

General Developer Tutorial for BRAPH 2.0

The BRAPH 2 Developers

October 14, 2023

...

Contents

<i>Software architecture</i>	2
<i>Elements</i>	2
<i>Category of a Property</i>	2
<i>Format of a Property</i>	3
<i>Create Elements</i>	3

Software architecture

The software architecture of BRAPH 2.0 provides a clear structure for developers to understand and extend the functionalities of the software. All objects in BRAPH 2.0 are derived from a base object called `Element`. The core code includes the compiler (`genesis`), the essential source code (`src`), and the GUI functionalities (`gui`). Developers can easily add new elements such as brain surfaces, atlases, example scripts, GUI pipelines, graphs, measures, data types, data importers, data exporters, and analyses. By writing new elements and recompiling the code, the new elements and their functionalities are immediately integrated into the GUI.

Elements

BRAPH 2.0 is a compiled object-oriented programming software. The base class for all elements is `Element`. Each element is essentially a container for a series of *properties*. Each property has a *category* and a *format*. Even though it is possible to create instances of `Element`, typically one uses its subclasses. In this section, we will see how to implement a new element.

Category of a Property

The category determines for what and how a property. The possible categories are:

CONSTANT Static constant equal for all instances of the element. It allows incoming callbacks. It is cloned (implicitly).

METADATA Metadata NOT used in the calculation of the results. It does not allow callbacks. It is not cloned. It is not locked when a result is calculated.

PARAMETER Parameter used to calculate the results of the element. It allows incoming and outgoing callbacks. It can be cloned. It is locked when a result is calculated.

DATA Data used to calculate the results of the element. It is `NoValue` when not set. It allows incoming and outgoing callbacks. It is not cloned. It is locked when a result is calculated.

RESULT Result calculated by the element using parameters and data. The calculation of a result locks the element. It is `NoValue` when not calculated. It allows incoming callbacks.

QUERY Query result calculated by the element. The calculation of a

query does NOT lock the element. It is NoValue when not calculated. It does not allow callbacks.

EVANESCENT Evanescent variable calculated at runtime (typically employed for handles of GUI components). It is NoValue when not calculated. It does not allow callbacks.

FIGURE Parameter used to plot the results in a figure. It allows incoming and outgoing callbacks. It is not cloned. It is not locked when a result is calculated.

GUI Parameter used by the graphical user interface (GUI). It allows incoming and outgoing callbacks. It is not cloned. It is not locked when a result is calculated.

Format of a Property

Create Elements