NAME

gv_io - graph manipulation in io

SYNOPSIS USAGE

INTRODUCTION

gv_io is a dynamically loaded extension for io that provides access to the graph facilities of graphviz.

COMMANDS

New graphs

```
New empty graph

graph_handle gv.graph (name);

graph_handle gv.digraph (name);

graph_handle gv.strictgraph (name);

graph_handle gv.strictdigraph (name);

New graph from a dot-syntax string or file

graph_handle gv.readstring (string);

graph_handle gv.read (string filename);

graph_handle gv.read (channel);

Add new subgraph to existing graph

graph_handle gv.graph (graph_handle, name);
```

New nodes

Add new node to existing graph node_handle **gv.node** (graph_handle, name);

New edges

Add new edge between existing nodes

```
edge_handle gv.edge (tail_node_handle, head_node_handle);
```

Add a new edge between an existing tail node, and a named head node which will be induced in the graph if it doesn't already exist

```
edge_handle gv.edge (tail_node_handle, head_name);
```

Add a new edge between an existing head node, and a named tail node which will be induced in the graph if it doesn't already exist

```
edge_handle gv.edge (tail_name, head_node_handle);
```

Add a new edge between named tail and head nodes which will be induced in the graph if they don't already exist

```
edge_handle gv.edge (graph_handle, tail_name, head_name);
```

Setting attribute values

```
Set value of named attribute of graph/node/edge - creating attribute if necessary string gv.setv (graph_handle, attr_name, attr_value); string gv.setv (node_handle, attr_name, attr_value); string gv.setv (edge_handle, attr_name, attr_value);

Set value of existing attribute of graph/node/edge (using attribute handle) string gv.setv (graph_handle, attr_handle, attr_value); string gv.setv (node_handle, attr_handle, attr_value); string gv.setv (edge_handle, attr_handle, attr_value);
```

Getting attribute values

```
Get value of named attribute of graph/node/edge
        string gv.getv (graph_handle, attr_name);
        string gv.getv (node_handle, attr_name);
        string gv.getv (edge_handle, attr_name);
Get value of attribute of graph/node/edge (using attribute handle)
        string gv.getv (graph_handle, attr_handle);
        string gv.getv (node_handle, attr_handle);
        string gv.getv (edge_handle, attr_handle);
Obtain names from handles
        string gv.nameof (graph_handle);
        string gv.nameof (node handle);
        string gv.nameof (attr_handle);
Find handles from names
        graph_handle gv.findsubg (graph_handle, name);
        node_handle gv.findnode (graph_handle, name);
        edge_handle gv.findedge (tail_node_handle, head_node_handle);
        attribute_handle gv.findattr (graph_handle, name);
        attribute_handle gv.findattr (node_handle, name);
        attribute_handle gv.findattr (edge_handle, name);
Misc graph navigators returning handles
        node_handle gv.headof (edge_handle);
        node_handle gv.tailof (edge_handle);
        graph_handle gv.graphof (graph_handle);
        graph_handle gv.graphof (edge_handle);
        graph_handle gv.graphof (node_handle);
        graph_handle gv.rootof (graph_handle);
Obtain handles of proto node/edge for setting default attribute values
        node_handle gv.protonode (graph_handle);
        edge_handle gv.protoedge (graph_handle);
Iterators
Iteration termination tests
        bool gv.ok (graph_handle);
        bool gv.ok (node handle);
        bool gv.ok (edge handle);
        bool gv.ok (attr_handle);
Iterate over subgraphs of a graph
        graph_handle gv.firstsubg (graph_handle);
        graph_handle gv.nextsubg (graph_handle, subgraph_handle);
Iterate over supergraphs of a graph (obscure and rarely useful)
        graph_handle gv.firstsupg (graph_handle);
        graph_handle gv.nextsupg (graph_handle, subgraph_handle);
Iterate over edges of a graph
        edge_handle gv.firstedge (graph_handle);
        edge_handle gv.nextedge (graph_handle, edge_handle);
Iterate over outedges of a graph
        edge handle gv.firstout (graph handle);
        edge_handle gv.nextout (graph_handle, edge_handle);
Iterate over edges of a node
        edge_handle gv.firstedge (node_handle);
        edge_handle gv.nextedge (node_handle, edge_handle);
```

```
Iterate over out-edges of a node
        edge_handle gv.firstout (node_handle);
        edge_handle gv.nextout (node_handle, edge_handle);
Iterate over head nodes reachable from out-edges of a node
        node_handle gv.firsthead (node_handle);
        node_handle gv.nexthead (node_handle, head_node_handle);
Iterate over in-edges of a graph
        edge_handle gv.firstin (graph_handle);
        edge_handle gv.nextin (node_handle, edge_handle);
Iterate over in-edges of a node
        edge_handle gv.firstin (node_handle);
        edge_handle gv.nextin (graph_handle, edge_handle);
Iterate over tail nodes reachable from in-edges of a node
        node_handle gv.firsttail (node_handle);
        node_handle gv.nexttail (node_handle, tail_node_handle);
Iterate over nodes of a graph
        node_handle gv.firstnode (graph_handle);
        node_handle gv.nextnode (graph_handle, node_handle);
Iterate over nodes of an edge
        node_handle gv.firstnode (edge_handle);
        node_handle gv.nextnode (edge_handle, node_handle);
Iterate over attributes of a graph
        attribute handle gv.firstattr (graph handle);
        attribute_handle gv.nextattr (graph_handle, attr_handle);
Iterate over attributes of an edge
        attribute_handle gv.firstattr (edge_handle);
        attribute_handle gv.nextattr (edge_handle, attr_handle);
Iterate over attributes of a node
        attribute_handle gv.firstattr (node_handle);
        attribute_handle gv.nextattr (node_handle, attr_handle);
Remove graph objects
        bool gv.rm (graph_handle);
        bool gv.rm (node_handle);
        bool gv.rm (edge_handle);
Layout
Annotate a graph with layout attributes and values using a specific layout engine
        bool gv.layout (graph_handle, string engine);
Render
Render a layout into attributes of the graph
        bool gv.render (graph_handle);
Render a layout to stdout
        bool gv.render (graph_handle, string format);
Render to an open file
        bool gv.render (graph_handle, string format, channel fout);
Render a layout to an unopened file by name
        bool gv.render (graph_handle, string format, string filename);
```

```
Render to a string result

string gv.renderresult (graph_handle ing, string format);

gv.renderresult (graph_handle, string format, string outdata);

Render to an open channel

bool gv.renderchannel (graph_handle, string format, string channelname);

Render a layout to a malloc'ed string, to be free'd by the caller

(deprecated - too easy to leak memory)

(still needed for "eval [gv::renderdata $G tk]")

string gv.renderdata (graph_handle, string format);

Writing graph back to file

bool gv.write (graph_handle, string filename);

bool gv.write (graph_handle, channel);

Graph transformation tools

bool gv.tred (graph_handle);
```

KEYWORDS

graph, dot, neato, fdp, circo, twopi, io.