

Object-Oriented Programming with Java

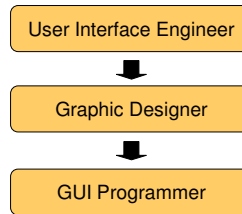
Recitation No. 11: SWT GUI Package

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The GUI Development Process

■ GUI: Graphical User Interface



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GUI Application

- When implementing a GUI application one should specify:
 - the GUI elements
 - the 2D arrangement of the GUI elements
 - the behavior of the GUI elements
- Java GUI libraries:
 - AWT (**A**bstract **W**indowing **T**oolkit)
 - Swing
 - SWT (**S**tandard **W**idget **T**oolkit)

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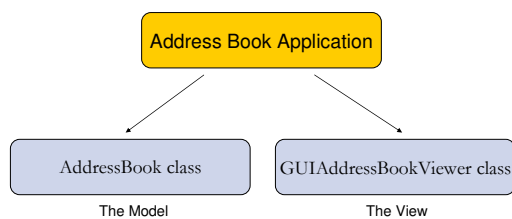
Model-View Separation

- Separate between the application logic (**model**) part and the GUI (**view**) part.
- Ensures that view changes have no effect on the basic model
- Enables us to maintain one model for several different views

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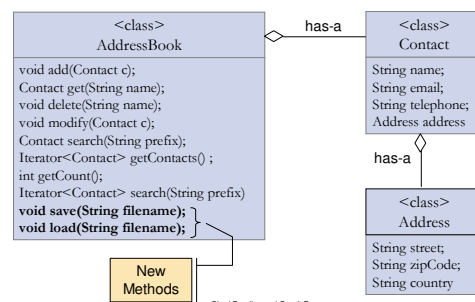
Example: Address Book



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The Model



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The View

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The View

- The class diagram:
- The implementation:
 - based on the SWT GUI library

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SWT

- Online Documentation:
 - SWT HomePage: <http://dev.eclipse.org/viewcvs/index.cgi/%7Echeckout%7E/platform-sw2-home/dev.html>
 - JavaDoc
 - Snippets
- Getting Started with Eclipse and the SWT: <http://www.cs.umanitoba.ca/~eclipse/>

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Widgets

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Layouts

- A Layout controls the position and size of Control widgets in a Composite.

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GridLayout

- Lays out the Control widgets in a grid.
- GridLayout Configuration fields:

Field	Default	Description
horizontalSpacing	5	Horizontal/vertical space between the grid cells
verticalSpacing	5	The size of the horizontal/vertical margins of the layout
marginHeight	5	
marginWidth	5	
numColumns	1	Number of columns
makeColumnsEqualWidth	false	If true, all columns will have the same size

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GridLayout (cont.)

GridData:

- Use GridData objects to configure the Control widgets in a GridLayout.
- Use the `setLayoutData()` to set a GridData object into a Control, e.g.
`label.setLayoutData(new GridData(...));`
- Do not reuse GridData objects

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GridLayout (cont.)

■ GridData Configuration Fields:

Field	Default	Description
<code>grabExcessHorizontalSpace</code> <code>grabExcessVerticalSpace</code>	false	If true, the width/length of the widget will be as large as possible to fit the remaining space.
<code>heightHint</code> <code>widthHint</code>	SWT.DEFAULT (no minimum)	A minimum width/height for the widget.
<code>horizontalSpan</code> <code>verticalSpan</code>	1	the number of column/row cells that the widget will take up.
<code>horizontalIndent</code>	0	the number of indentation pixels along the left side of the cell.
<code>horizontalAlignment</code> <code>verticalAlignment</code>	GridData.BEGINNING GridData.CENTER	how controls will be positioned horizontally/vertically within a cell.

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FormLayouts

- A very flexible layout
- FormLayout Configuration Properties:

Field	Default	Description
<code>marginHeight</code> <code>marginWidth</code>	0	the margin width/height
<code>spacing</code>	0	the number of pixels between the edge of one control and the edge of its neighbouring control.

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FormLayouts (cont.)

- Use FormData objects to configure the Control widgets in a FormLayout.
- Use the `setLayoutData()` to set a FormData object into a Control widget.
- A FormData object has a FormAttachment object for each edge of the Control.

Field	Description
<code>width/height</code>	the desired width/height in pixels.
<code>top/bottom/left/right</code>	Specifies the position of the control attachment.

FormLayouts (cont.)

- A FormAttachment defines where to attach the side of a Control by using the equation: $y = ax + b$.

A fraction defined by:
-numerator
-denominator

an offset, in pixels

the width/height of a Control to which the control side is attached (control).

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FormLayouts (cont.)

■ Main FormAttachment Constructors:

- `public FormAttachment(Control control)`
- `public FormAttachment(Control control, int offset)`
- `public FormAttachment(int numerator)`
- `public FormAttachment(int numerator, int offset)`

Field	Default
<code>control</code>	Parent Composite
<code>numerator</code>	100
<code>denominator</code>	100
<code>offset</code>	0

$$y = \frac{\text{numerator}}{\text{denominator}} \cdot x + \text{offset}$$

x - control's width/ height

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