

Cheat Sheet on AWT/Swing Layout

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Daqing Hou

GUI components and containers need to be laid out when they are

1. initialized (`JFrame.pack()/JDialog.pack()`),
2. resized, or
3. affected by the addition or removal of other components or adjustments of other visual attributes like fonts.

Layout is a process that determines both the position and size (height and width) for a GUI component.

Layout manager objects implement common layout strategies/algorithms that automate the process.

GUI developers control the layout process by (1) choosing the proper layout manager and (2) setting proper values for minimum size, preferred size, and maximum size.

How container that uses BoxLayout resizes children when its height enlarged

A

Parameters that developers can control:
max, pref, min

B

Initially, **$h_A = \text{pref}_A$** , **$h_B = \text{pref}_B$** , and **$h = h_A + h_B$**

extra

When container is enlarged vertically,
its new height is **h_{New}** , with **$\text{extra} = h_{\text{New}} - h$** .

How is extra allocated between A and B?

$h_A' = h_A + \text{extra} * f_a$

$h_B' = h_B + \text{extra} * f_b$, where

$f_a = (\text{max}_A - \text{pref}_A) / (\text{max}_A - \text{pref}_A + \text{max}_B - \text{pref}_B)$

$f_b = (\text{max}_B - \text{pref}_B) / (\text{max}_A - \text{pref}_A + \text{max}_B - \text{pref}_B)$

when **$\text{max}_A + \text{max}_B = \text{pref}_A + \text{pref}_B$** , **$f_a = f_b = 0$**

Default max, pref, min for various widgets

	Max	Pref	Min
Container using BorderLayout	MAX_I ($2^{31}-1$)	Sum of Children's pref	Sum of Children's min
Container using FlowLayout	MAX_S ($2^{15}-1$)	Sum	Sum
Container using BoxLayout	Sum of Children's max	Sum	Sum
Container using GridLayout	MAX_S	#cell*Max of children's pref	#cell*Max of children's min
JButton	MAX_S	Default value	0
JTextField	MAX_I	Default value	0
JLabel	Default value	Default value	0

Some useful facts:

1. By default, a JPanel uses FlowLayout.
2. By default, the content pane of a JFrame uses BorderLayout.

Exercises

A. What happens when a BoxLayout containing a FlowLayout and a BorderLayout is enlarged?

B. What happens if a BoxLayout containing 2 FlowLayout is enlarged?