Basic4Android Form Generator

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Conventions

Commands syntax, instructions in programming language and examples are with font `COURIER NEW`. The optional parties of syntactic explanation are contained between `[square parentheses]`, alternatives are separated by `|` and the variable parties are in *`italics`*.

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1 Form generator

Form generator, briefly *FormGen*, is a class module for Basic4Android which allows to build and handle forms data; it is sufficiently generalized for a wide use.

1.1 Using the form generator

Before use FormGen the class `fgen` must be instantiate:

```
Sub Globals
...
      Dim fg As fgen      ' instantiate Form Generator class
...
End Sub
...
      fg.Initialize
```

The form is generated by calling the `fg` method:

instantiatedName`.fg(`*activity*`,`*dataDescription*`,`*subHandleAnswer*`,`*subHandleEvents*`)`

where *activity* is the activity which will contains the form, *dataDescription* is a character string containing the form components description, *subHandleAnswer* and *subHandleEvents* are characters string containing the name of the sub for handle data when the form is closed and the possible sub for handle events or an empty string if you wouldn't handle events; they are in the form:

moduleName`.`*functionName*.

Example:

```
...
Dim parms As String = "Slide,,5,S,3,10 -10;Rdb,Sexe,10,R,,M:Male|F:Female;"
...
fg.fg(Activity,Parms,"Main.handleAnswerTest","Main.handleEvents")
...
fg.fg(Activity,Parms,"Main.handleAnswerTest","")
...
```

1.2 Data description

Every view (or widget) is characterized by a list of attributes (comma separated) in this order: Field Name, Field Label, Length, Type, Default Value and Extra. Views are separated by semicolon.

1.2.1 Field Name

Is the name of the field, which, when the form is closed, is returned with the value associated; the name is case-sensitive and is used to access data and possibly handle the views.

1.2.2 Field Label

Label of widget or caption of button, if omitted it is used the Field Name.

1.2.3 Length

The length of the view in characters.

If the length is omitted it is assumed the maximum from 20 and the length of the possibly default value.

1.2.4 View Type

The Types are indifferent to case.

- Buttons:
    - **B** utton;

    - **BC** CallBack button;
    - **R** radio button, a set of Radio buttons;
- **CKB** check box;
- Spinners (or Combo boxes):
    - **CMB** spinner;
    - **CMT** is a spinner with Text associated for insert values not in spinner;
    - **F** file and directory;
- Text fields:
    - **N** numeric field;
    - **DN** decimal numeric field;
    - **S** seek bar or slider is an extension of the standard control;
    - **P** password field, the data entered are masked;
    - **T** text field is the default if the Type is omitted;
    - **U** not modifiable field i.e. a protected field.

An **M** after the Type means that the field is mandatory, this is ignored for **B, CKB** and **U** type; if a mandatory field is not entered the form can't be submitted, and the label of omitted field is changed to red.

1.2.5 Default value

Is the value proposed in form; the form is restored with the defaults values when the `Reset` button is pushed.

1.2.6 Extra

Extra Field is used for add information at widget.

1.2.7 Pseudo fields

Pseudo fields are flavors for show form; they have a type.

1.2.7.1 Ground

The pseudo field `Ground` or `Background` create a background in the form or a gradient with a possible effect of transparency; the gradient is indicated by two colors, and a direction in the **default** field.
The colors are in hexadecimal notation with two digit for every component: `RRGGBB`, in this form the color is opaque; the transparency is a hexadecimal value from `00` to `FF` appended before the color, see the examples below:

```
"Ground,,,Ground;"              ' default FF202020
"Ground,,,Ground,FF;"           ' blue
"Ground,,,Ground,7F0000FF;"     ' semitransparent blue
"Ground,,,Ground,FF 8000 LEFT-RIGHT;"      ' gradient blue to green
```

The background is indicated in **default** field, each possibly component must be separated by space, the default is `FF202020 FF202020 TOP_BOTTOM`.

1.2.7.2 Tip (Tool tip)

The **default** field is used for tooltip the **extra** field must contain the name of the type text view for which show the tool tip. **Label**, **name** and **length** are meaningless.

```
Dim form As String = "MailTo,Mail to,20,TM,elcondor@libero.it;" _
      & "Subject,,40,T;" _
      & "Message,,200,T,,Message here;" _
      & "Send,,10,B,,;" _
      & "Parms,,10,B;" _
      & "tip,,,tip,Insert subject,Subject;" _
      & "Title,Send mail,20,TITLE;"
```

1.2.7.3 Title

The **default** field is used as form title, if omitted the **label** field is used.

```
Title,Send mail parameters,20,TITLE;
```

1.2.8 Summary by type

Type	Length	Default field	Extra field
B	Ignored	possibly `dis[able]` or `cancel`	
BC	Ignored	Value returned	Name of CallBack function
CKB		`1` or `check[ed]` = checked	Possible Description at right of check box
CMB		*`value`*	An item list separated by `|`: `[`*`key`*`:]`*`value`*
F		Initial folder	
S		Initial value	Start and end value, default is `0 100`
T,N,DN,P		Initial value	hint
U		Unmodifiable text	

1.2.8.1 Buttons

Buttons can be used both for take different actions on closing form both for show user caption instead of default `Ok` or `Cancel`.

The value of **default** field `dis[able]` is used to start the form with the button disabled; the value `cancel` is used for suppress the standard `Cancel` button.

The **extra** field contains a name of the function called when a CallBack Button is pushed, in the form: *`moduleName.functionName`*.

```
...
Dim fg As fgen      ' instantiate Form Generator class
...
Dim frm as String = "n1,Integer,10,N,;n2,Decimal,10,DN;Multiply,,10,BC,,Main.CallBack"
fg.fg(Activity,frm,"Main.handleAnswerTest","")
...
Sub CallBack(btnName As String)   ' CallBack event handler
      Dim n1 As Float = fg.iIF(IsNumber(fg.valueOf("n1")),fg.valueOf("n1"),0)
      Dim n2 As Float = fg.iIF(IsNumber(fg.valueOf("n2")),fg.valueOf("n2"),0)
      Msgbox(n1*n2,btnName)
End Sub
...
```

1.2.8.2 Check box

For checked box insert into **default** field `check[ed]` or `1`.

The **extra** field can contain a possibly description at right of the check box.

The value returned of check box is a string containing 0 or 1, they must be compared as string:

```
cmd.Append(fg.iIF(fh_Data.Get("Mandatory") = "1","M",""))
```

1.2.8.3 File

The initial Folder (and possibly file name) is in **default** field to start, if it is omitted or if it is not a folder, the `File.DirRootExternal` is assumed.

1.2.8.4 Radio buttons

It is possible to have more than one set of radio radio buttons.

The **length** is the length of the single view; the **extra** field contains the item list separated by `|`. For get a key instead the description, the item must have the form: `key:value`.

The **default** value must be the data showed, not the possible key:

```
Rdb,Status,10,R,Single,M:Married|S:Single|W:Widow
```

1.2.8.5 Slider

The **length** is the length of the unmodifiable text which shows the slider value.

The **extra** field can contains the start and end values in the form `start end`, e.g. `-5 5`; the range is `0 100 if` omitted, if only one value is present, the default value for the second is `100`; the result can have decimals depending on the difference from `start` and `end` value, see table at right.

`start` can be greater of `end` e.g.:

```
Slider,,5,S,-3,10 -10
```

abs(start - end)	n. decimals
> 99	0
<100 and > 10	1
<10 and > 1	2
<1 and > 0.1	3
...	...

1.2.8.6 Spinners

CMT type is a spinner with Text associated for insert a value not in spinner; the **extra** field contains the item list separated by `|` (see description in Radio button).

If there is only one spinner (**CMB** type) in the form, the form has only a cancel button and it is exited when a spinner item is selected.

1.2.8.7 Text fields

For text type (**T**, **P**, **N**, **DN**) the **extra** field, if the **default** field is empty, is the *hint*.

1.2.9 Returned Values

The data are accessible in the Sub indicated as third parameter of the call, which is called when the buttons `Ok` or `Cancel` or the possible type **B** button are pushed.

The sub has a parameter which is the map which contains the data which are accessible via `Get` or `GetDefault` methods: the key is the field name, besides there is the element with key `fh_button` which contains the name of the button pushed (`Ok` or `Cancel` or the name of the button pushed).

☞ If `cancel` button was pressed there is only `fh_button` element.

1.3 CallBack

FormGen works on CallBack not only at the end of form, but also, possibly, for handle events (the fourth parameters of the call), or by a sub associated at **BC** button.

1.3.1 Handle Events

This function can be used to personalize the form e.g. modify the state of the view, perform controls end so on. The functions receive an array which contains view name and event, besides, for views, contain the view handle, the value end possibly extra field, see below.

Parameters		
	Event	**Note**
event	`Start`	view name = `fh_start`, no view handle and value.
event	`End`	view name = `fh_end`, no view handle and value.
event	`Reset`	view name = `fh_reset`
`Buttons`	`CLICK`	
`EditText`	`FOCUS, LFOCUS`	Focus and lost focus.
`EditText`	`VREND`	At end of Voice recognition (if is active)
`Check box`	`CHK`	Value = 1 if checked, else 0

Slider	SLIDE	Extra is the handle of text containing the value.
Spinner text	CLICK	

The button `CLICK` event precedes the closing of the form, however, it is possible to inhibit the closing by setting the property `fh_yesToExit` to `False`.

```
Sub handleEvents(parm() As Object)      ' widget events handler
  Dim value As String = ""
  If parm.Length > 2 Then
       If parm.Length > 3 Then value = parm(3)
  End If
  Log("Handle event " & parm(0) & " event: " & parm(1) & " Value: " & value)
       Select parm(0)
         Case "fh_start","fh_reset"
         Case "Message"
              If parm(1) = "VREND" Then
                Dim txt As String = parm(3)
                parm(3) = txt.SubString2(0,1).ToUpperCase & txt.substring(1) & "."
              End If
         Case "Parms"
              fg.fg(Activity,"Prova,,,t","Main.handleAnswer","Main.handleEvents")
         Case "Send"
              sendMail(parm(0))
              fg.fh_yesToExit = False
       End Select
End Sub
```

Example of sub for handle events

1.3.2 Handle CallBack

The function is called when a type **BC** button is clicked; the function receive the name of the button.

Note: you can also manage the CallBack in the event management function, in this case it is not necessary to specify a dedicated function.

1.4 Remarks

1.4.1 Handling Buttons

Form Generator inserts the `Ok` button, the `Cancel` button and the `Reset` button depending on the views contained in the form:

- the `Cancel` button is always present unless there is a button with cancel in the **default** field,
- the `Reset` button is present if there are data fields (e.g. Type **F**, **DN**, **N**, **T**, **R**, **CKB, CKT),**
- the `Ok` button is not present if there are types **B** Buttons or only one spinner (**CMB** type).

1.4.2 Data presentation

The data are presented in the order they appears in the parameters list, except for the Type **B** and **BC** buttons that appears together buttons inserted by *FormGen*, at the bottom of the form.

For view of Type Text, if the length exceed the maximum characters allowed for the line, the view is multi lined; this maximum characters for line depends from the labels width.

The value of check box is a string containing 0 or 1 i.e. it must be compared like string:

```
cmd.Append(fg.iIF(fh_Data.Get("Mandatory") = "1","M",""))
```

1.4.3 Work with views

We can modify the view properties getting the view by the function `getHandle`; therefore for some properties there are specific functions:

- enable view: **`enable`**`(view`*`Name`*`)`

- disable view: **`disable`**`(viewName)`
- get the handle of the view: **`getHandle`**`(viewName)` In case of radio button is the handle of radio button checked.
- set some properties: **`setWidget`**`(viewName,property)`
  where `property` can be: `enable`, `disable`, `visible`, `hidden`.
- Change the value: **`setValue`**`(viewName,value)`
- Get the view value: **`valueOf`**`(viewName)`

Examples:

```
fg.disable("btnGo")
Dim lbl As Label = fg.getHandle("title")
lbl.TextColor = Colors.Green
If fg.valueOf("Consent") = 1 Then fg.enable("btnGo")
fg.SetValue("Slider",0.2)
fg.setValue("Number",400)
fg.setValue("Spinner","Delta")
fg.setValue("UnMod","**********")
fg.setValue("Rdb","Married")
```

1.4.4 Voice recognition

It is possible to use voice recognition for enter text spoken into text field; this is done by the function `startVoiceRec`.

Voice recognition is deactivated, for enable uncomment:

```
'Dim VR As VoiceRecognition
'VR.Initialize("VR")
Sub startVoiceRec()
  'VR.Listen 'calls the voice recognition external activity
End Sub
```

In the event `VREND` we can access the text and modify (see the above example).

```
Sub handleEvents(parm() As Object)      ' widget events handler
          Dim value As String = ""
          If parm.Length > 2 Then
                    If parm.Length > 3 Then value = parm(3)
          End If
          Select parm(0)
             ...
             Case "Message"
                If parm(1) = "VREND" Then
                  Dim txt As String = parm(3)
                  parm(3) = txt.SubString2(0,1).ToUpperCase & txt.substring(1) & "."
                End If
             ...
      End Select
End Sub
```

1.5 Others functions and utilities

FormGen module contains, may be, useful functions; some are just seen above at paragraph 1.4.3 Work with views.

1.5.1 iIf

`iIf` function return an object depending on a test:

```
Dim Number As Int = fg.valueOf("Number")
```

```
Log(Number & " is " & fg.iIf((Number Mod 2) = 0,"even","odd"))
```

1.5.2 Right and Left string functions

Right and Left functions returns a pieces of string stripped by some extent:

```
Log(fg.Left(fg.Right("Condor Informatique",12),6))    ' Inform
```

1.5.3 Get filename

`stripFile` return a file without the directory components.

1.5.4 Extend Log function

`toText` is a function for speedy logs; it has two parameters, the first is a string containing some text and a formatting command (`%` or `%n` or `%n.d`), the second is an array of object. Every `%` is replaced by an element of the second parameter. The possible *n* is a length of output, the possible *d* is the number of decimals to show.

```
Dim aaa() As Object
aaa = Array As Object (3,3.14,"vintun",False,True, 18723)
Dim t As String = "% %6.3 %11 %1 aaaa %3 %12.2"
Log(fg.toText(t,aaa))
```

The risult is:

```
3  3.140 vintun      f aaaa tru    18,723.00
```

1.5.5 Implode

`implode` function returns a string containing all elements of an array or list with separator between each element:

```
Log(fg.implode("<br>",aaa))
```

The risult is:

```
set<br>3<br>3.14<br>vintun<br>false<br>true<br>18723
```

1.5.6 Object type

`typeOf` is a function which return a type of object, stripping `java.lang` from what is returned by `GetType` Basic4Android function.

```
Select TypeOf(values(j))
   Case "Integer","Double"
      ...
```

1.5.7 Mask comma and semicolon

If label or default or extra contains commas or semicolons, the function `mask(data)` must be used:

```
instantiatedName.mask(data_to_be_masked)
cmd.Initialize
cmd.Append(fh_Data.Get("Name") & ",")
cmd.Append(fg.mask(fh_Data.Get("Label")) & ",")
cmd.Append(fh_Data.Get("Length") & ",")
cmd.Append(fh_Data.Get("Type"))
cmd.Append(fg.iIF(fh_Data.Get("Mandatory") = 1,"M",""))
cmd.Append("," & fg.mask(fh_Data.Get("Default")) & ",")
cmd.Append(fg.mask(fh_Data.Get("Extra")))
```

1.5.8 Sand box

The Sand box is a demo of *FormGen* and a tool for testing the forms. The initial form, not created by *FormGen,* has a text box and some buttons:

- Add button generate a form for create a view.
- Test button generate a form starting from what is contained in the text box.
- Button for generate samples of selected type.
- Sample button generate a sample form with some views and a CallBack button.

2 Technical notes

2.1 Library

Form generator need Core library and Phone library (if use Voice recognition).

2.2 Maps

- `Elem` data fields key = *`fieldname`*, *value* = *`array field description`*
- `mapValues` combo/radio key = *`fieldname`* & *`visualizedValue`*, value = *`key`*
- `tipsMap` key = `fieldname`,value = tips
- `widgetRef` contains a reference to all view and TITLE pseudo field
  - key = *`fieldname`*, value = `array(`*`Id, widgetType, label, extraField`*`)`
  - `Id` is a widget `ID`, for RadioButtons is a panel container
  - *`extraField`* is:
    - for button type **BC** a sub for CallBack,
    - for seekbar (type **S**) is the ID of text containing the value,
    - for file (type **F**) is the file path,
    - for spinner text (type CMT) is the ID of the spinner associated.
    - for RadioButton is a radiobutton selected

Name	Key	Value	Note
`Elem`	`Field name`	`Property field array`	
`widgetRef`	`Field name`	`Id,widgetType, label, extraField1, extraField2`	
`limits`	*`fieldName`*`Min`, *`fieldName`*`Max`	`value`	Slider limits
`mapValues`	`Field name & value`	`key`	For Combo box (spinner)
`fh_Data`	`Field name`	`value`	

2.3 Lists and arrays

- `rdbList` the data array contains normalized RadioButtons data description
- finalButtons: label, name. The name of Ok button is `Ok`.

3 History

Version 3.1.1

- Button with `cancel` in default field for do not show `Cancel` button

Version 3.1

- function `implode` accept in addition to the `Arrays` also `Lists`,
- a form with only a single spinner exits when an element is selected.
- pseudo field GROUND added

3.1 Differences from previous version

3.1.1 Buttons

Default field of type **B** and **BC** buttons can contain the disable command, instead of the value returned when the button is clicked; the value returned is the button name.

3.2 May be in future

- Add Hidden Fields,
- handle CR and LF for Type **U**,
- field controls (e.g. range numeric, date, mail, etc.),
- date fields.

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