NAME

libxdot – parsing and deparsing of xdot operations

SYNOPSIS

```
#include <graphviz/xdot.h>

typedef enum {
   xd_none,
   xd_linear,
   xd_radial
} xdot_grad_type;

typedef struct {
   float frac;
   char* color;
} xdot_color_stop;

typedef struct {
   double x0, y0;
   double x1, y1;
   int n_stops;
   xdot_color_stop* stops;
} xdot_linear_grad;

typedef struct {
   double x0, y0, r0;
   double x1, y1, r1;
   int n_stops;
   xdot_color_stop* stops;
} xdot_radial_grad;

typedef struct {
   xdot_grad_type type;
   union {
               char* clr;
               xdot_linear_grad ling;
               xdot_radial_grad ring;
   } u;
} xdot_color;

typedef enum {
   xd_left, xd_center, xd_right
} xdot_align;

typedef struct {
   double x, y, z;
} xdot_point;

typedef struct {
   double x, y, w, h;
} xdot_rect;

typedef struct {
   int cnt;
   xdot_point* pts;
```

```
} xdot_polyline;

typedef struct {
  double x, y;
  xdot_align align;
  double width;
  char* text;
} xdot_text;

typedef struct {
    xdot_rect pos;
    char* name;
} xdot_image;

typedef struct {
    double size;
    char* name;
} xdot_font;

typedef enum {
    xd_filled_ellipse, xd_unfilled_ellipse,
    xd_filled_polygon, xd_unfilled_polygon,
    xd_filled_bezier,  xd_unfilled_bezier,
    xd_polyline,       xd_text,
    xd_fill_color,     xd_pen_color, xd_font, xd_style, xd_image,
    xd_grad_fill_color,     xd_grad_pen_color,
    xd_fontchar
} xdot_kind;

typedef enum {
    xop_ellipse,
    xop_polygon,
    xop_bezier,
    xop_polyline,       xop_text,
    xop_fill_color,     xop_pen_color, xop_font, xop_style, xop_image,
    xop_grad_fill_color,     xop_grad_pen_color,
    xop_fontchar
} xop_kind;

typedef struct _xdot_op xdot_op;
typedef void (*drawfunc_t)(xdot_op*, int);
typedef void (*freefunc_t)(xdot_op*);

struct _xdot_op {
    xdot_kind kind;
    union {
      xdot_rect ellipse;       /* xd_filled_ellipse, xd_unfilled_ellipse */
      xdot_polyline polygon;   /* xd_filled_polygon, xd_unfilled_polygon */
      xdot_polyline polyline;  /* xd_polyline */
      xdot_polyline bezier;    /* xd_filled_bezier,  xd_unfilled_bezier */
      xdot_text text;          /* xd_text */
      xdot_image image;        /* xd_image */
      char* color;             /* xd_fill_color, xd_pen_color */
      xdot_color grad_color;   /* xd_grad_fill_color, xd_grad_pen_color */
      xdot_font font;          /* xd_font */
      char* style;             /* xd_style */
      unsigned int fontchar;   /* xd_fontchar */
    } u;
    drawfunc_t drawfunc;
};

#define XDOT_PARSE_ERROR 1

typedef struct {
    int cnt;
    int sz;
    xdot_op* ops;
    freefunc_t freefunc;
    int flags;
} xdot;

xdot* parseXDotF (char*, drawfunc_t opfns[], int sz);
xdot* parseXDot (char*);
char* sprintXDot (xdot*);
void fprintXDot (FILE*, xdot*);
void freeXDot (xdot*);

xdot_grad_type colorType (char*);
xdot_color* parseXDotColor (char*);
void freeXDotColor (xdot_color*);
```

DESCRIPTION

libxdot provides support for parsing and deparsing graphical operations specificed by the *xdot* language.

Types

xdot

This encapsulates a series of *cnt* xdot operations, stored in the array pointed to by *ops*. The *sz* indicates the size of each item stored in *ops*. If the user sets the *freefunc* field, this function will be called on each item in *ops* during *freeXDot* before the library does its own clean up of the item. This allows the user to free any resources stored in the item by using an expansion of the *xdot_op* structure.

xdot_op

A value of this type represents one xdot operation. The operation is specified by the *kind* field. The corresponding data is stored in the union *u*, with the subfield associated with a given *kind* indicated by the comments.

The *drawfunc* field allows the user to attach a drawing-specific function to the operation, providing an object-based interface. These functions can be automatically attached during parsing by providing a non-NULL second argument to **parseXDotF**.

xop_kind

This type provides an enumeration of the allowed xdot operations. See
  http://www.graphviz.org/doc/info/output.html#d:xdot
for the specific semantics associated with each operation.

xdot_rect

This represents a rectangle. For ellipses, the *x* and *x* fields represent the center of the rectangle, and *w* and *h* give the half-width and half-height, respectively. For images, (*x*,*y*) gives the lower left corner of the rectangle, and *w* and *h* give the width and height, respectively.

xdot_polyline

This type encapsulates a series of *cnt* points.

xdot_text

A value of this type corresponds to printing the string *text* using the baseline point (*x*,*y*). The *width* field gives an approximation of how wide the printed string will be using the current font and font size. The *align* field indicates how the text should be horizontally aligned with the point (*x*,*y*).

xdot_image

This denotes the insertion of an image. The image source is given by *name*. The images is to be placed into the rectangle *pos*.

xdot_font

The fields give the name and size, in points, of a font.

xdot_align

This enumeration type corresponds to the xdot alignment values -1, 0 and 1 used with the text operator, or '\l', '\n' and '\r' used in dot text.

Functions

xdot* parseXDotF (char *str, drawfunc_t* opfns, int sz)

Parses the string *str* as a sequence of xdot operations and returns a pointer to the resulting *xdot* structure. The function parses as many xdot operations as it can. If some unknown or incorrect input was encountered in *str*, the *ops* and *cnt* fields will reflect the operations parsed before the error, and the *XDOT_PARSE_ERROR* bit will be set in the *flags* field. The function returns NULL if it cannot parse anything.

If *sz* is non-zero, it is assumed to be the size of some structure type containing *xdot_op* as a prefix. In this case, the elements in the array pointed to by *ops* will each have size *sz*.

If *opfns* is non-zero, it is taken to be any array of functions indexed by *xop_kind*. During parsing, the *drawfunc* member of *xop_op* will be set to the corresponding function in *opfns*.

xdot* parseXDot (char *str)

This is equivalent to *parseXDotF(str, 0, 0)* .

void freeXDot (xdot* xp)

This frees the resources associated with the argument. If *xp* is NULL, nothing happens.

extern char* sprintXDot (xdot* xp)
extern void fprintXDot (FILE* fp, xdot* xp)

These two functions deparse the argument xdot structure, producing a string representation. *fprintXDot* writes the output onto the open stream *fp*; *sprintXDot* returns a heap-allocated string.

The color string with fill and draw operations can encode linear and radial gradients. These values are parsed automatically by **parseXDotF** or **parseXDot**, with *xdot_op* having kind *xd_grad_pen_color* or *xd_grad_fill_color* and the value is stored in *grad_color*.

For an application that handles its own parsing of xdot, the library provides three helper functions.

xdot_grad_type colorTypeXDot (char *str)

returns the color type described by the input string.

char* parseXDotColor (char *str, xdot_color* clr)

attempts to parse the string *str* as a color value, storing the result in *clr*. It returns NULL on failure.

void freeXDotColor (xdot_color* cp)

This frees the resources associated with a value of type *xdot_color*.

BUGS

Although some small checking is done on the *sz* argument to *parseXDotF*, it is assumed it is a valid value from *sizeof* applied to some structure type containing *xdot_op* as its first field. There can be no validation of the *opfns* argument.

AUTHORS

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