token_print(T_UNDERSCORE); yylval.strval=strdup(yytext); return T_UNDERSCORE;}
113 " # " { token_print(T_HASH); yylval.strval=strdup(yytext); return T_HASH;}
114 " ' " { token_print(T_SQUOTES); yylval.strval=strdup(yytext); return T_SQUOTES;}
115 [ \t]+ { } A /* \n */
116 <<EOF>> { token_print(T_EOF); yylval.strval=strdup(yytext); return T_EOF;}
117 . { printf("UNRECOGNIZED_CHAR: %s\n", yytext); }
118
119 [\n]+ {lineno++;}
120
121 "<!--" { BEGIN(STATE_COMMENT); str_buf_ptr = str_buf; *str_buf_ptr = '\0'; }
122 <STATE_COMMENT>"-->" { BEGIN(INITIAL);
123 if(strstr(str_buf, "--") != NULL) {
124 fprintf(stderr, "Invalid comment on line %d: comment contains '--'\n", lineno);
125 yyerror("Wrong token");
126 } else {
127 comment_print();
128 }
129 }
130 <STATE_COMMENT>.\n { *str_buf_ptr = *yytext; str_buf_ptr++; *str_buf_ptr = '\0'; ECHO;}
131
132
133
134 %%
135
136
137 void token_print(){ ////////////////////////////////////////////////// ** error
138 if(FLEX_DEBUG && SHOW_TOKENS){
139 printf("TOKEN FOUND: %s | LINE: %d\n", yytext,lineno);
140 }
141 }
142
143 //print if comment is found
144
145 void comment_print(){ ////////////////////////////////////////////////// ** error
146 if(FLEX_DEBUG && SHOW_COMMENTS){
147 printf("COMMENT FOUND: %s | LINE: %d\n", yytext,lineno);
148 }
149 }

```

BISON FILE yacc (grammar.y)

LEX FILE (lexical.l)

```
1 %{\n2 %{\n3 #include <stdio.h>\n4 #include <stdlib.h>\n5 #include <string.h>\n6 #include "token.h"\n7 #include <stdbool.h>\n8 #define MAX_RADIO_BUTTONS 100\n9 #define MAX_USED_IDS 100\n10 #define MAX_ID_LENGTH 100\n11 #define MAX_IDS 100\n12\n13\n14 /** Extern from Flex **/\n15 extern int lineno,\n16         line_init;\n17\n18 extern char str_buf[256];\n19 extern char* str_buf_ptr;\n20\n21\n22 /*Flex and bison*/\n23 extern int yylex();\n24 extern char *yytext;\n25 extern FILE *yyin;\n26\n27\n28 extern void yyterminate();\n29\n30 /* Variables for error handling and saving */\n31 int error_count=0;\n32 int flag_err_type=0; // 0: Token Error (YYTEXT) || 1: String Error (STRBUF)\n33 int scope=0;\n34 int pos_number=0;\n35 int flag=0; //flag gia to token ean einai swsto to android\n36 int valueflag=0;\n37 char* strint;\n38 char valid_radio_buttons[MAX_RADIO_BUTTONS][50]; // Array to store valid radio button ids\n39 int valid_radio_button_count = 0;\n40 int max_value = 0; // Variable to store android:max values\n41 char used_ids[MAX_USED_IDS][MAX_ID_LENGTH]; // Array to store used IDs\n42 int used_id_count = 0;\n43 static int child_count = 0; // Counter for child elements within <RadioGroup> ///3\n44 static int child_count_rge = 0; // value of radio_button_child_count\n45 char radio_button_ids[MAX_IDS][MAX_ID_LENGTH];\n46 int radio_button_id_count = 0;\n47 char temp_checked_button[MAX_ID_LENGTH];\n48 char* checked_button_id = NULL;\n49 char used_checkb[MAX_USED_IDS][MAX_ID_LENGTH];
```



```

50 char check_radiob[MAX_USED_IDS][MAX_ID_LENGTH];
51 int flag_radio_button=0;
52
53
54
55 /*Specific Functions*/
56 void yyerror(const char *message);
57 bool containsDash(const char* str);
58 int dq_string_to_int(const char* str);
59 int isIdUsed(char* id);
60 void addUsedId(char* id);
61 void addUsedIdInt(int id);
62 void increment_child_count();
63 void check_radio_group_child_count(int expected_count, int cumulative_count);
64 int isIdUsedInRadioButtons(char* id);
65 int checkRadioButtonId();
66 void save_checked_button_id(char* id);
67 void checkRadioBId(char* id);
68 void check_values();
69 %}
70
71 %define parse.error verbose
72
73 %union{
74     int intval;
75     float floatval;
76     char charval;
77     char *strval;
78 }
79
80
81 /*Keywords*/
82 %token<strval> T_LINEAR_LAYOUT
83 %token<strval> T_RELATIVE_LAYOUT
84 %token<strval> T_TEXT_VIEW
85 %token<strval> T_IMAGE_VIEW
86 %token<strval> T_BUTTON
87 %token<strval> T_RADIO_BUTTON
88 %token<strval> T_RADIO_GROUP
89 %token<strval> T_PROGRESS_BAR
90 %token<strval> T_END_TAG
91
92 %token<strval> T_END_LINEAR_LAYOUT
93 %token<strval> T_END_RELATIVE_LAYOUT
94 %token<strval> T_END_TEXT_VIEW
95 %token<strval> T_END_IMAGE_VIEW
96 %token<strval> T_END_BUTTON
97 %token<strval> T_END_RADIO_BUTTON
98 %token<strval> T_END_RADIO_GROUP
99 %token<strval> T_END_PROGRESS_BAR
100
101 %token<strval> T_ANDROID_LAYOUT_WIDTH

```

```

102 %token<strval> T_ANDROID_LAYOUT_HEIGHT
103 %token<strval> T_ANDROID_ID
104 %token<strval> T_ANDROID_TEXT
105 %token<strval> T_ANDROID_ORIENTATION
106 %token<strval> T_ANDROID_SRC
107 %token<strval> T_ANDROID_PADDING
108 %token<strval> T_ANDROID_TEXTCOLOR
109 %token<strval> T_ANDROID_CHECKEDBUTTON
110 %token<strval> T_RADIO_BUTTON_CHILD_COUNT
111 %token<strval> T_ANDROID_PROGRESS
112 %token<strval> T_ANDROID_MAX
113
114 %token<strval> T_COMMENT_OPEN
115 %token<strval> T_COMMENT_CLOSE
116
117 %token<strval> T_STRING
118 %token<strval> T_STRING_SINGLE_QUOTE
119 %token<strval> T_POSITIVE_INTEGER
120 %token<strval> T_SLASH_END_TAG
121 %token<strval> T_STRING_DQ_SPACE
122
123 /*Other tokens*/
124 %left  <strval> T_DOT                "."
125 %left  <strval> T_COMMA              ","
126 %right <strval> T_ASSIGN             "="
127 %token <strval> T_COLON              ":"
128 %left  <strval> T_LBRACK             "["
129 %left  <strval> T_RBRACK             "]"
130 %token <strval> T_SLASH              "/"
131 %token <strval> T_EXCLAMATION        "!"
132 %token <strval> T_DASH               "-"
133 %token <strval> T_LBRACES            "{"
134 %token <strval> T_RBRACES            "}"
135 %left  <strval> T_AT                 "@"
136 %token <strval> T_QUESTION_MARK     "?"
137 %token <strval> T_UNDERSCORE         "_"
138 %token <strval> T_HASH               "#"
139 %token <strval> T_QUOTES             "\""
140
141 /*EOF*/
142 %token <strval> T_EOF                0          "end of file"
143
144 /*Non-Terminal*/
145 %type  program  relativelayout2 linearlayout linearlayoutattributes  relativelayout relativelayoutattributes
146 %type  textview textviewattributes  imageview imageviewattributes
147 %type  button buttonattributes  radiogroup radiogroupattributes  radio_group_element
148 %type  src  textColor padding checkedButton progress max android_orientation
149 %type  radiobutton  radiobuttonattributes  progressbar progressbarattributes
150 %type  text content contentempty element
151 %type  radio_start radio_end
152
153 %type <strval> layout_width layout_height

```

```

154 %type <strval> android_id
155
156
157 %start program
158
159 %%
160
161 /*Grammar Rules*/
162
163 program :          T_LINEAR_LAYOUT linearlayout2
164             | T_RELATIVE_LAYOUT relativelayout2 //gia na min psaxnei duo fores to <Relative paei sto relativelayout2 poy exei kateuthian ta
165             ;
166
167 linearlayout:      T_LINEAR_LAYOUT linearlayoutattributes T_END_TAG element T_END_LINEAR_LAYOUT
168             | T_LINEAR_LAYOUT linearlayoutattributes T_END_TAG element  T_END_LINEAR_LAYOUT linearlayout
169             ;
170
171 linearlayout2:      linearlayoutattributes T_END_TAG element  T_END_LINEAR_LAYOUT
172             | linearlayoutattributes T_END_TAG element  T_END_LINEAR_LAYOUT linearlayout
173             | linearlayoutattributes T_END_TAG element element T_END_LINEAR_LAYOUT
174             ;
175
176
177 linearlayoutattributes:  layout_width layout_height element
178             | layout_width layout_height android_id element
179             | layout_width layout_height android_orientation element
180             | layout_width layout_height android_id android_orientation element comment
181             ;
182
183 layout_width:        T_ANDROID_LAYOUT_WIDTH  T_STRING //for strings "android:layout_width="
184             {
185                 if (strcmp($1, "android:layout_width=") == 0 || flag==1) { //ama to flag exei ginei 1 exei mpei hdh mia fora kai einai swsto
186                     //printf("EDW TO FLAG : \t%d\t", flag);
187                     flag=1;
188                     if (strcmp($2, "\"match_parent\"") == 0 || strcmp($2, "\"wrap_content\"") == 0){ //|| strcmp($2, T_DIMENSION) == 0 || str
189                         //printf("%s = %s\n", $1, $2);
190                         valueflag=1;
191                     }
192                 }
193             }
194             else
195                 yyerror("Expected android:layout_width=");
196
197             if(valueflag==0 ) //an ta string != value poy prepei na exoyn
198             {
199                 printf("Invalid value for android:layout_width: %s\n", $2);
200                 yyerror("Invalid value.");
201             }
202         }
203
204         | T_ANDROID_LAYOUT_WIDTH T_QUESTION_MARK
205         {

```



```

258         if (isIdUsed(pos_number_str)) {
259             yyerror("The android:id value is not unique.");
260         } else {
261             addUsedId(pos_number_str);
262         }
263     } else {
264         yyerror("Expected android:id=");
265     }
266 }
267 | T_ANDROID_ID T_STRING
268 {
269     flag = 0;
270     if (strcmp($1, "android:id=") == 0 || flag == 1) {
271         flag = 1;
272         printf("%s = %s\n", $1, $2);
273
274         if(flag_radio_button==1){
275             checkRadioBId($2);
276         }
277
278         if(isIdUsed($2)){
279             yyerror("The android:id value is not unique.");
280         }else{
281             addUsedId($2);
282         }
283     } else {
284         yyerror("Expected android:id=");
285     }
286 }
287 ;
288
289
290
291 android_orientation:      T_ANDROID_ORIENTATION T_STRING
292 { flag=0;
293     if(strcmp($1, "android:orientation=") == 0 || flag==1){
294         flag=1;
295         if(strcmp($2, "\"horizontal\"") == 0 || strcmp($2, "\"vertical\"") == 0)
296             printf("%s = %s\n", $1, $2);
297         }
298     else yyerror("Expected android:orientation=");
299 }
300 ;
301
302 text:      T_ANDROID_TEXT T_STRING
303 {
304     flag=0;
305     if(strcmp($1, "android:text=") == 0 || flag==1){
306         flag=1;
307         printf("%s = %s\n", $1, $2);}
308     else yyerror("Expected android:text=");
309 }

```

```

310 |T_ANDROID_TEXT T_STRING_DQ_SPACE //periptwsi na einai 2 lekseis me keno metaksu toys kai "" sta akra
311 {flag=0;
312     if(strcmp($1, "android:text") == 0 || flag==1){
313         flag=1;
314         printf("%s = %s\n", $1, $2);}
315     else yyerror("Expected android:text=");
316 }
317 ;
318
319
320 textColor:      T_ANDROID_TEXTCOLOR T_STRING
321 { flag=0;
322     if(strcmp($1, "android:textColor") == 0 || flag==1){
323         flag=1;
324         printf("%s = %s\n", $1, $2);}
325     else yyerror("Expected android:textColor=");
326 }
327 ;
328
329
330
331 checkedButton:  T_ANDROID_CHECKEDBUTTON T_STRING
332 {
333     save_checked_button_id($2);
334     printf("%s = %s\n", $1, $2);
335 }
336 ;
337
338 //progress max kai padding einai arithmoi giauto vazw to atoi gia na kanw to string noymero
339 progress:      T_ANDROID_PROGRESS T_POSITIVE_INTEGER
340 {
341     if (strcmp($1, "android:progress") == 0 || flag == 1) {
342         flag = 1;
343         int progress = dq_string_to_int($2);
344         if (progress >= 0 && progress <= max_value) {
345             printf("%s = %d\n", $1, progress);
346         } else {
347             yyerror("Invalid android:progress value");
348         }
349     } else {
350         yyerror("Expected android:progress=");
351     }
352 }
353 ;
354
355
356 padding:      T_ANDROID_PADDING T_POSITIVE_INTEGER
357 { flag=0;
358     if(strcmp($1, "android:padding") == 0 || flag ==1) {
359         flag=1;
360         pos_number = atoi($2);
361         if (pos_number < 0) {

```

```

362         yyerror("Invalid progress value. It should be a positive integer.");
363     }
364     printf("%s = '%d'\n", $1, pos_number);}
365     else {
366         yyerror("Expected android:padding=");
367     }
368 };
369
370
371 max:      T_ANDROID_MAX T_POSITIVE_INTEGER
372 {
373     if (strcmp($1, "android:max=") == 0) {
374         max_value = dq_string_to_int($2);
375         printf("%s = %d\n", $1, max_value);
376     } else {
377         yyerror("Expected android:max=");
378     }
379 }
380 ;
381
382 src:      T_ANDROID_SRC T_STRING
383 {
384     flag=0;
385     if(strcmp($1, "android:src=") == 0 || flag==1){
386         flag=1;
387         printf("%s = %s\n", $1, $2);}
388     else yyerror("Expected android:src=");
389 }
390 ;
391
392 relativelayout:      T_RELATIVE_LAYOUT      relativelayoutattributes T_END_TAG element T_END_RELATIVE_LAYOUT
393 |T_RELATIVE_LAYOUT      relativelayoutattributes T_END_TAG element element T_END_RELATIVE_LAYOUT
394 |T_RELATIVE_LAYOUT      relativelayoutattributes T_END_RELATIVE_LAYOUT element relativelayout
395 |T_RELATIVE_LAYOUT      relativelayoutattributes relativelayoutattributes T_END_TAG element T_END_RELATIVE_LAYOUT
396 |T_RELATIVE_LAYOUT      relativelayoutattributes element T_END_RELATIVE_LAYOUT progressbar progressbarattributes T_END_LINEAR_LAYOUT
397 |T_RELATIVE_LAYOUT      relativelayoutattributes T_END_TAG element element T_END_RELATIVE_LAYOUT T_END_LINEAR_LAYOUT
398 ;
399
400 relativelayout2:      relativelayoutattributes T_END_RELATIVE_LAYOUT element
401 | relativelayoutattributes T_END_RELATIVE_LAYOUT element relativelayout
402 | relativelayoutattributes T_END_RELATIVE_LAYOUT element
403 ;
404
405
406 relativelayoutattributes:      layout_width layout_height
407 | layout_width layout_height android_id
408 | layout_width layout_height element
409 | %empty
410 ;
411
412 textview:      T_TEXT_VIEW      textviewattributes T_SLASH_END_TAG
413 ;

```

```

414
415 textviewattributes:      layout_width layout_height text
416                          |layout_width layout_height android_id text
417                          |layout_width layout_height android_id text textColor
418                          ;
419
420 imageview:               T_IMAGE_VIEW  imageviewattributes T_SLASH_END_TAG
421                          ;
422
423 imageviewattributes:     layout_width layout_height src
424                          |layout_width layout_height src android_id
425                          |layout_width layout_height src android_id padding
426                          |layout_width layout_height src padding
427                          ;
428
429 button:                  T_BUTTON    buttonattributes T_END_BUTTON
430                          ;
431
432 buttonattributes:        layout_width layout_height text
433                          |layout_width layout_height text android_id
434                          |layout_width layout_height text android_id padding
435                          ;
436
437 radiogroup:              T_RADIO_GROUP radio_start radiogroupattributes T_END_TAG radiobutton radio_end T_END_RADIO_GROUP
438                          ;
439
440 radio_start:             %empty
441                          {
442                          flag_radio_button =1;
443                          };
444
445
446 radio_end:               %empty
447                          {
448                          flag_radio_button = 0;
449                          check_values();
450                          check_radio_group_child_count(child_count, child_count_rge);
451                          }
452                          ;
453
454
455
456 radiogroupattributes:    layout_width layout_height
457                          | layout_width layout_height text
458                          | layout_width layout_height checkedButton
459                          | layout_width layout_height checkedButton radio_group_element  //////////
460                          | layout_width layout_height radiobutton
461                          | layout_width layout_height radiobutton checkedButton
462                          | layout_width layout_height text android_id
463                          | layout_width layout_height text android_id checkedButton
464                          | layout_width layout_height text radiobutton
465                          | layout_width layout_height text android_id radio_group_element radiobutton

```



```

466 | layout_width layout_height text android_id radiobutton
467 | layout_width layout_height text android_id checkedButton radiobutton
468 | layout_width layout_height text android_id checkedButton radio_group_element radiobutton
469 ;
470
471
472 radio_group_element:    T_RADIO_BUTTON_CHILD_COUNT T_POSITIVE_INTEGER
473 {
474     const char* str = $2; // Get the string value
475     int len = strlen(str);
476     char* int_str = malloc(len - 1); // Allocate memory for the integer string
477     strncpy(int_str, str + 1, len - 2); // Copy the inner part of the string without the quotes
478     int_str[len - 2] = '\0'; // Add null terminator
479     child_count_rge = atoi(int_str); // Convert the string to an integer
480     free(int_str); // Free the allocated memory
481     printf("Number of children for <RadioGroup>: %d\n", child_count_rge);
482 }
483 ;
484
485
486
487 radiobutton:    T_RADIO_BUTTON radiobuttonattributes T_SLASH_END_TAG
488 {
489     // Increment child count when a <RadioButton> is encountered
490     increment_child_count();
491 }
492 | T_RADIO_BUTTON radiobuttonattributes T_SLASH_END_TAG radiobutton
493 {
494     // Increment child count when a <RadioButton> is encountered
495     increment_child_count();
496 }
497
498 ;
499
500 radiobuttonattributes:    layout_width layout_height text
501 | layout_width layout_height android_id text
502 | layout_width layout_height android_id text checkedButton
503 ;
504
505
506 progressbar:    T_PROGRESS_BAR progressbarattributes T_SLASH_END_TAG
507 ;
508
509 progressbarattributes:    layout_width layout_height
510 | layout_width layout_height android_id
511 | layout_width layout_height android_id max
512 | layout_width layout_height android_id max progress
513 ;
514
515
516 comment:    T_COMMENT_OPEN T_STRING T_COMMENT_CLOSE
517 ;

```

```

518
519
520 content:                element
521         | element content
522         ;
523
524 contentempty:           element
525         | element content
526         | %empty
527         ;
528
529 element:                textview element
530         | radiogroup element
531         | radiobutton element
532         | relativelayout element
533         | imageview element
534         | imageview
535         | progressbar
536         | checkedButton
537         |%empty
538         ;                      /*ebgala to linear*/
539
540
541
542
543 %%
544
545 int main(int argc, char *argv[]){
546     int token;
547
548     /*Δ          */
549
550
551     if(argc > 1){
552         yyin = fopen(argv[1], "r");
553         if (yyin == NULL){
554             perror ("Error opening file");
555             return -1;
556         }
557     }
558
559     /*K          */
560     yyparse();
561
562
563     if(error_count > 0){
564         printf("Syntax Analysis failed due to %d errors\n", error_count);
565     }
566
567     else{
568         printf("Syntax Analysis completed successfully.\n");
569     }

```

```

570
571     return 0;
572     yyrestart(yyin);
573     fclose(yyin);
574 }
575
576
577 void yyerror(const char *message)
578 {
579     error_count++;
580
581     if(flag_err_type==0){
582         printf("-> ERROR at line %d caused by %s : %s\n", lineno, yytext, message);
583     }else if(flag_err_type==1){
584         *str_buf_ptr = '\0';
585         printf("-> ERROR at line %d near \"%s\": %s\n", lineno, str_buf, message);
586     }
587
588     flag_err_type = 0;
589     if(MAX_ERRORS <= 0) return;
590     if(error_count == MAX_ERRORS){
591         printf("Max errors (%d) detected. ABORTING...\n", MAX_ERRORS);
592         exit(-1);
593     }
594 }
595
596
597 int dq_string_to_int(const char* str) {
598     if (str[0] == '"' && str[strlen(str)-1] == '"') {
599         char* new_str = malloc(strlen(str) - 1);
600         strncpy(new_str, str + 1, strlen(str) - 2);
601         new_str[strlen(str) - 2] = '\0';
602
603         int result = atoi(new_str);
604         free(new_str);
605         return result;
606     } else {
607
608         return 0;
609     }
610 }
611
612 //////////////// functions to ensure every android:id is unique ////////////////
613
614 int isIdUsed(char* id) {
615     for (int i = 0; i < used_id_count; i++) {
616         if (strcmp(used_ids[i], id) == 0) {
617             return 1; // ID is used
618         }
619     }
620     return 0; // ID is not used
621 }

```

```

622
623 void addUsedId(char* id) {
624     strncpy(used_ids[used_id_count++], id, MAX_ID_LENGTH - 1);
625     used_ids[used_id_count - 1][MAX_ID_LENGTH - 1] = '\0'; // Ensure null-termination
626 }
627
628 void addUsedIdInt(int id) {
629     char id_string[MAX_ID_LENGTH];
630     snprintf(id_string, sizeof(id_string), "%d", id);
631     addUsedId(id_string);
632 }
633
634 ////////////////////////////////////////////////// 3o erwthma //////////////////////////////////////
635
636 void increment_child_count() {
637     child_count++;
638 }
639
640 void check_radio_group_child_count(int expected_count, int cumulative_count) {
641     if (cumulative_count != expected_count) {
642         char error_message[100];
643         printf("cumulative_count: %d\n", cumulative_count);
644         sprintf(error_message, "Invalid number of children. Expected %d children for <RadioGroup>.", expected_count);
645         yyerror(error_message);
646     } else {
647         printf("The number of children is correct!\n\n");
648     }
649 }
650
651
652 ////////////////////////////////////////////////// ERWTHMA 2 CHECKED_BUTTON //////////////////////////////////////
653
654
655 void save_checked_button_id(char* id){
656     static int k = 0;
657     size_t len = strlen(id);
658
659     strncpy(used_checkb[k], id, len);
660     k++;
661
662     /* for(int i=0;i<k;i++){
663         //printf("\n%s\n",used_checkb[i]);
664     } */
665
666 }
667
668 void checkRadioBIId(char* id){
669     static int k = 0;
670     size_t len = strlen(id);
671
672     strncpy(check_radiob[k], id, len);
673     k++;

```

```
674     for(int i=0;i<k;i++){
675         printf("\n%s\n",check_radiob[i]);
676     }
677 }
678
679 }
680
681 void check_values() {
682     int i, j;
683     int check_flag = 0;
684     int counter = 0;
685
686     for (i = 0; i < 5; i++) {
687         int match_found = 0; // track if a match is found for each used_checkb value
688         for (j = 0; j < 5; j++) {
689             if (strcmp(used_checkb[i], check_radiob[j]) == 0) {
690                 match_found = 1; // Match found, set the flag
691                 counter++;
692                 break;
693             }
694         }
695         if (match_found == 0) {
696             check_flag = 1; // No match found, set the flag to indicate mismatch
697             break; // No need to continue the outer loop if a mismatch is found
698         }
699     }
700
701     //printf("\n\n FLAG VALUE: \n %d \n", check_flag);
702
703     if (check_flag == 1) {
704         char error_message[100];
705         sprintf(error_message, "CHECKED BUTTON VALUE ISN'T IN THE USED RadioButton IDs LIST");
706         yyerror(error_message);
707     }
708     else {
709         printf("The values are the same!\n\n");
710     }
711 }
```