Neil J Martin
neilm@4js.com

Genero User Interface Forms

Genero BDL 3.10
Genero Studio 3.10

FOUR Js
The Power of Simplicity

January 2018

Goals

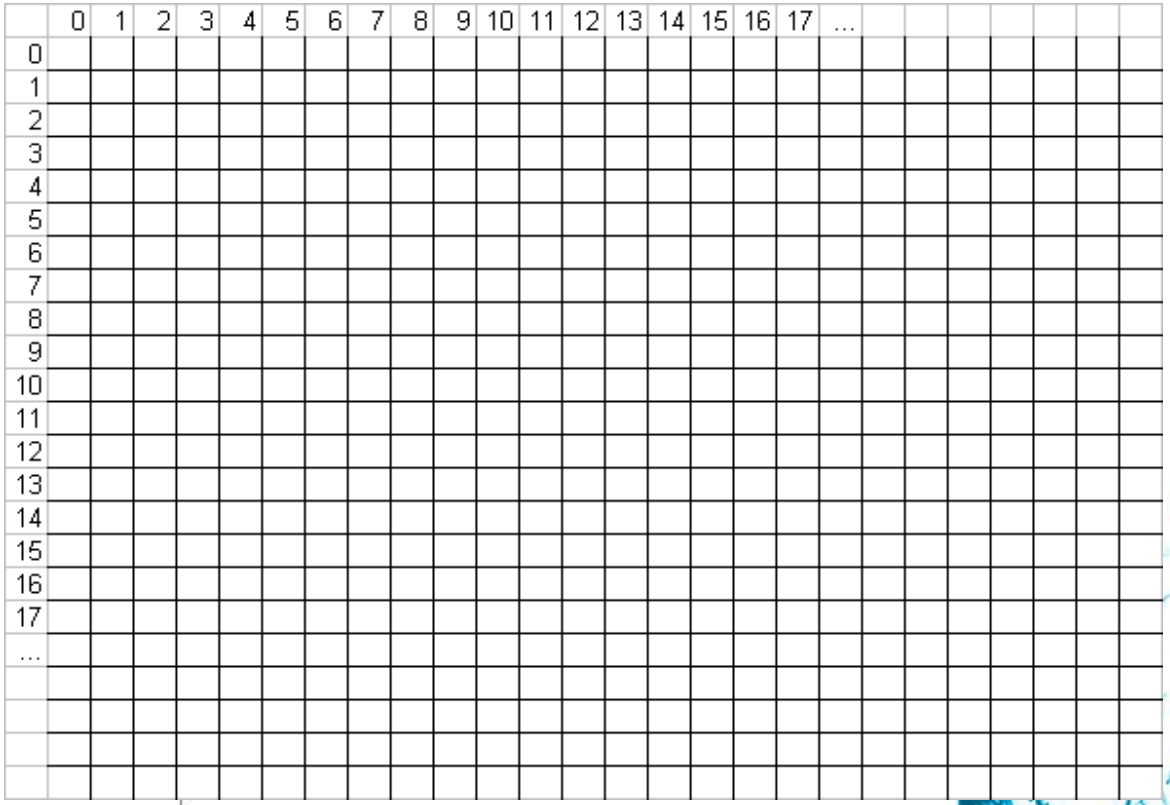
- Learn all the elements of a form file.
- Use the LAYOUT section to design a form.
  - Lay out the form with containers and layout tags
  - Add form items such as combo boxes, buttons and radio groups.
- Compile the form definition file (.per).
- Read and interpret a compiled form file (.42f).

Elements of a Genero Form

- **Container** – a formatted screen region or a container for other containers (Grid, Folder, Table, groupboxes, etc.)
- **Form field** – an area where users can view and/or edit data
- **Widgets** – the decoration for the form field (Edit, ButtonEdit, ComboBox, RadioGroup, etc)
- **Action View** – a form item that can trigger a program action (Button, Topmenu, Toolbar, etc.)
- **Label** – text displaying static information

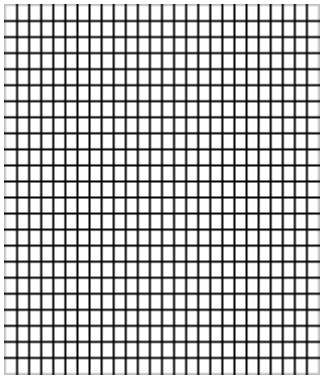
Genero Forms – Legacy / Ascii Terminal

A common fixed form (not sizeable, with fixed font) would be represented as a grid with fixed sized cells:



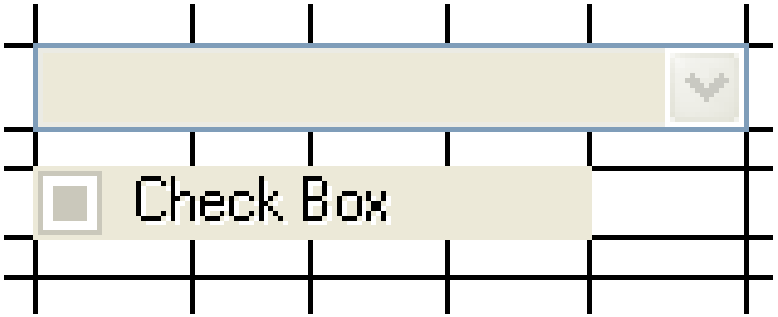
Genero Forms – Modern

Genero forms are sizeable and can include proportional fonts and graphical objects of different sizes.



- Each cell has its own size
- Default size is about 2 pixels
- The cell takes the size of its content or of the larger cell in the same column.
- An object can use one or more cells, depending on its definition

Genero Forms – Layouting Rules



- Adding a Combo box with a width of 5 cells will enlarge these cells to the combo box size.
- The last cell is kept for the combo box button.
- Cells around the combo box are automatically retained to provide a margin.

Genero Forms – Creating a Form

Three ways to define application screens:

- Write text-based form definition files with a suffix of .per
- Use the drag-and-drop graphical Form Designer in Genero Studio
- Dynamically at runtime

Genero Forms – Definition File (.per)

The .per file consists of a set of defined sections, which must appear in the following order in the file:

- SCHEMA
- ACTION DEFAULTS
- TOPMENU
- TOOLBAR
- LAYOUT
- TABLES
- ATTRIBUTES
- INSTRUCTIONS

Only LAYOUT is required, the rest are optional depending on the features of the form.

Genero Forms – Definition File (.per)

SCHEMA Section

- Defines the database schema on which the form is based.
  - You can define fields on the form in terms of the schema tables and columns.
  - The Schema must be defined in a database schema file.
- Optional; defaults to FORMONLY if omitted.

Syntax:

```
SCHEMA ( string | FORMONLY )
```

Genero Forms – Definition File (.per)

LAYOUT Section

- The LAYOUT section defines the abstract layout of the elements of the form.
- This section is a tree of *layout nodes*, used to define graphical elements.
- Mandatory

Syntax:

```
LAYOUT [ ( attribute [ = value ] [,…] ) ]
    root-layout-container
    […]
[END]
```

FOUR Js
The Power of Simplicity

Genero Forms – Definition File (.per)

ATTRIBUTES section

- Describes the properties of elements in the LAYOUT section
- Mandatory

Syntax:

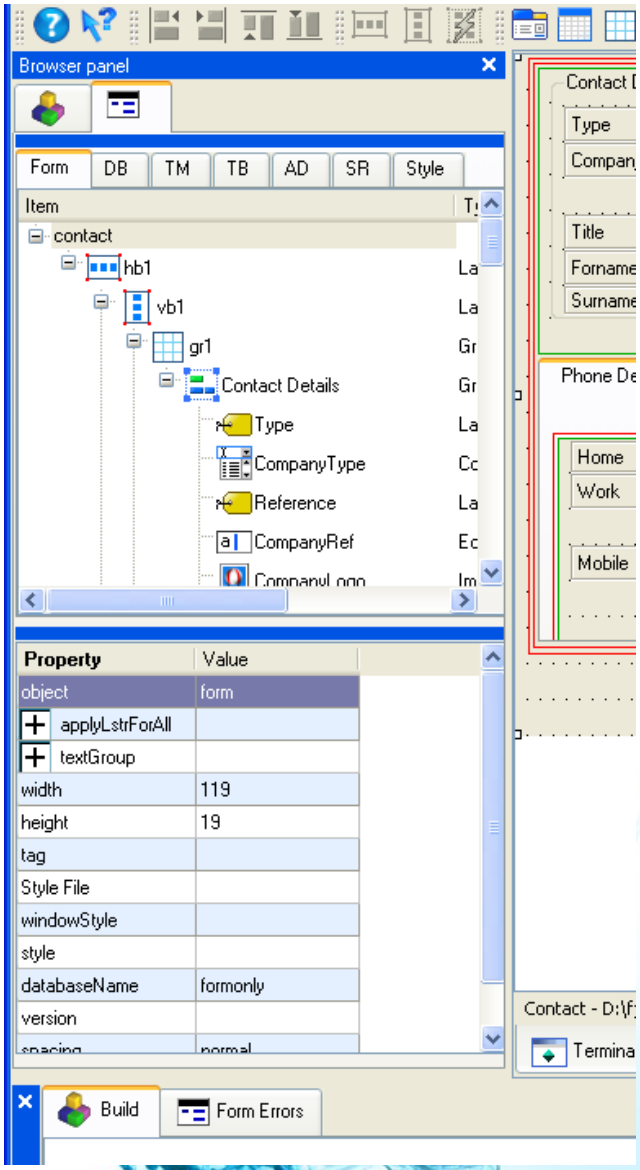
```
ATTRIBUTES
 [item-type] item-tag = field-name [ , attribute-
list ] ;
 [item-type] item-tag : item-name [ , attribute-list ]
;
 …
END
```

FOUR Js
The Power of Simplicity

Genero Forms – Studio Form Designer (.4fd)

- In Genero Studio Form Designer all sections and widget attributes are shown and can be updated in the browser panel.

- The browser panel is located by default on the left side of Genero Studio screen.



FOUR Js
The Power of Simplicity

Genero Forms – Containers

Containers are blocks holding other containers or defining a formatted screen region.

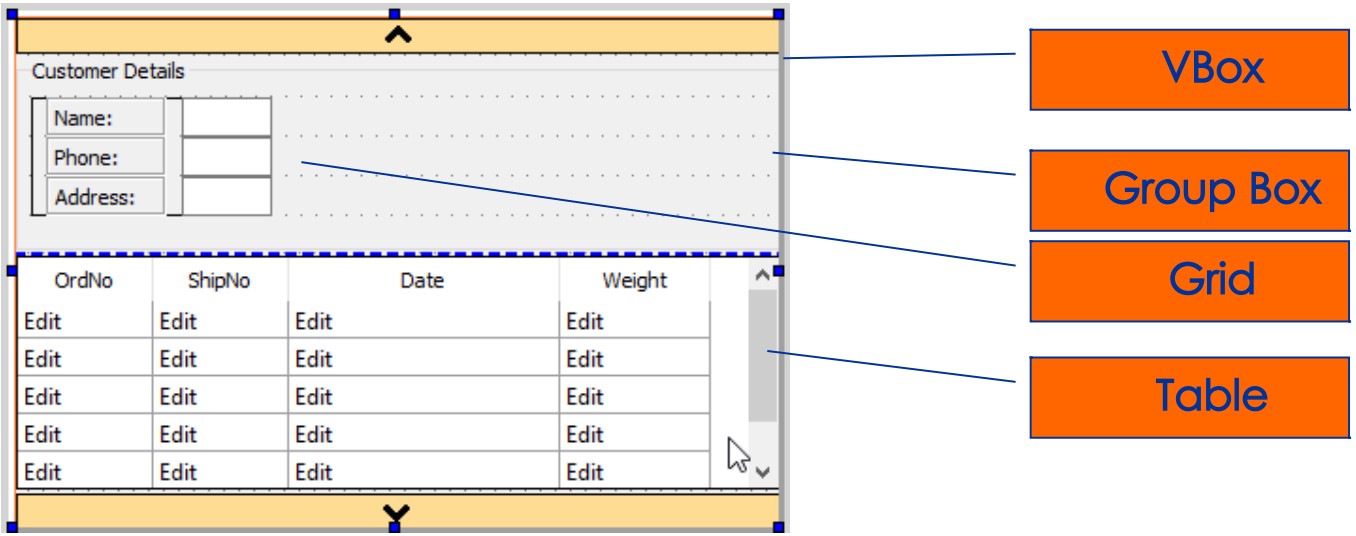
- They are nested to create the visual layout of the form area of the user interface.
- The END keyword defines the end of the list of children inside a container.

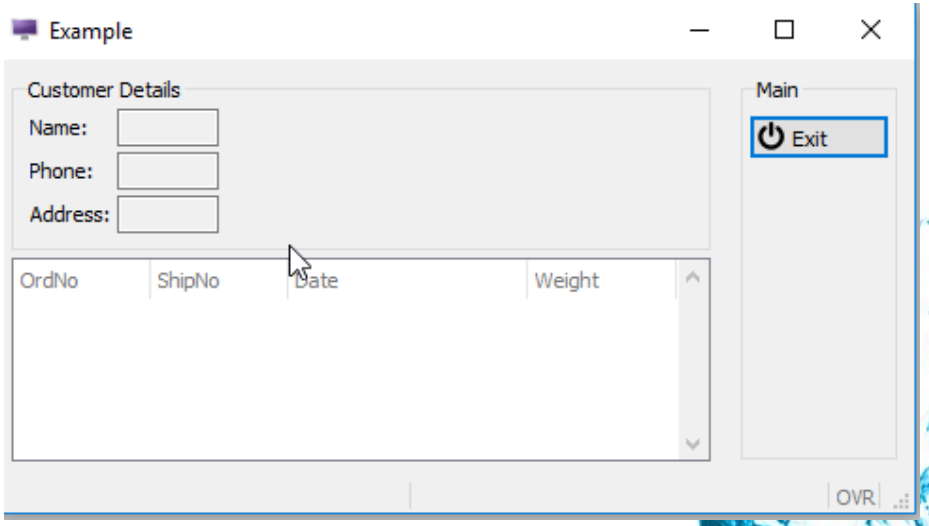
HBOX
VBOX
GROUP
FOLDER
PAGE
GRID
SCROLLGRID
TABLE

Genero Form – .per Example

```
LAYOUT ( text = "Customer Orders" )
    VBOX
        GROUP ( text = "Customer Details" )
            GRID
            {
             Name:      [f001 ]
             Phone:     [f002 ]
             Address:   [f003 ]
            }
            END --GRID
        END --GROUP
        TABLE
        {
          OrdNo        Date        Ship date            Weight
         [c01         |c02        |c03                 |c04      ]
         [c01         |c02        |c03                 |c04      ]
         [c01         |c02        |c03                 |c04      ]
        }
        END --TABLE
    END --VBOX
END --LAYOUT
```

Genero Forms – GST Layout Example





FOUR Js
The Power of Simplicity

Genero Forms – Containers

Containers have a set of supported attributes that can be applied in the .per definition for presentation and behavior.

Example:

```
GROUP (TEXT = "Customer Details", HIDDEN)
```

The documentation lists the valid attributes for each container, and includes an Attributes List.

Genero Forms – Containers

VBOX (Vertical Box)

- Displays the elements defined within the container vertically from top to bottom.

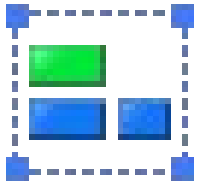
HBOX (Horizontal Box)

- Displays the elements defined within the container horizontally from left to right.

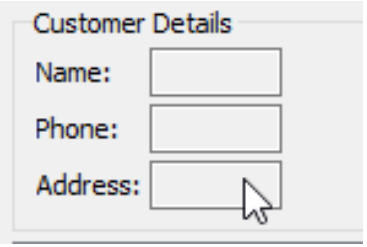
Syntax:

```
VBOX [ ( attribute [ = value ] ) ]
    layout-container
    [...]
END
```

Genero Forms – Containers



A GROUP container can be used to display a titled box (usually called a groupbox) around contained elements.



Syntax:

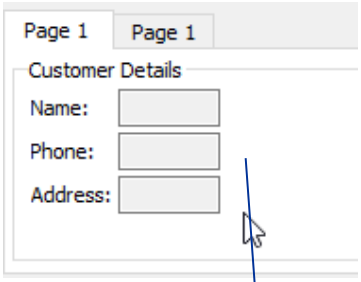
```
GROUP [ ( attribute [ = value ] ) ]
    layout-container
    [...]
END
```

Where *layout-container* can be:

VBOX, HBOX, GROUP, FOLDER, GRID, TABLE

Genero Forms – Containers

A FOLDER container can be used to display PAGE containers as folder tabs.



Syntax:

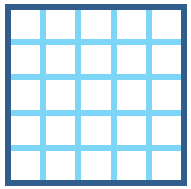
```
FOLDER [ ( attribute [ = value ] ) ]
    PAGE
      layout-container
      [...]
    END
    [...]
  END
```

PAGE containers can include other containers such as GROUP and GRID

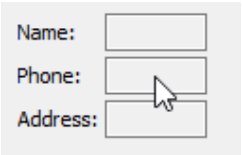
Where *layout-container* can be:

VBOX, HBOX, GROUP, FOLDER, GRID, SCROLLGRID, TABLE

Genero Forms – Containers



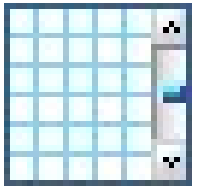
The GRID container declares a formatted text block, encased in braces "{…}", defining the
dimensions and the relative positions of the logical elements of a screen. Form fields are normally defined here.



Syntax:

```
GRID [ ( attribute [ = value ] ) ]
   {
      { text | item-tag | layout-tag }
      [...]
   }
END
```

Genero Forms – Containers



SCROLLGRID is similar to the GRID container, except that you can repeat the screen elements on Several "record rows" in order to design a multiple-record view, which will appear with a scrollbar.

Syntax:

```
SCROLLGRID [ ( attribute [ = value ] )
]
{
  row-template
  [...]
}
END
```

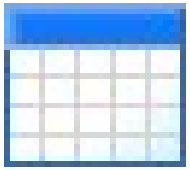
where *row-template* is a text block containing:

{ *text* | *item-tag* | *h-line* **}**

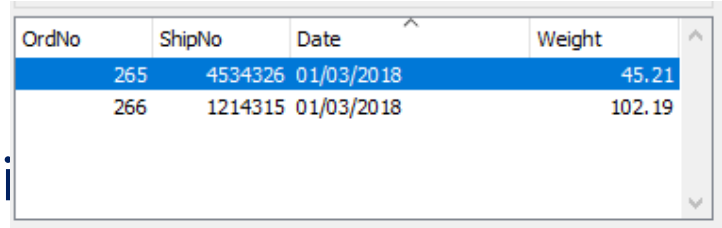
[...]

Do Chapter 2 - Exercise 1

Genero Forms – Containers - Tables



The TABLE container defines the presentation of a list of records.
The first line of a table-area can be text defining the column titles.
The second line must be field i
that define the columns receiving data.



OrdNo	ShipNo	Date	Weight
265	4534326	01/03/2018	45.21
266	1214315	01/03/2018	102.19

Syntax:

```
TABLE [ ( attribute [ = value ] ) ]
{
[ title [...] ]
[identifier [|...] ]
}
END
```

FOUR Js
The Power of Simplicity

Genero Forms – Containers - Tables

A Table can also have a summary line for either automatically calculated values or program calculated.

```
TABLE
 {
   Stock#  Description        Qty     Unit    Price        Total
  [f08    |f09               |f10    |f11    |f12         |f13      ]
  [f08    |f09               |f10    |f11    |f12         |f13      ]
  [f08    |f09               |f10    |f11    |f12         |f13      ]
  [f08    |f09               |f10    |f11    |f12         |f13      ]
                                                          [sum      ]
 }
END


AGGREGATE  sum = FORMONLY.total;
```

Stock#	Description	Qty	Unit	Price	Total
310	sink stoppers	5	grss	12.85	64.25
456	lightbulbs	10	ctn	5.55	55.50
744	faucets	60	6/bx	250.95	15057.00
					15176.75

FOUR Js
The Power of Simplicity

Do Chapter 2 - Exercise 2

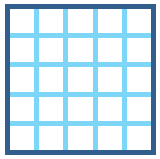
Genero Forms – Layout Tag

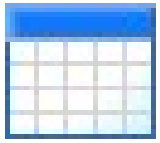
Layout tags define layout regions within a GRID or SCROLLGRID container.

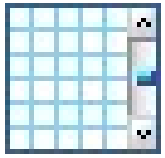
G - Groupbox layout tag gives same presentation as a GROUP container.

T - Table layout tag gives same presentation as the TABLE.

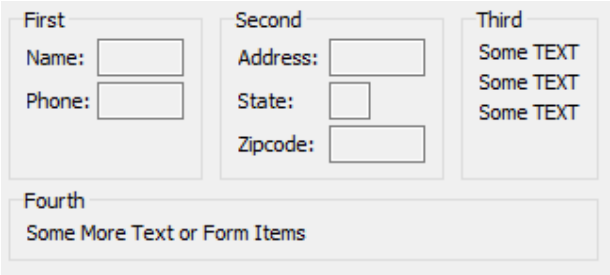
S - ScrollGrid layout tag resulting in the same presentation as the SCROLLGRID.







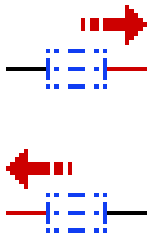
```
GRID
{
<G "First"       ><G "Second"         ><G "Third" >
 Name:    [f001 ]  Address: [f003 ]    Some TEXT
 Phone:   [f002 ]  State:   [a0]       Some TEXT
                   Zipcode: [f010 ]    Some TEXT
<                 ><                   ><          >
<G "Fourth"                                        >
 Some More Text or Form Items
<                                                  >
}
END --GRID
```



FOUR Js
The Power of Simplicity

Genero Forms – Spaces

An HBox Tag defines the position and size in a GRID of a horizontal box containing several form items.



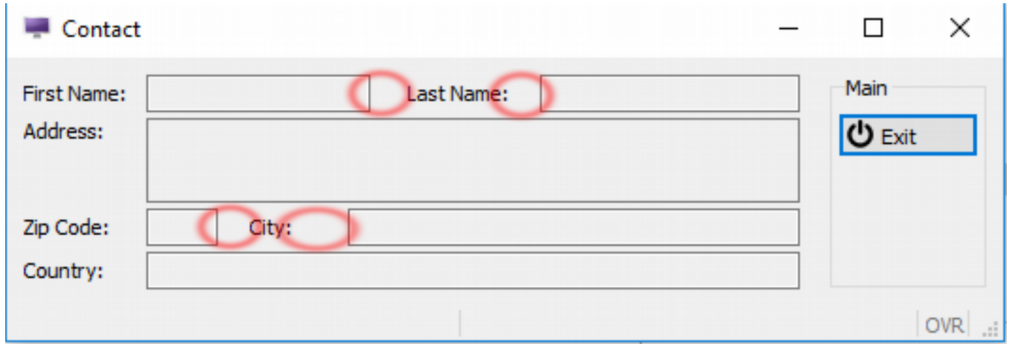
Syntax:
[element [...]]

Where element can be:
{ identifier [-] | string-list } [:...]

Where string-list is:
{ string-literal | spacer } [...]

Genero Forms – Solving Misaligned Elements

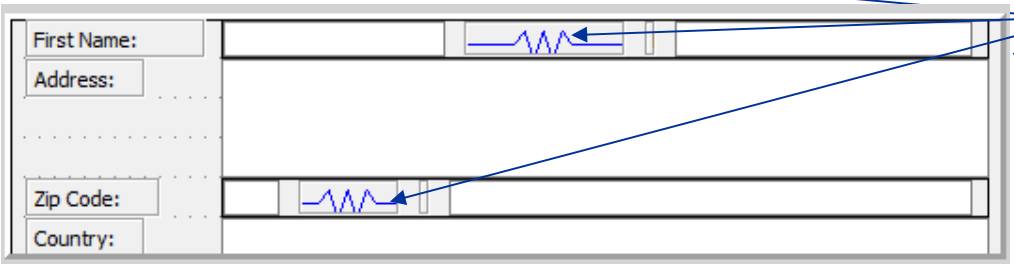
```
GRID
{
 First Name: [fldfname            ]  Last Name: [fldlname            ]
 Address:    [fldaddress                                             ]
             [                                                       ]
             [                                                       ]
 Zip Code:   [fldzip ] City: [fldcity                                ]
 Country:    [fldcountry                                             ]
}
END --GRID
```



FOUR Js
The Power of Simplicity

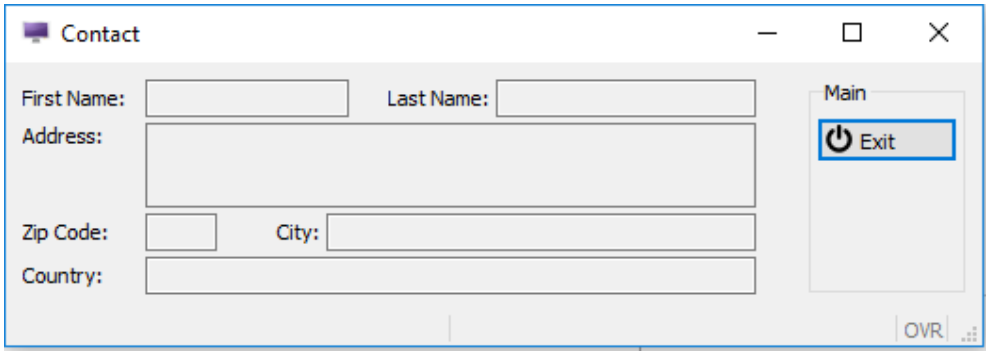
Genero Forms – Containers

```
GRID
{
 First Name: [fldfname              : :"Last Name:":fldlname            ]
 Address:    [fldaddress                                                ]
             [                                                          ]
             [                                                          ]
 Zip Code:   [fldzip : :"City:":fldcity                                 ]
 Country:    [fldcountry                                                ]
}
END --GRID
```



Spacers:

When the window is drawn, the length will change within the spacer, not within the whole line.



FOUR Js
The Power of Simplicity

Do Chapter 2 - Exercise 3

Genero Forms – Form Elements - .per File.

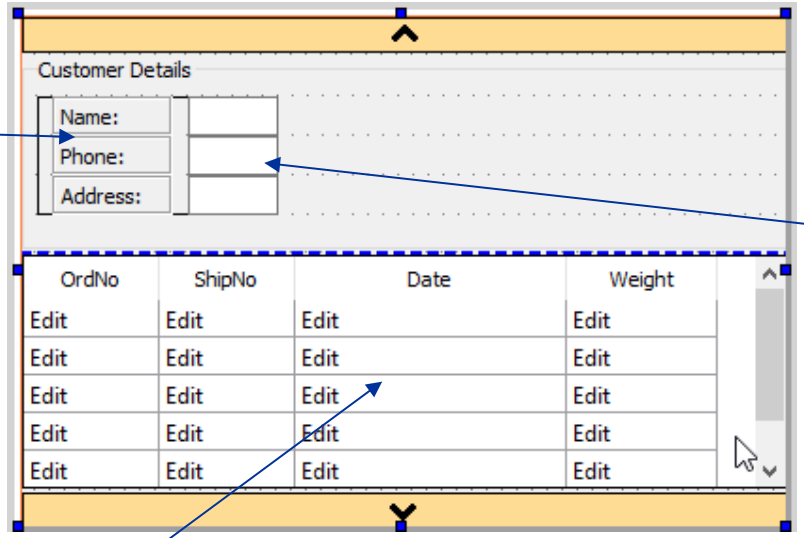
```
LAYOUT ( text = "Customer orders" )
    VBOX
        GROUP ( text = "Customer details" )
            GRID
            {
            Name:      [f001 ]
            Phone:     [f002 ]
            Address:   [f003 ]
            }
            END --GRID
        END --GROUP
        TABLE
        {
          OrdNo            Date        Ship date            Weight
         [c01        |c02        |c03                |c04      ]
         [c01        |c02        |c03                |c04      ]
         [c01        |c02        |c03                |c04      ]
        }
        END --TABLE
    END --VBOX
END --LAYOUT
```

Text labels

Form Fields

Pipe symbol used to make items appear next to each other

Genero Forms – Form Elements - .4fd File



Text labels

Form Fields

Table Widget

Genero Forms – Form Elements

Form elements have a set of supported attributes that can be applied in the .per definition for presentation and behavior.

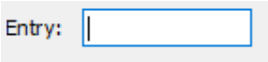
The Genero documentation lists the valid attributes for all the form elements, and contains an Attributes List.

Genero Forms – Form Elements - The Widgets

EDIT
BUTTON
BUTTONEDIT
CANVAS
COMBOBOX
CHECKBOX
DATEEDIT
DATETIMEEDIT
GROUP
IMAGE
LABEL
PROGRESSBAR
RADIOGROUP
SCROLLGRID
SLIDER
SPINEDIT
TABLE
TEXTEDIT
TIMEEDIT

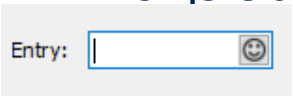
Genero Forms – The Widgets

A **EDIT** item is a common edit field.




```
EDIT item-tag = field-name[,attribute-list];
```

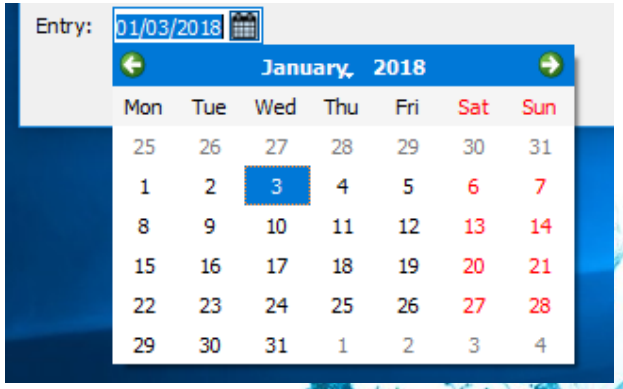
A **BUTTONEDIT** defines an edit field with a push button that can trigger an action.




```
BUTTONEDIT f001 = customer.state,REQUIRED,
                  IMAGE="smiley",ACTION=zoom;
```

A **DateEdit** defines an edit box with a button that opens a calendar.

```
DATEEDIT item-tag =
    field-name
    [,attribute-list];
```



FOUR Js
The Power of Simplicity

Genero Forms – Widgets

The **ProgressBar** item type defines a horizontal bar with a progress indicator.

```
PROGRESSBAR r1 = FORMONLY.r1 TYPE INTEGER,
                 VALUEMIN=0, VALUEMAX=100;
```

The **SLIDER** item type defines a horizontal or vertical slider.

```
SLIDER f01 = workstate.duration,
             VALUEMIN=0, VALUEMAX=5,
             STEP=1;
```

Genero Forms – Widgets

A **CHECKBOX** defines a boolean entry with a box and a text label.

```
CHECKBOX check1= formonly.check1,
                 valueChecked="Y",
                 valueUnchecked="N",
                 text="Confirm"
```

A **RADIOGROUP** defines a set of radio buttons.

```
RADIOGROUP r1 = formonly.r1,
              items=((0,"Leo"),(1,"Rene"),
               (2,"Peter"),(3,"Horst")),
              ORIENTATION=HORIZONTAL;
```

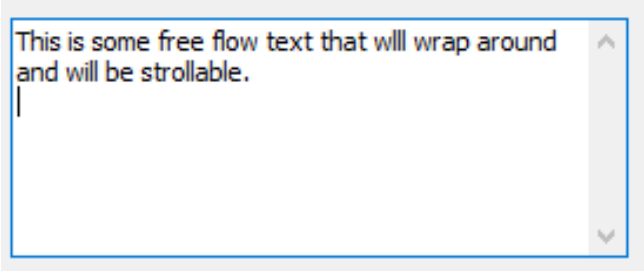
Genero Forms – Widgets

The **COMBOBOX** item type defines a line-edit with a drop-down list of values.

```
COMBOBOX cb = FORMONLY.l_colours,
 ITEMS=((1,"Red"),(2,"Green"), (3,"Blue"));
```

The **TEXTEDIT** form item type defines a multi-line edit form field.

```
TEXTEDIT f1 = customer.comments,STRETCH=BOTH;
```



Genero Forms – Widgets

An IMAGE item defines an area in which you can display an image from a pixel-map file.

Form Field Images – for images that change often.

```
IMAGE f01 = contact.picture,
            HEIGHT=400 PIXELS,
            WIDTH=200 PIXELS,
            STRETCH=BOTH;
```

Static Images – for images that do not change.

```
IMAGE f01 : logo, IMAGE="fjs.gif",
            STRETCH=BOTH;
```

Genero Forms – Widgets

The LABEL form item defines a simple text area to display read-only data. There are two types, and each has unique syntax:

Form Field Labels - for labels that have a value that changes often, such as data retrieved from a database.

```
LABEL custid = customer.customer_id;
```

Static Labels - for labels that have a value that does not change.

```
LABEL lab1 : copyright,
             TEXT = "2003 ABC COMPANY";
```

Genero Forms – Widgets

A **BUTTON** is an action view, not associated with database columns and therefore using the static notation.

```
BUTTON btn1 : help, TEXT="Click me",
                    IMAGE="question“;
```

A **CANVAS** item defines an area in which you can draw shapes.

```
CANVAS cvs1 : canvasarea1;
```

FOUR Js
The Power of Simplicity

Genero Forms – Widgets

The COMPLETER attribute provides a way to do auto completion, ie a list of valid results based on an array of data that's filtered as the user types.

```
ATTRIBUTES
  f1 = FORMONLY.f1, COMPLETER;
```

In the 4gl code:

```
FUNCTION set_completer(l_d ui.Dialog, l_in_str STRING)
  DEFINE l_items DYNAMIC ARRAY OF STRING
  DEFINE i INTEGER
  IF l_in_str.getLength() > 0 THEN
    FOR i = 1 TO m_all_names.getLength()
      IF UPSHIFT(m_all_names[i])
      MATCHES UPSHIFT(l_in_str.append("*"))
      THEN -- case insensitive filter
        LET l_items[ l_items.getLength() + 1 ] = m_all_names[i]
        IF  l_items.getLength() == 50 THEN EXIT FOR END IF -- Completer
is limited to 50 items
      END IF
    END FOR
  END IF
  CALL l_d.setCompleterItems(l_items)
END FUNCTION
```

FOUR Js
The Power of Simplicity

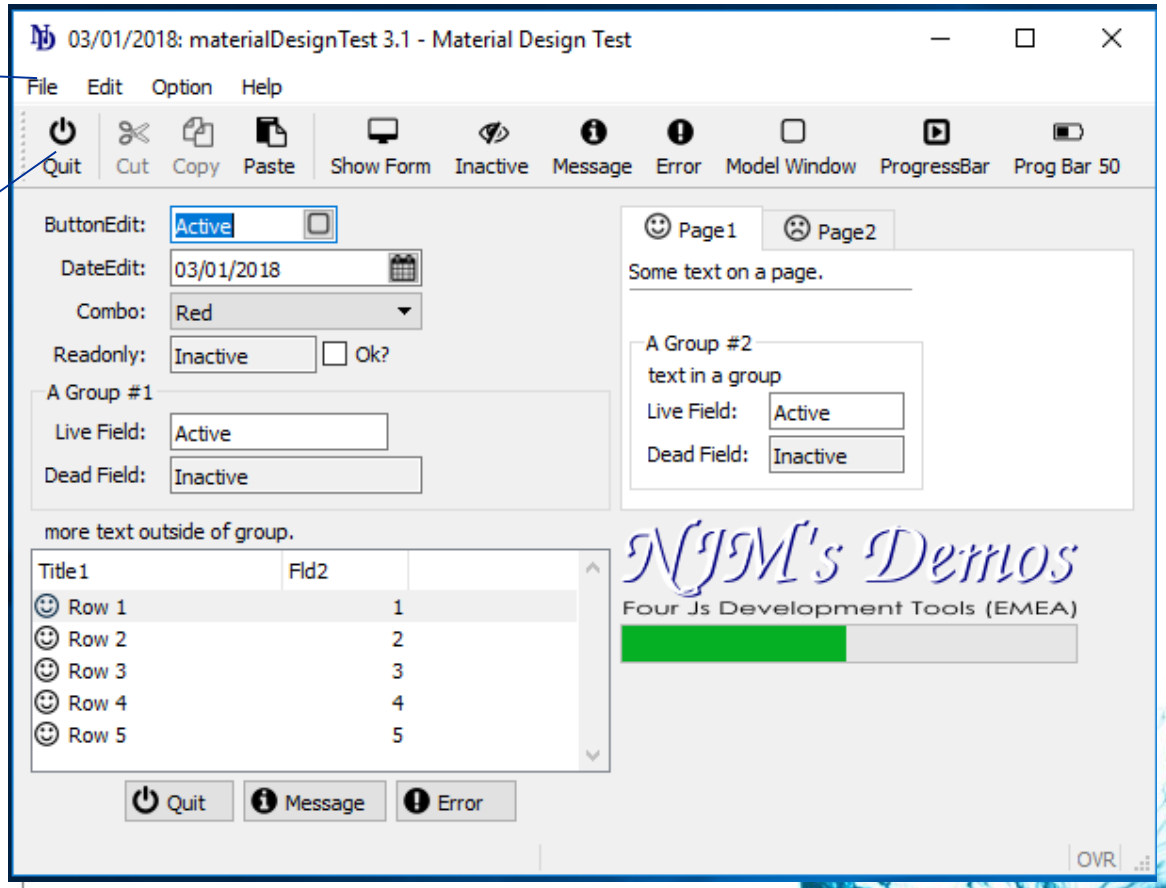
Do Chapter 2 - Exercise 4

Genero Forms – Additional Form Elements

Topmenus and Toolbars are views for actions that can trigger events in your code.

Top menu

Toolbar



FOUR Js
The Power of Simplicity

Genero Forms – Additional Form Elements

ACTION DEFAULTS

```
ACTION DEFAULTS
  ACTION action_id
( action_attribute [,…] )
  […]
END
```

TOPMENU

TOOLBAR

Genero Forms – Compiling

Form definitions in text files (.per files) can be compiled from the command line using the tool **fglform**:

fglform custform.per

Genero Studio has menu options and icons that allow you to validate or compile form definitions.

The resulting runtime form file is an XML file with a .42f extension.

Genero Forms – Summary

- A form definition file is used to design the form area of a Genero program.
- The definition file is translated into an XML document and loaded into the **AUI** at runtime.
- The **LAYOUT** section in the file manages the layout of the form.
- Form items are used within **GRID**, **SCROLLGRID** and **TABLE** containers to provide fields for static and database-driven values.
- Containers and form items have specific attributes.
- **TopMenus** and **Toolbars** can be defined.
- The **Action Defaults** section can be used to centralize the definition of attributes for action views.

Do Chapter 2 - Exercise 5

Q&A

Intelligent Business Application Infrastructure