Tizen Native Development Tips to Save Time & Trouble

Tizen Developer Conference 2015

深圳，中华人民共和国

Shenzhen, People's Republic of China

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Enlightenment / EFL Founder

Tizen Development Today

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HTML5

HTML5

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HTML5 + Native

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Why Native or HTML5?

Pros & Cons

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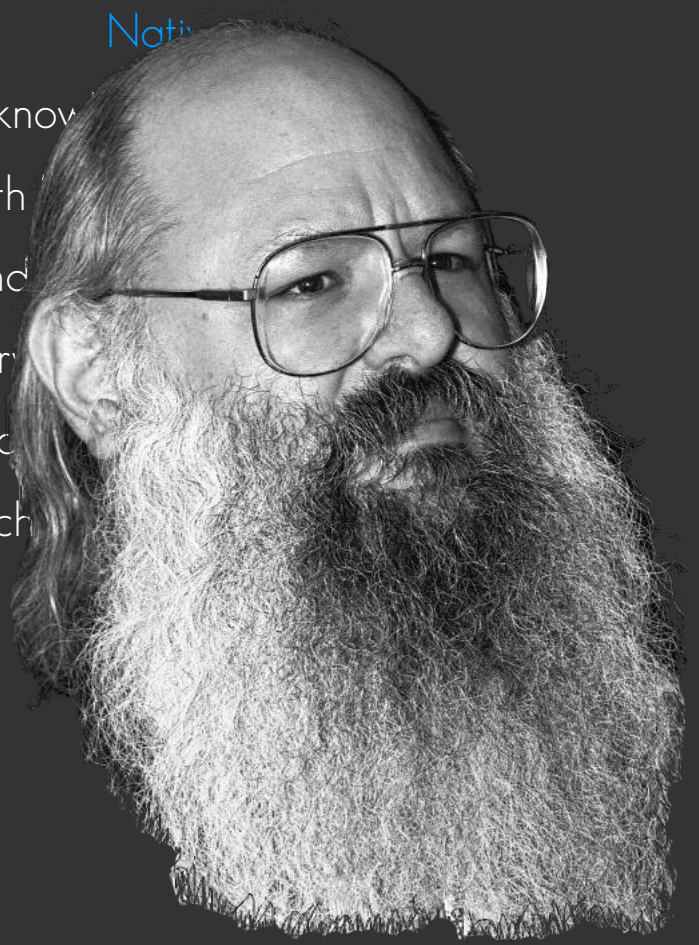

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  - Other open source project APIs suported like cURL, libEXIF, libXML, Sqlite etc.

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- So if you have Questions – Please Ask I don't bite

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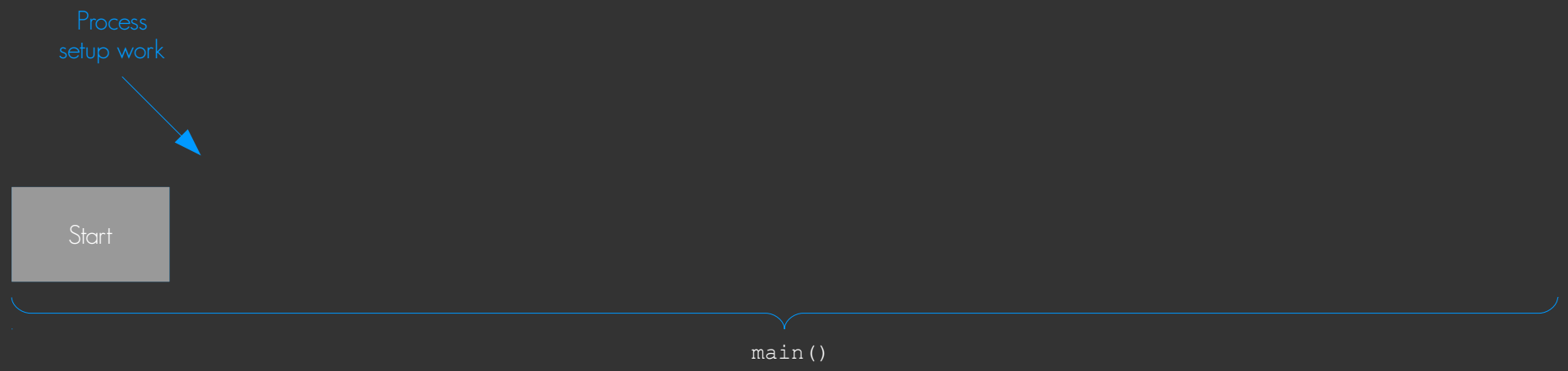
  - Links at end of presentation

Anatomy of the Application Core



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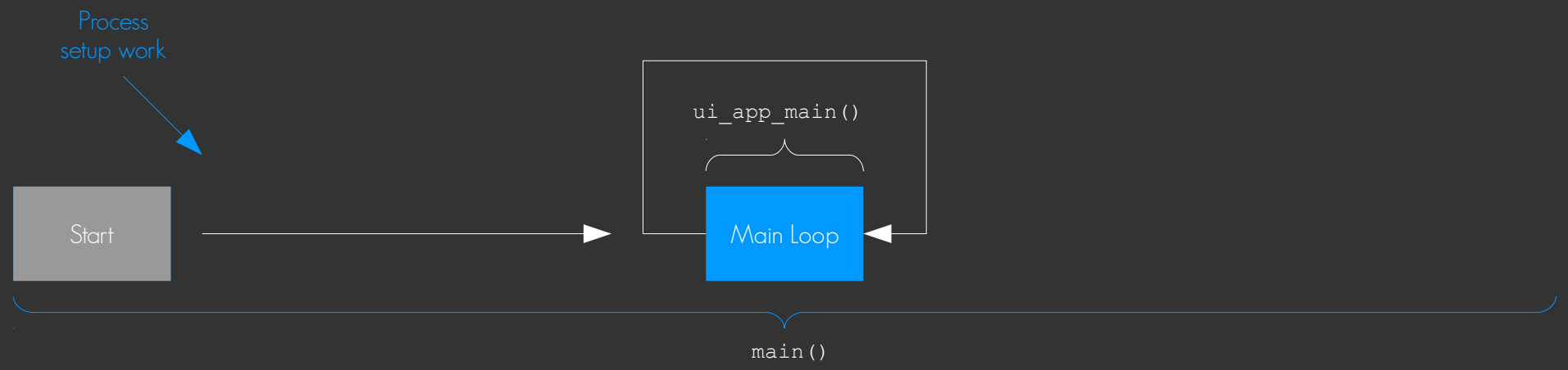

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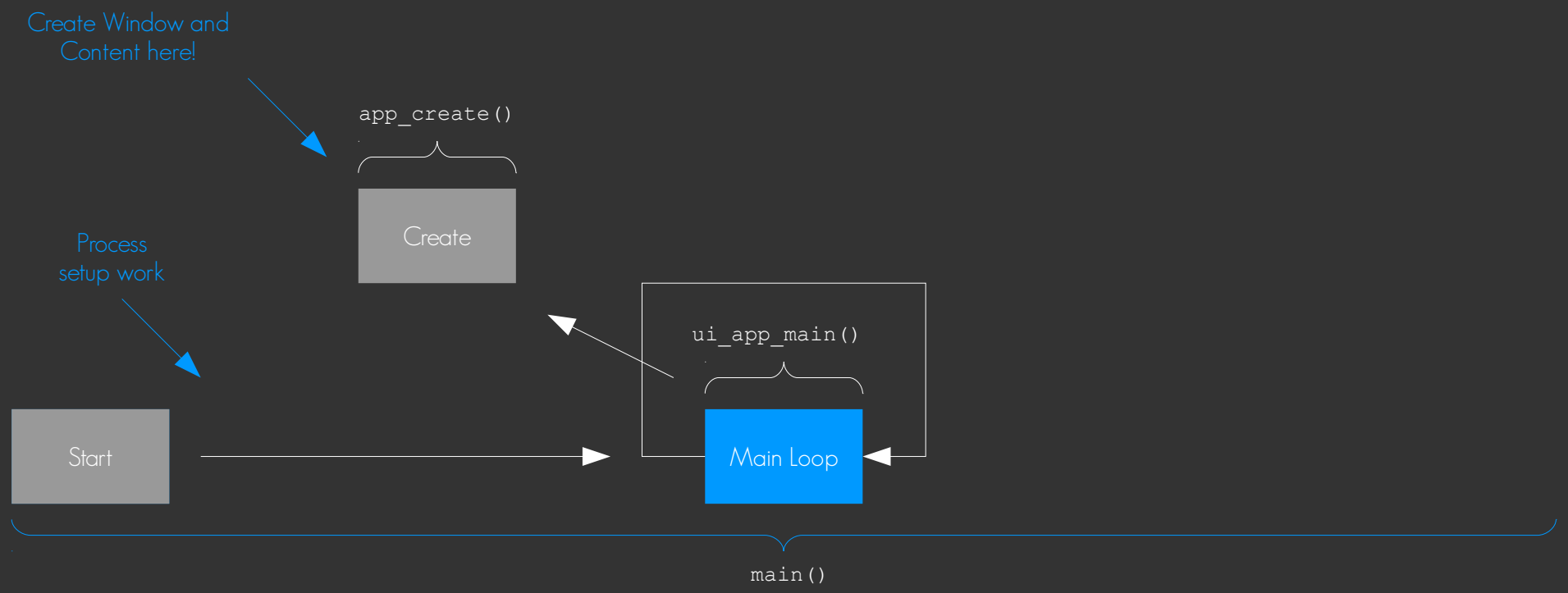

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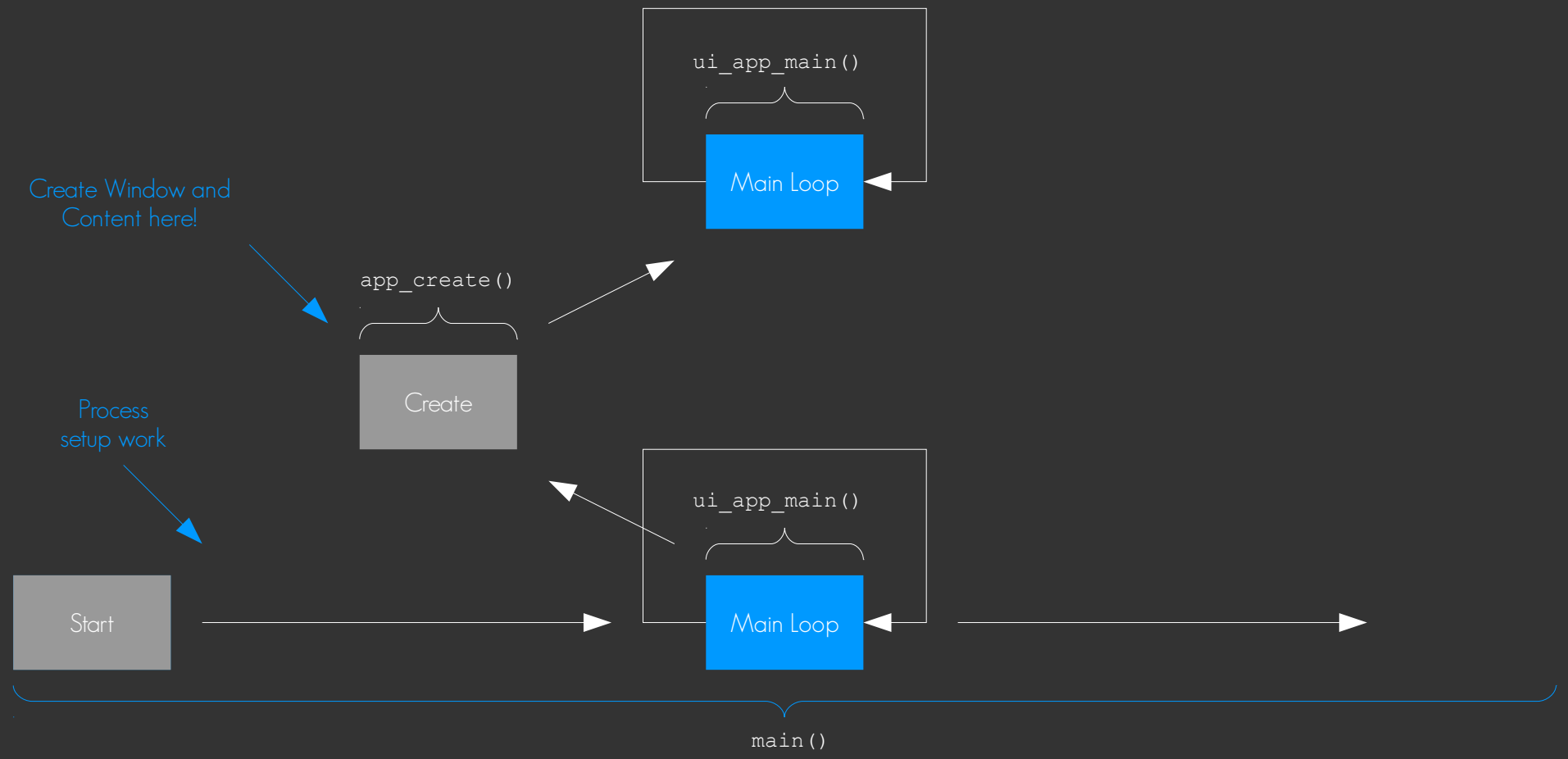

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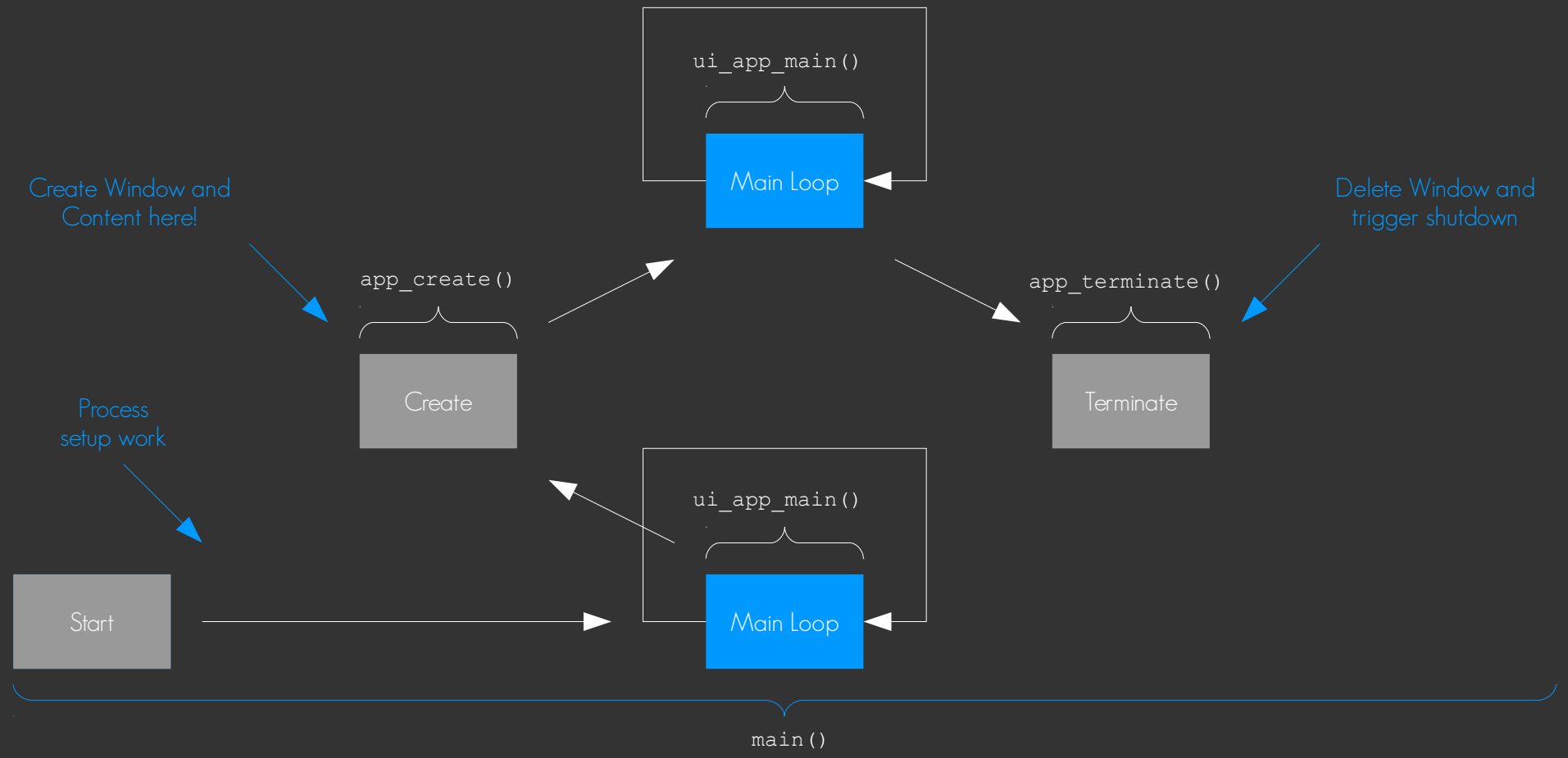

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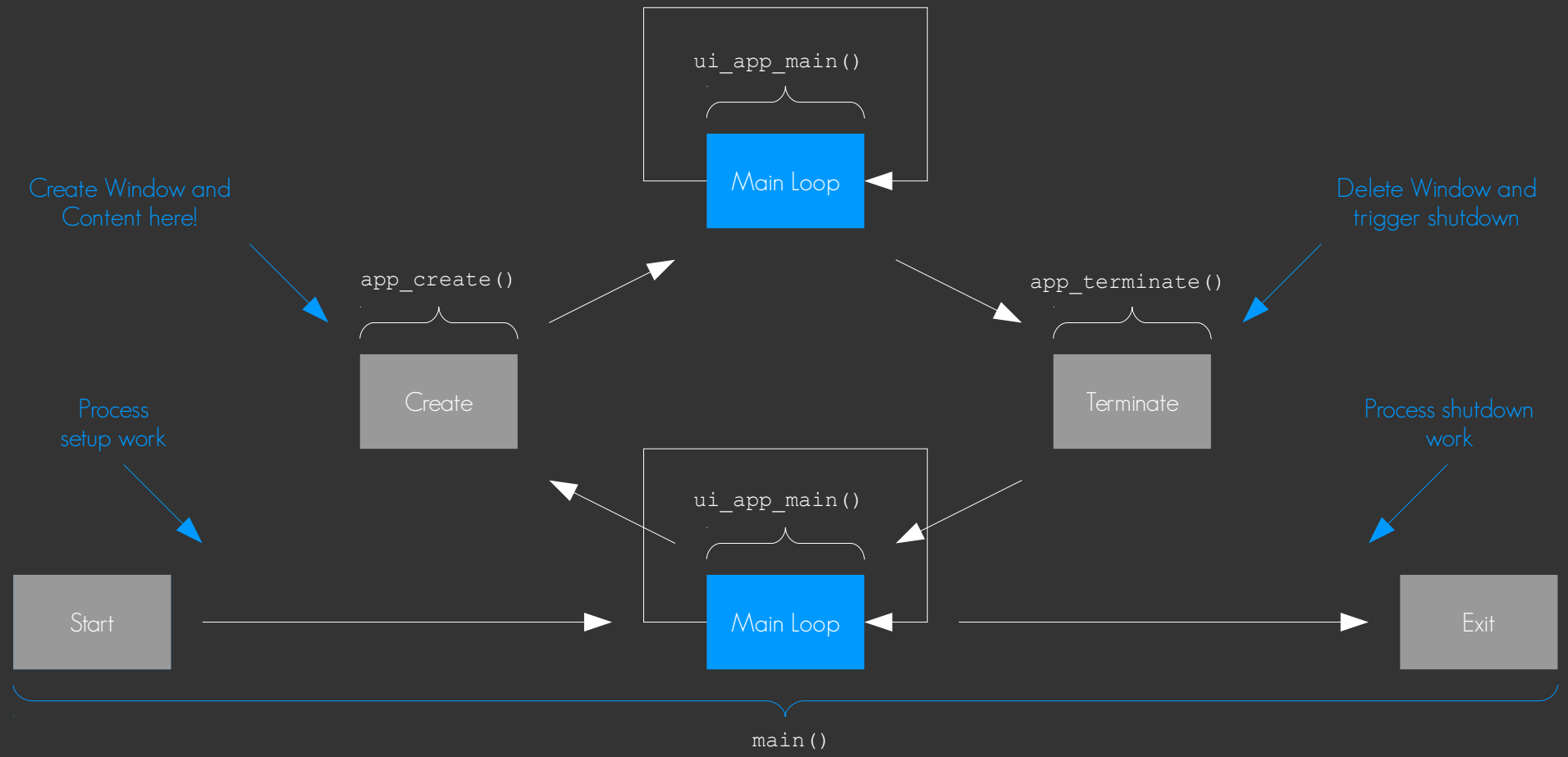
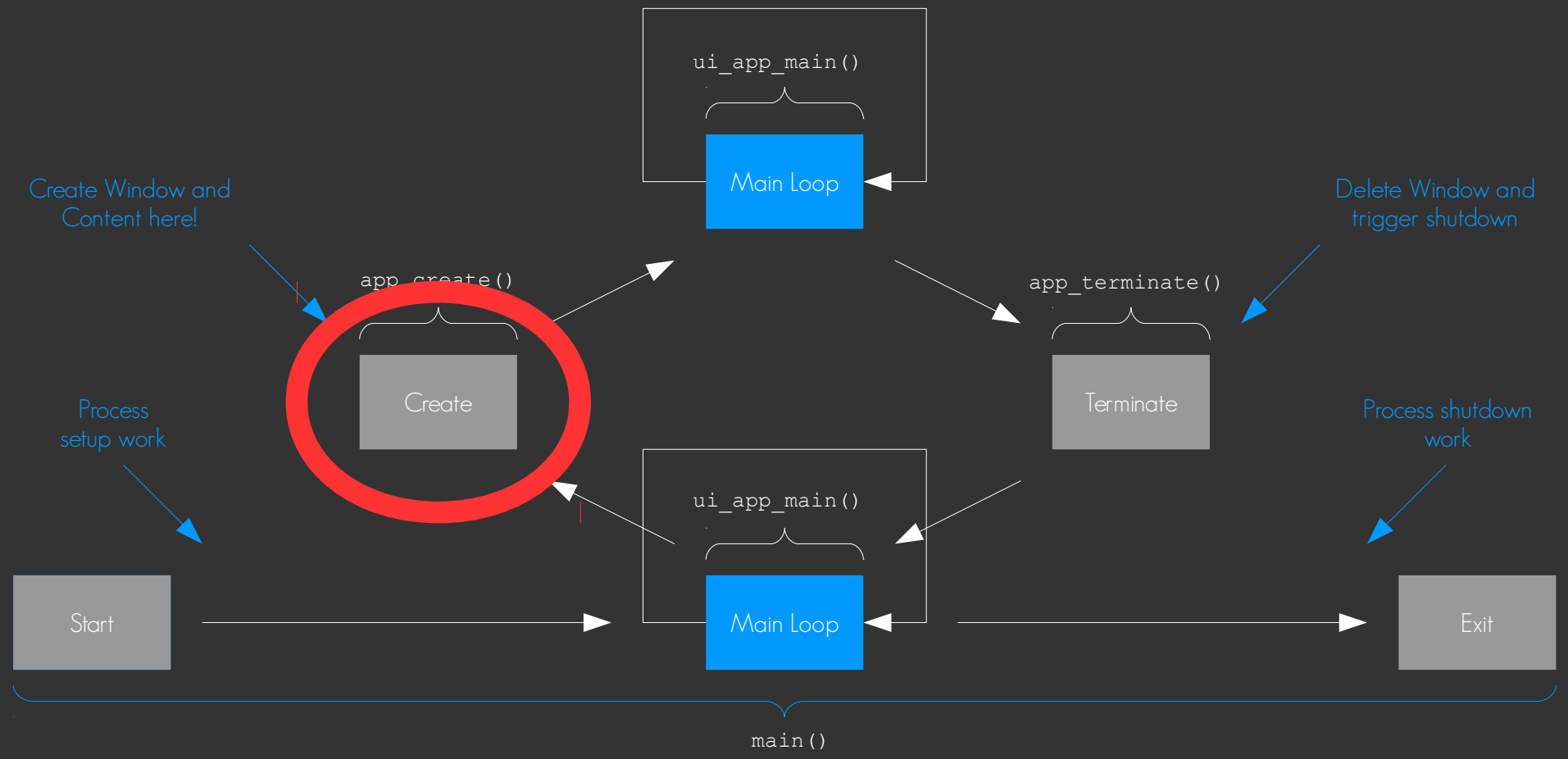


Now ... Creation of your UI



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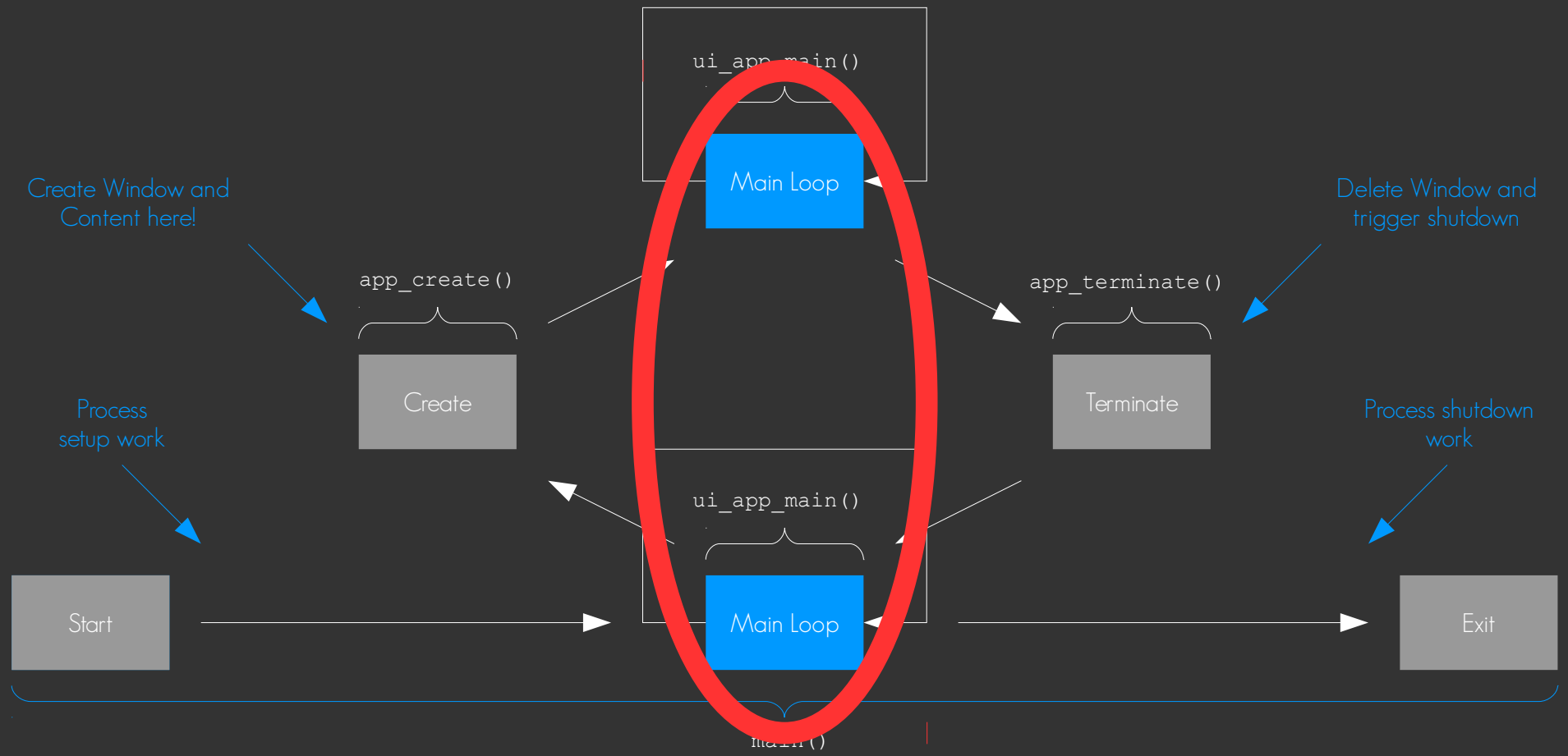
- ... Let main loop run and call callbacks

Now ... Mainloop Interactions



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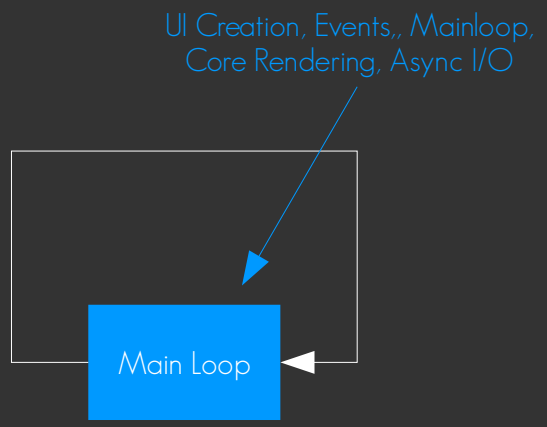

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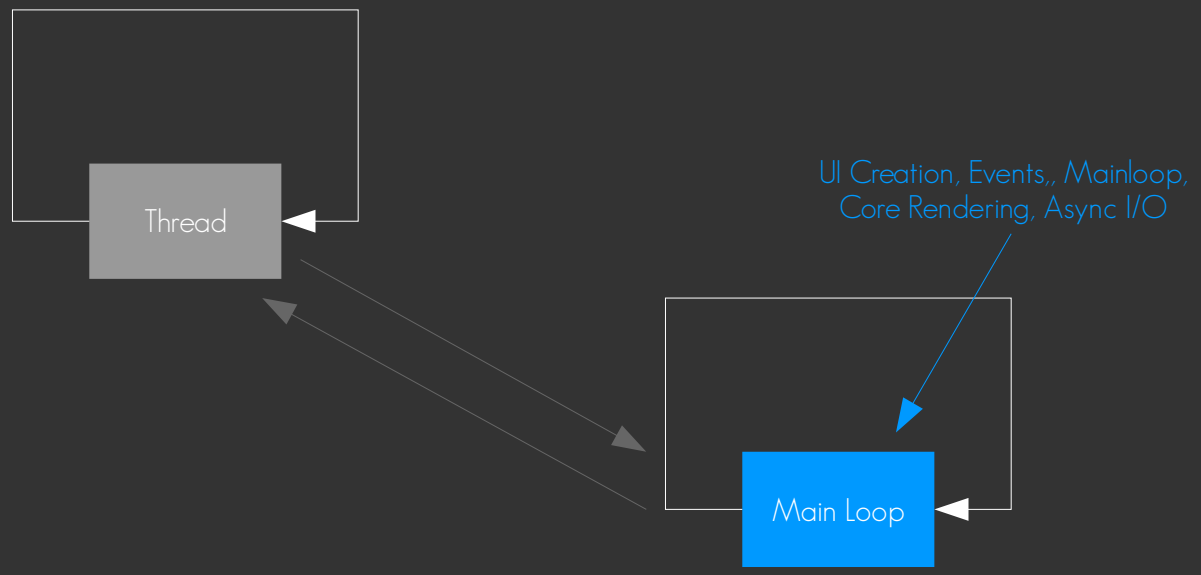

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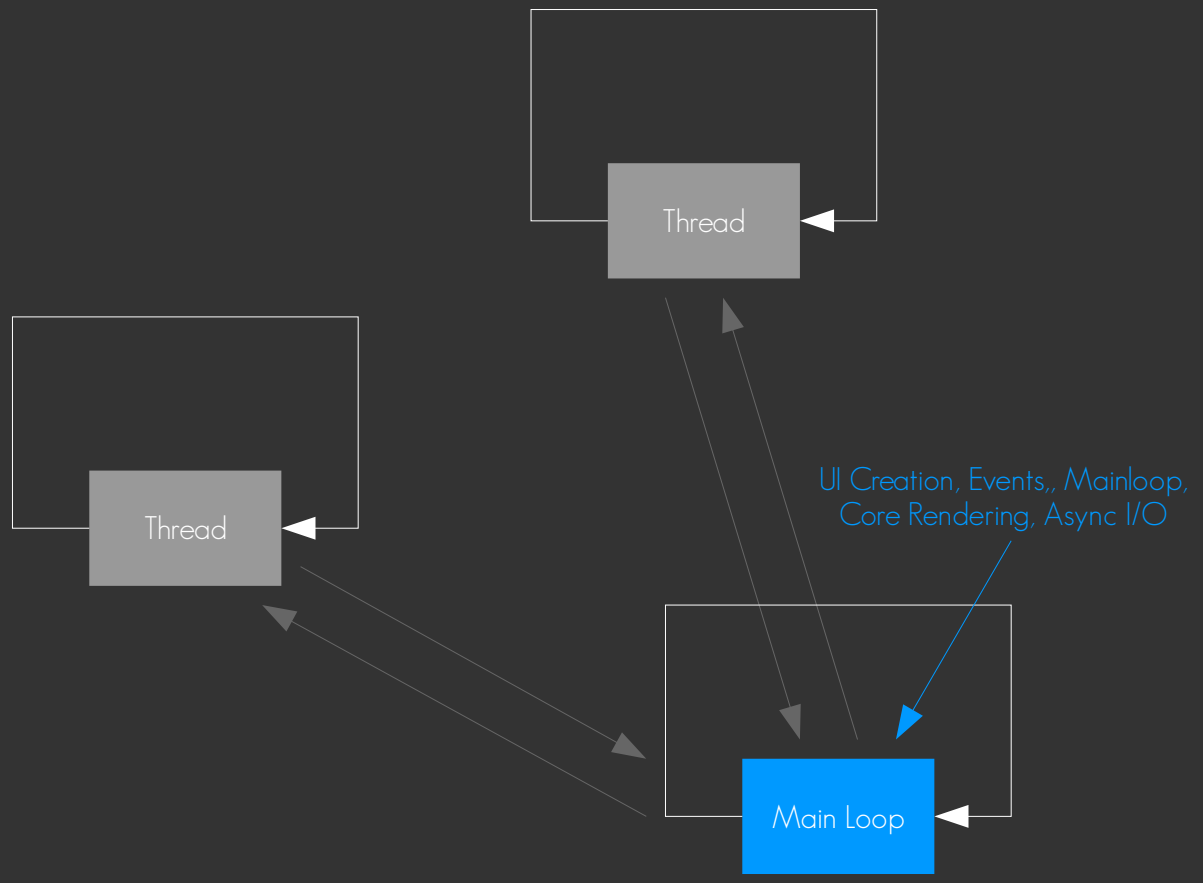

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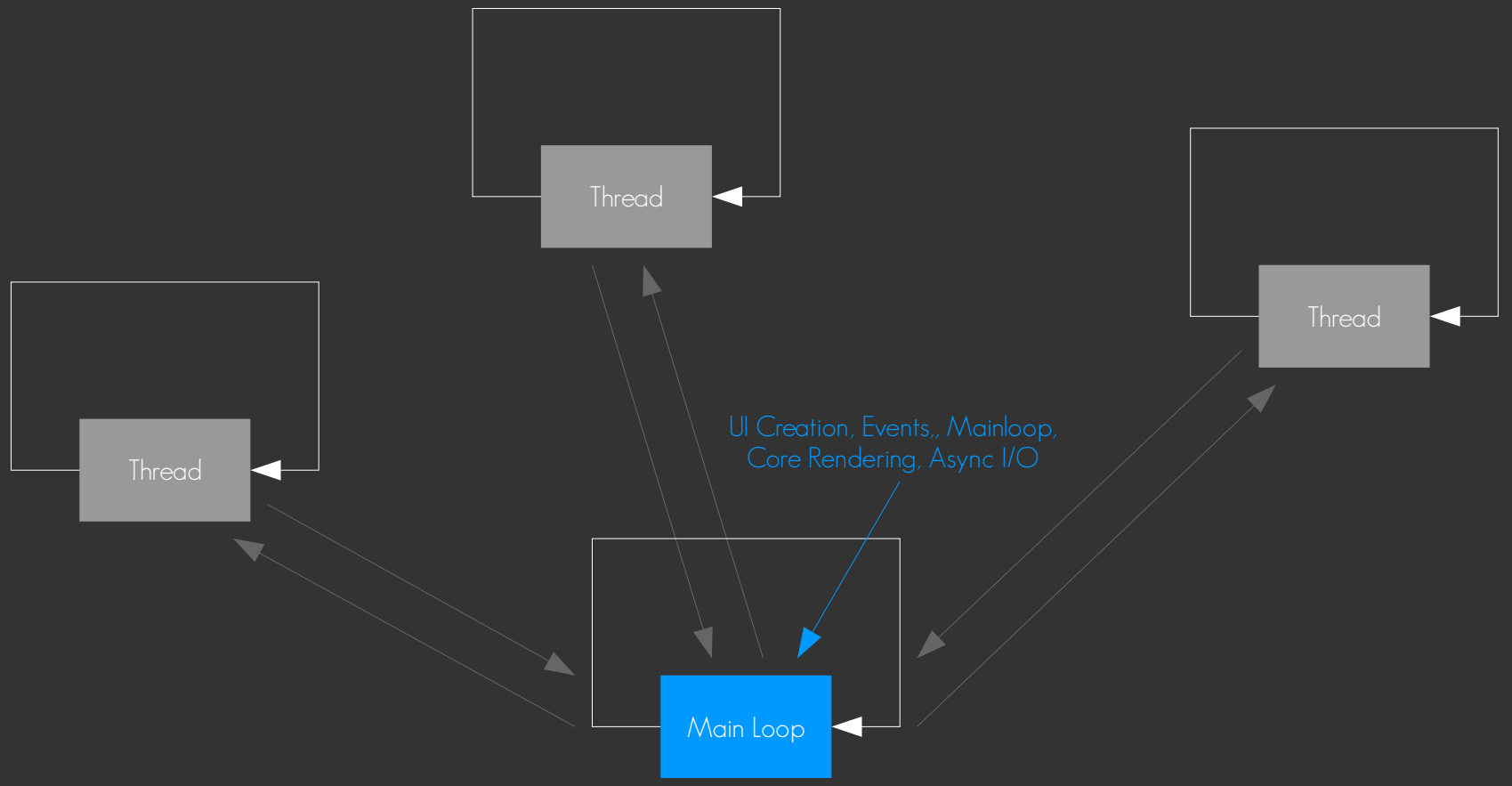

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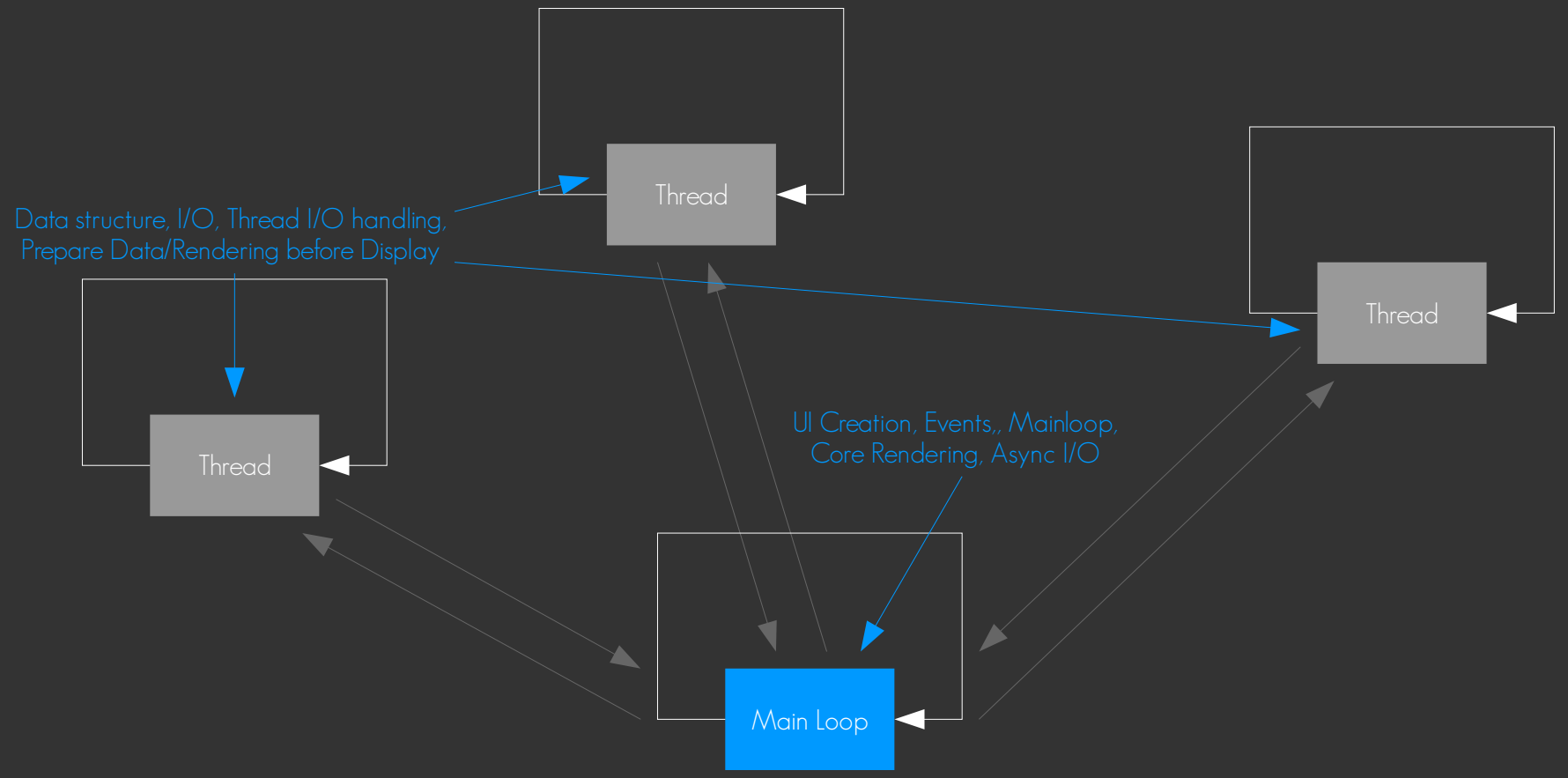

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Main Loop Only

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```
LibC Calls…
eina_…
ecore_main_loop_thread_safe_call_async()
ecore_main_loop_thread_safe_call_sync()
ecore_thread_main_loop_begin()
ecore_thread_main_loop_end()
ecore_thread_check()
ecore_thread_feedback()
ecore_thread_reschedule()
ecore_thread_local_data_add()
ecore_thread_local_data_set()
ecore_thread_local_data_find()
ecore_thread_local_data_del()
ecore_thread_global_data_add()
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elm_…
evas_…
edje_…
ecore_…
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Call “Main Loop” Calls from Thread

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```
…
ecore_thread_main_loop_begin(); { // Begin main loop code
  …
  timer = ecore_timer_add(42.0, my_timer_callback, NULL);
  evas_object_move(my_object, x, y);
  …
} ecore_thread_main_loop_end(); // End main loop code
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```

Very simple & easy way to call rare blocks of code within main loop context from a thread

Call "Main Loop" Calls from Thread

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or

```
…
void my_main_loop_code(void *data) { // Begin main loop code
  My_Data *my_data = data;
  …
  timer = ecore_timer_add(42.0, my_timer_callback, NULL);
  evas_object_move(my_data->obj, my_data->x, my_data->y);
  free(my_data);
  …
} // End main loop code
…

…
// Queue function to be called in the main loop
My_Data *my_data = calloc(1, sizeof(My_Data));
my_data->x = x;
my_data->y = y;
my_data->obj = my_object;
ecore_main_loop_thread_safe_call_async(my_main_loop_code, my_data);
…
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Very efficent way to call code async very frequently from thread in main loop context

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- See Tizen and Elementary docs for more threading usage examples

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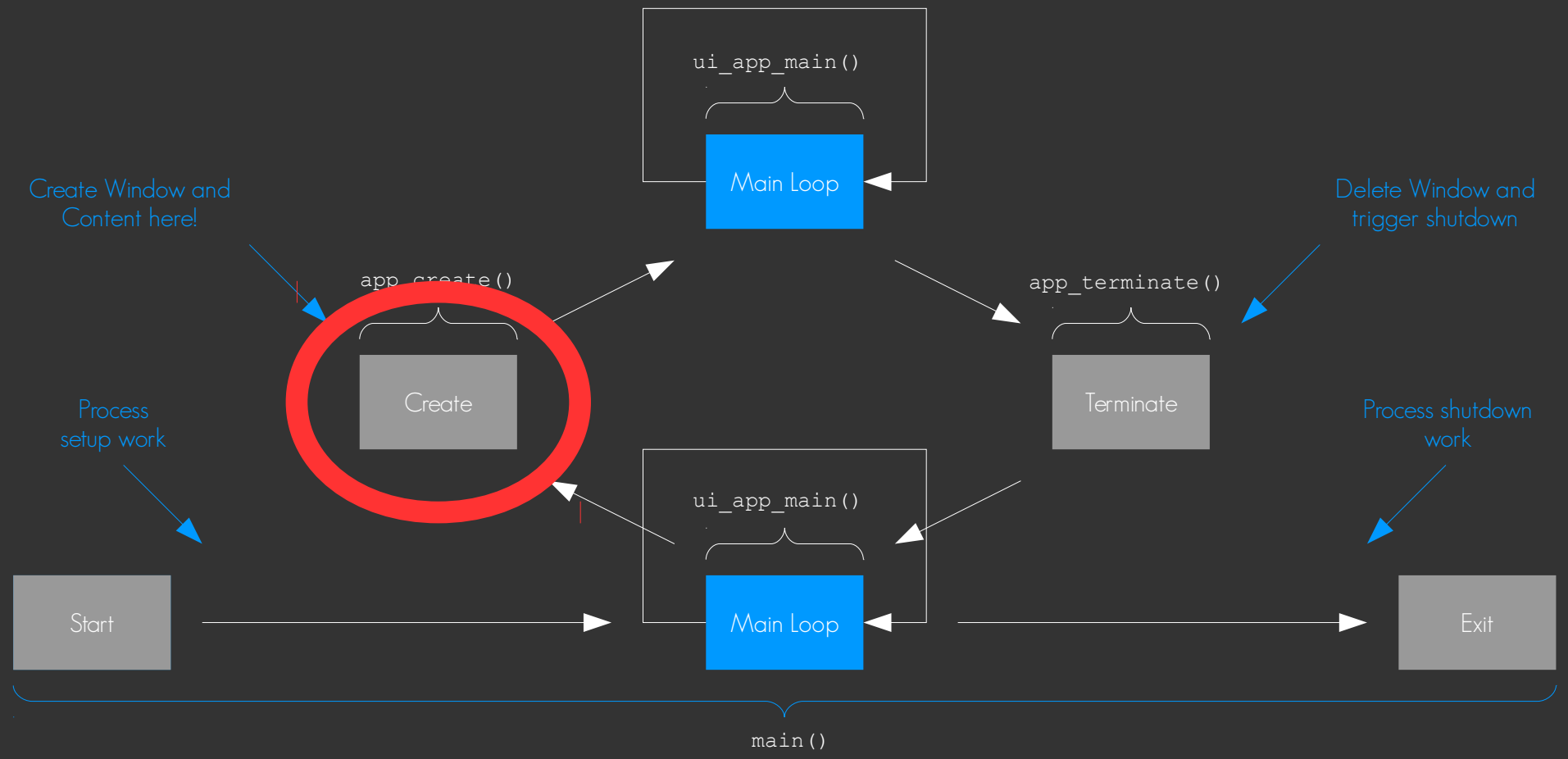
    - Mainloop "collects results & implements display state"
    - Use ecore thread infra to save re-inventing the wheel
- If you have issues, please report/bring them up!

Now … Back to the Window that is created



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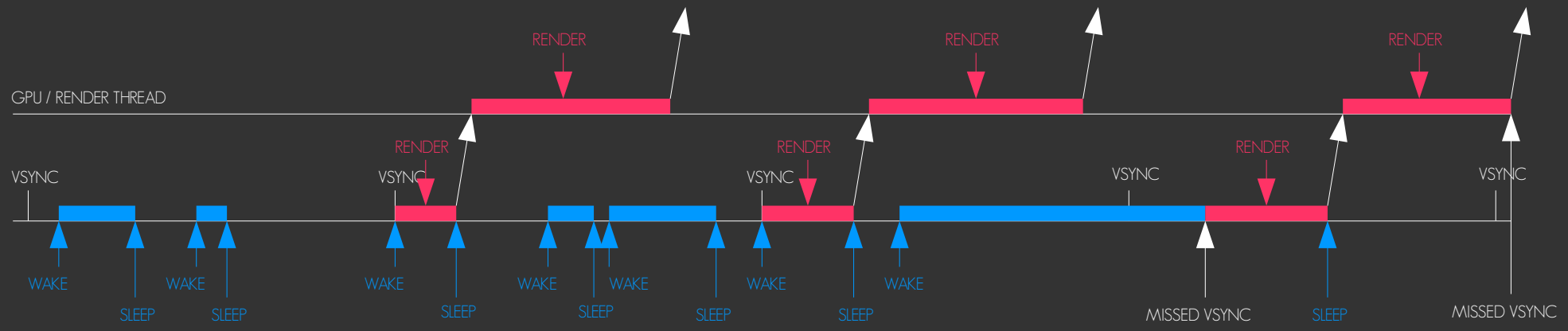

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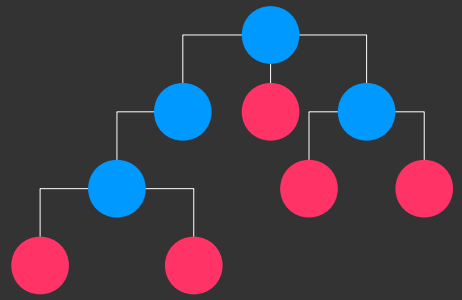

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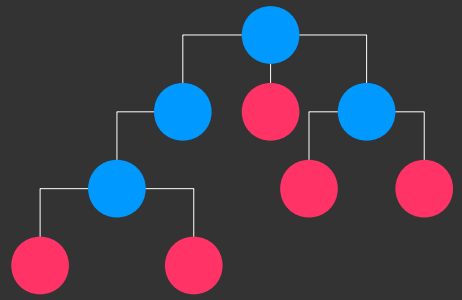

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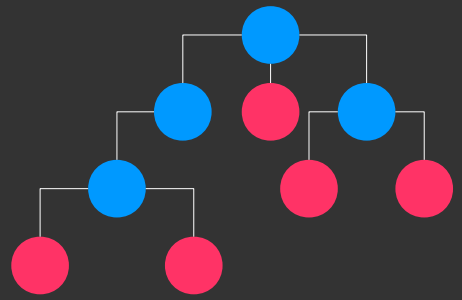

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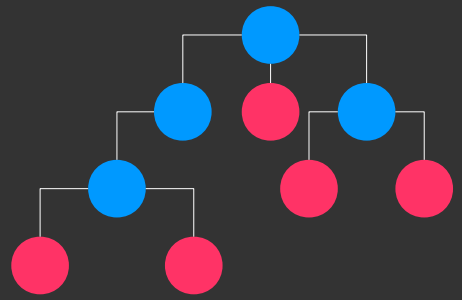

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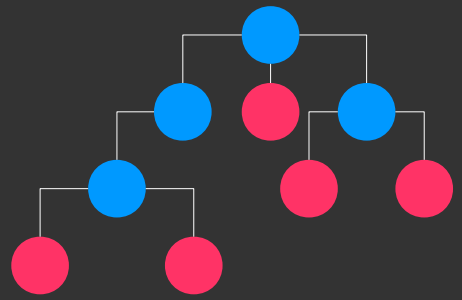

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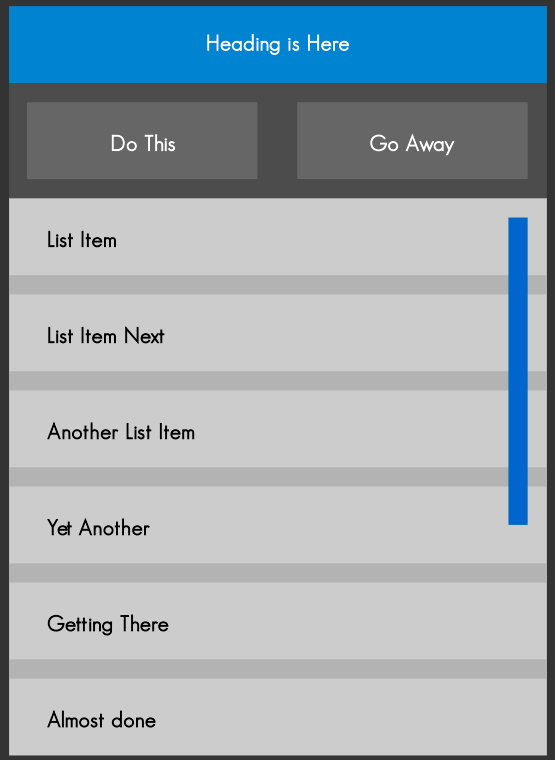
- Basic objects
  - Rectangle
  - Image (images, buffers, proxies)
  - Text (single line simple text)
  - Textblock (multi-line formatted text)
  - Textgrid (for grids of chars)
  - Polygon (used for event regions)
  - Line (really limited)
  - VG (Vector Graphic)
  - 3D

Scene Graph Objects



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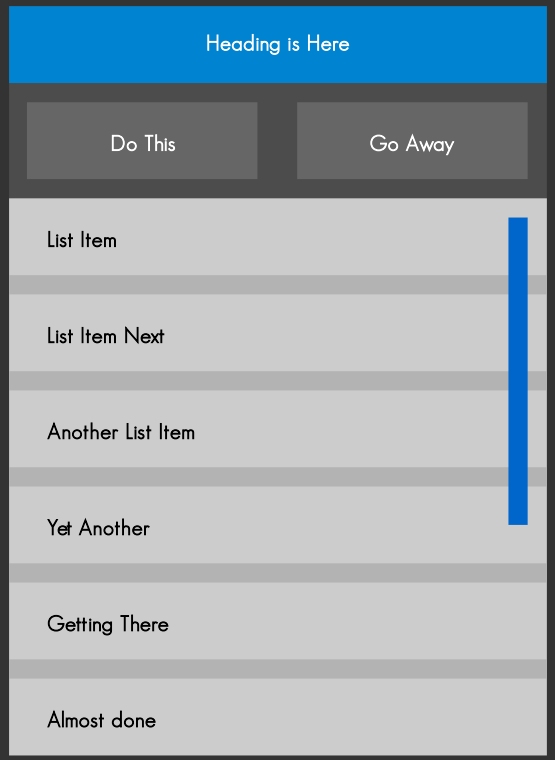
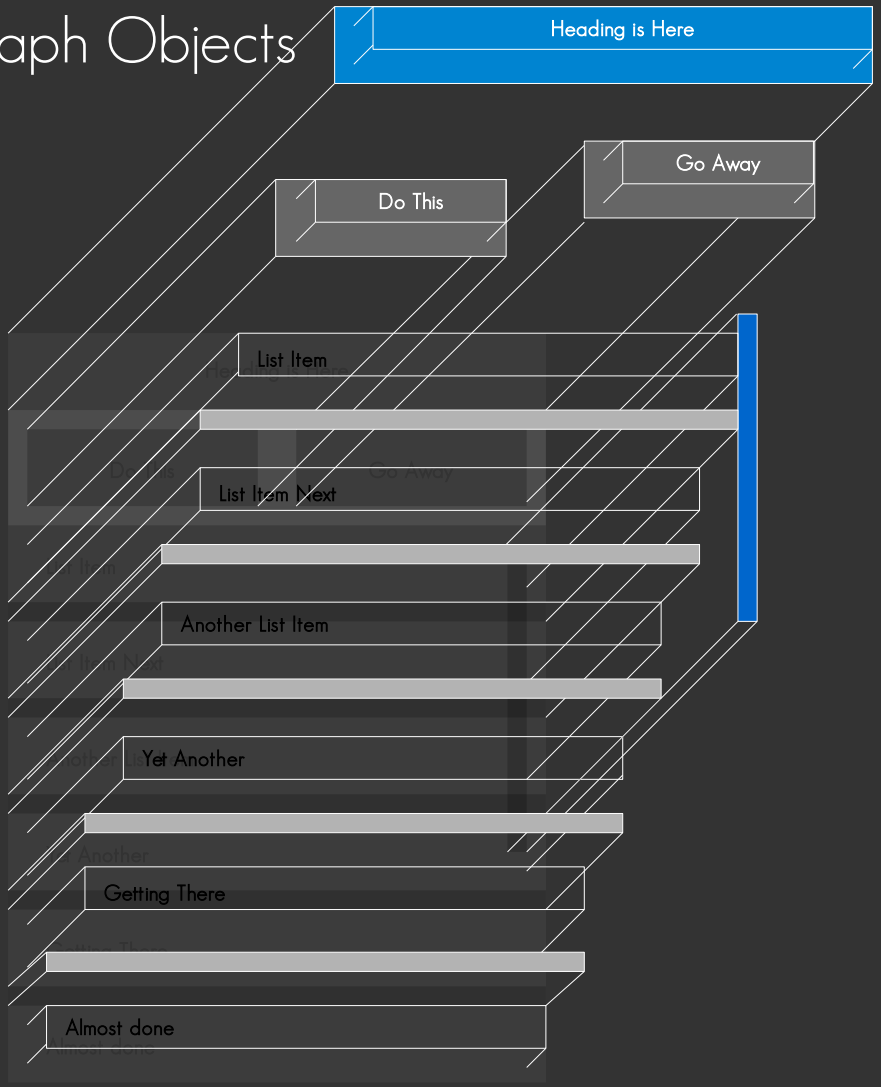
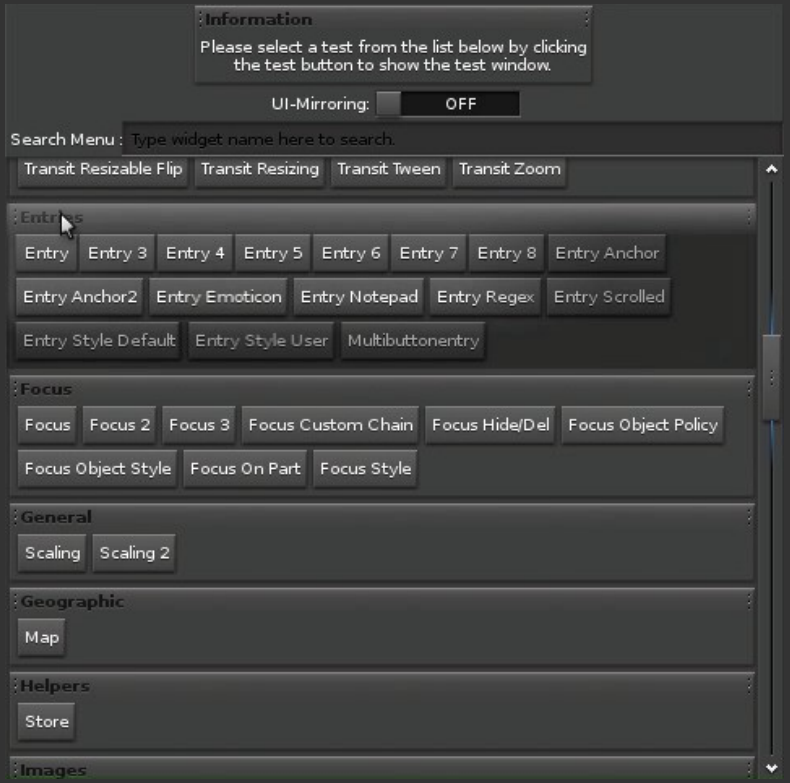




Object Components & Layers



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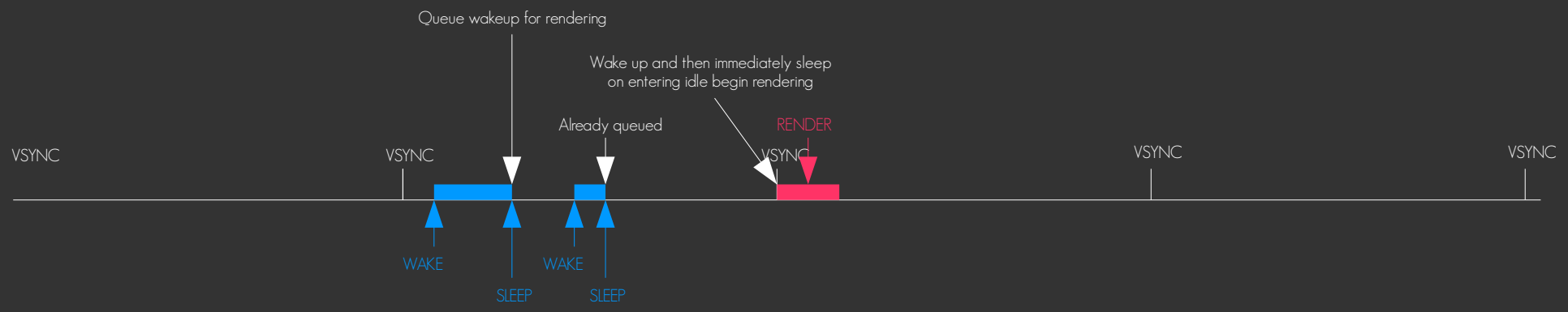

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  - Uses Edje to define some internal layout/look and animation

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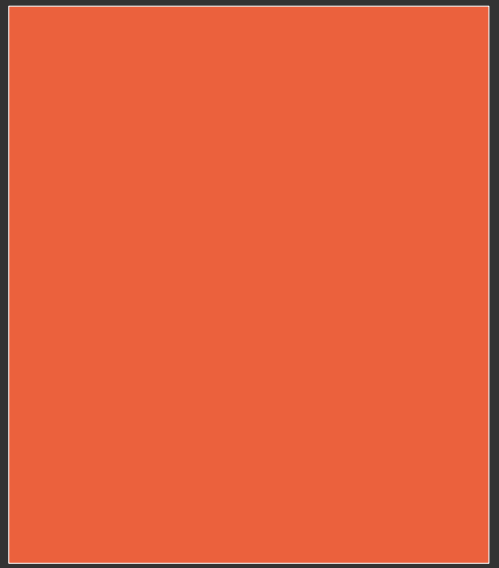
    - Mixed with other standard widgets and objects that can be used for game HUD

Containers & Scaling

- EFL loves containers



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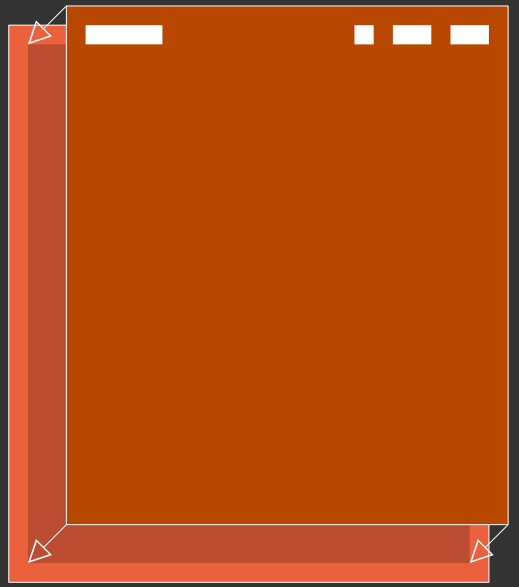

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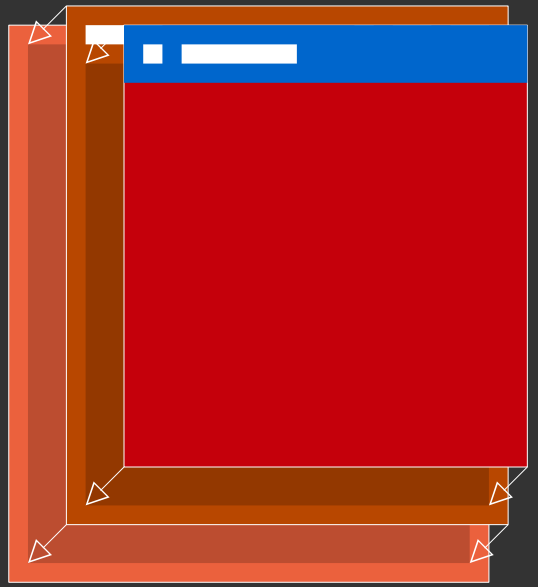

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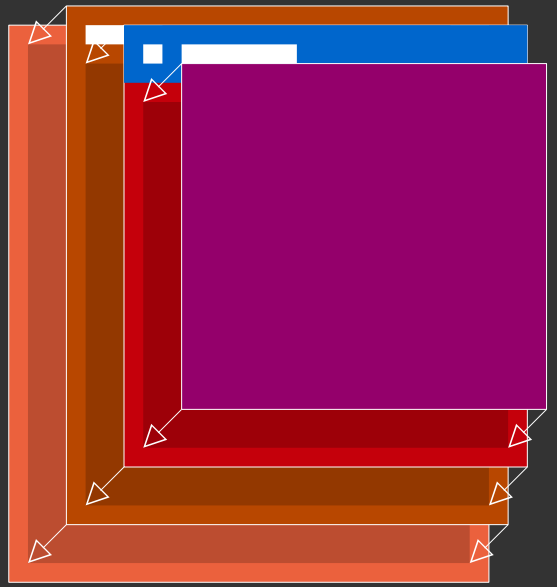

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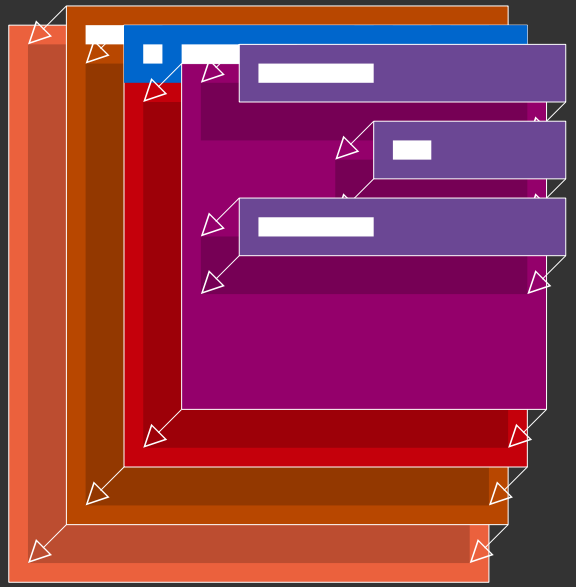

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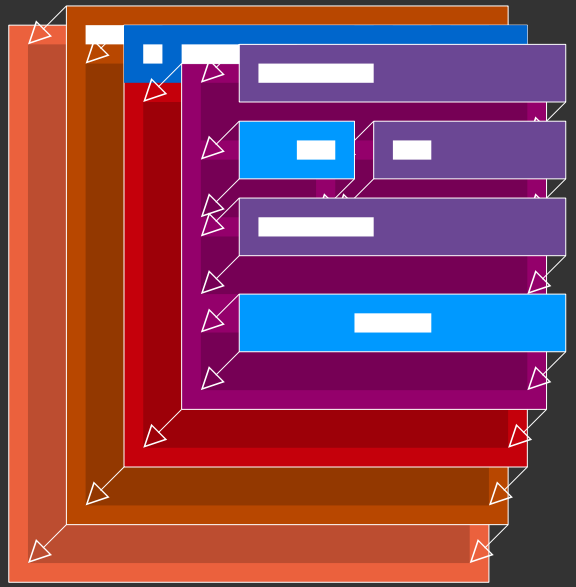

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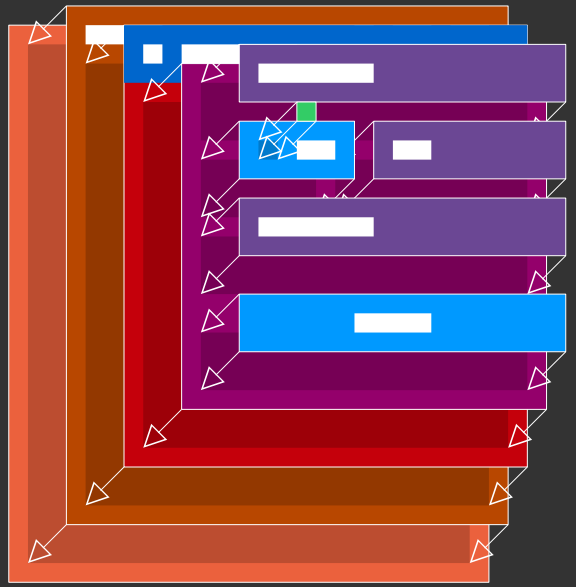

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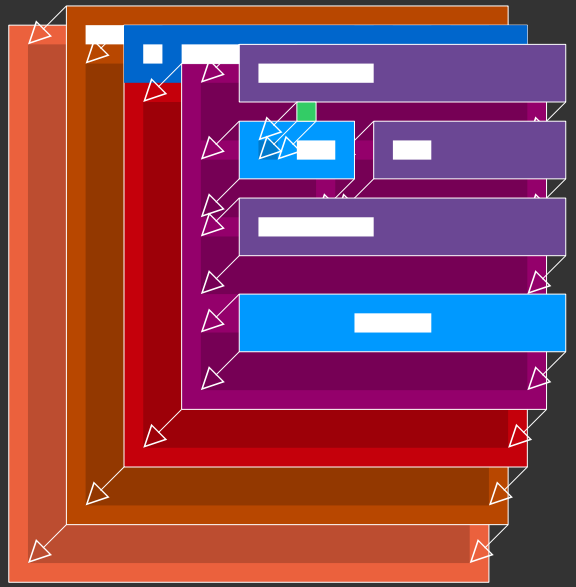

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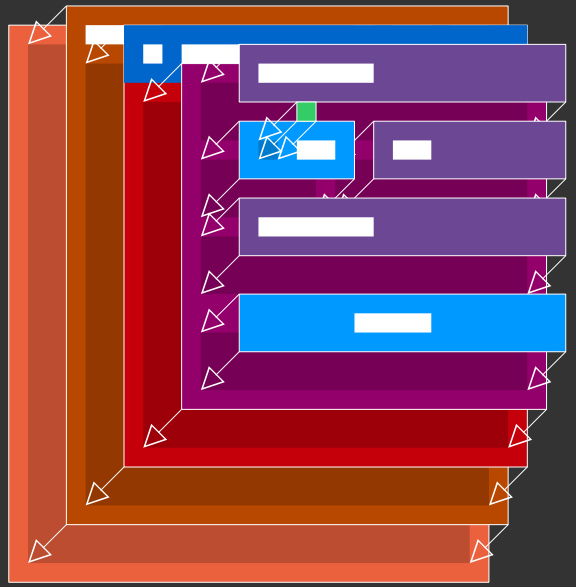

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  - This is like HTML with <DIV> in a <DIV> in a <TABLE> in a ...

Size Hinting

Defaults

Weight	0.0	0.0
Align	0.5	0.5

Weight	1.0	0.0
Align	0.5	0.5

Weight	1.0	1.0
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Weight	1.0	1.0
Align	1.0	-1

-1 = FILL

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  - Objects do NOT Fill and do NOT Expand by default

Size Hinting

- Window, Conformant, Part content (Layouts and other widgets)
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- Never set min (or max) size if already controlled by object

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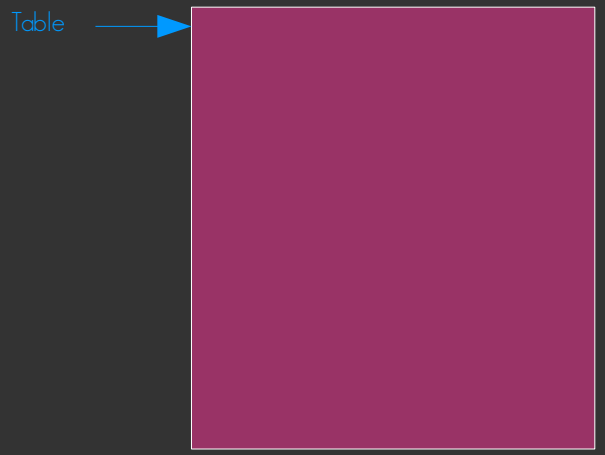
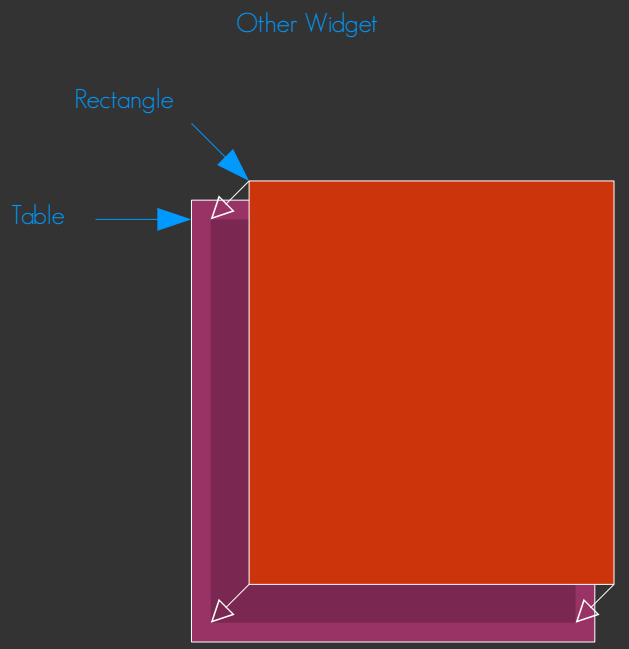


Min Size Control Trick

- Make Elm Table
- Make Evas Rectangle (do not show it)
- Pack Rectangle at 0, 0, 1x1



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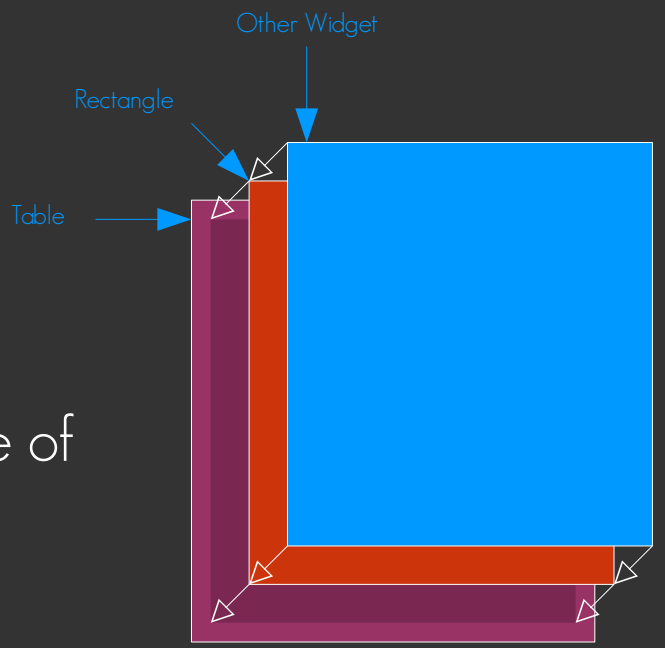

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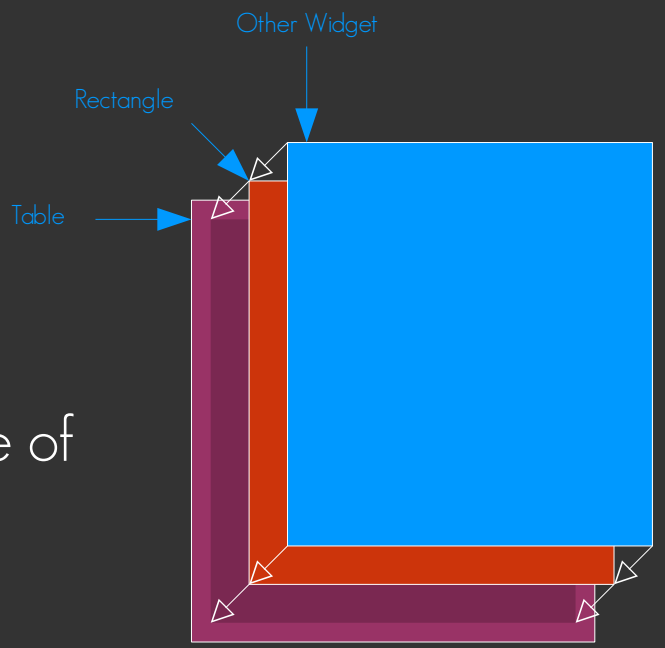

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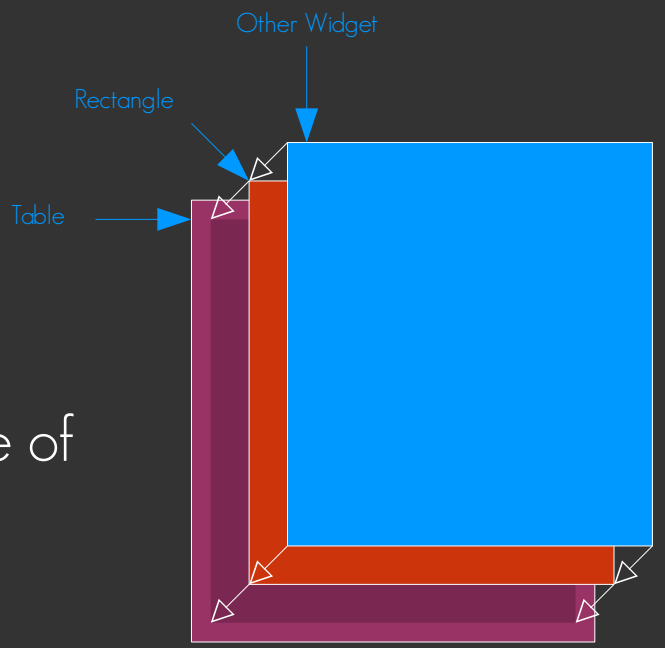

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- This gives a second control point (Rectangle object) to set hints on.

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```
void func_to_call_on_del(void *data, Evas *e, Evas_Object *obj, void *info) {
  printf("object %p deleted, data is %p\n", obj, data);
}
evas_object_vevent_callback_add(obj, EVAS_CALLBACK_DEL, func_to_call_on_del, data_pointer_for_func);
```

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```
void func_to_call_on_del(void *data, Evas *e, Evas_Object *obj, void *info) {
  printf("object %p deleted, data is %p\n", obj, data);
}
evas_object_vevent_callback_add(obj, EVAS_CALLBACK_DEL, func_to_call_on_del, data_pointer_for_func);
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- You can attach key → pointer values to any object

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evas_object_data_set(obj, "mykey", mypointer);
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```
EVAS_CALLBACK_DEL
EVAS_CALLBACK_SHOW
EVAS_CALLBACK_HIDE
EVAS_CALLBACK_MOVE
EVAS_CALLBACK_RESIZE
EVAS_CALLBACK_RESTACK
EVAS_CALLBACK_CHANGED_SIZE_HINTS
EVAS_CALLBACK_IMAGE_PRELOADED
```

…

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    - This will try and use zero-copy for textures with OpenGL, SW is always zero-copy

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  - Do not abuse Genlist and Gengrid for generic scrollable UIs

“Infinite Scrolling” Trick

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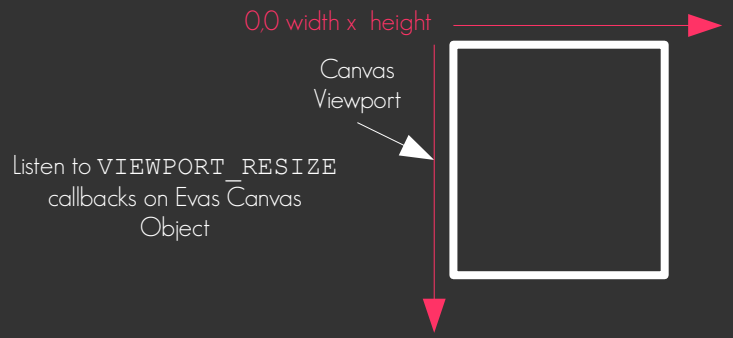
- Add a Scroller



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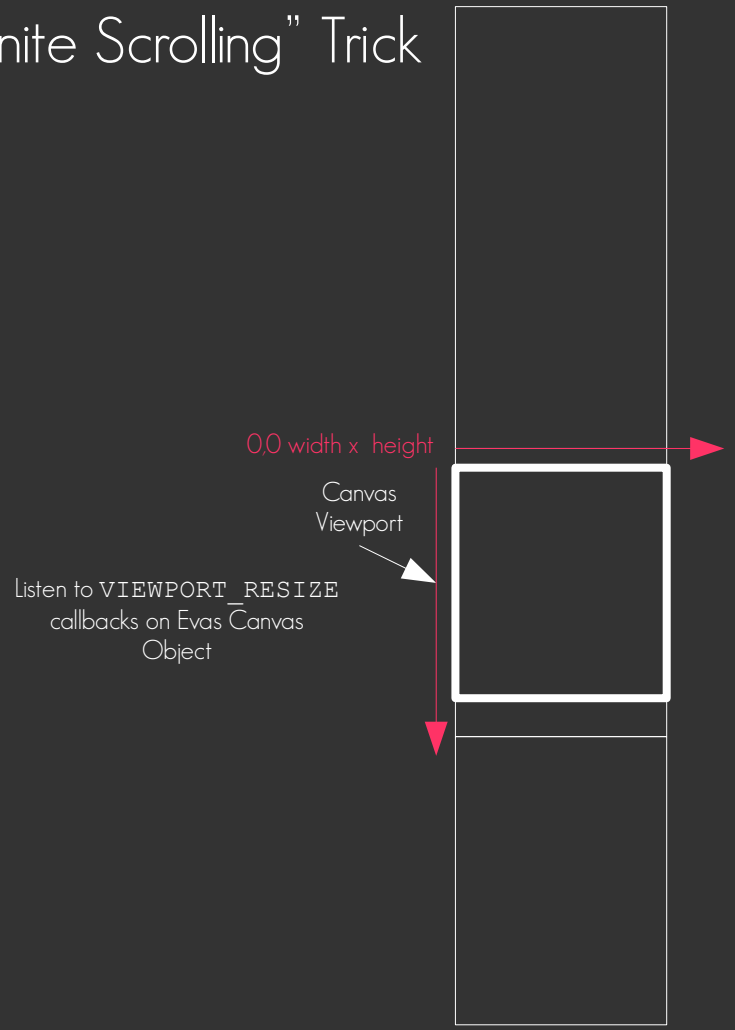

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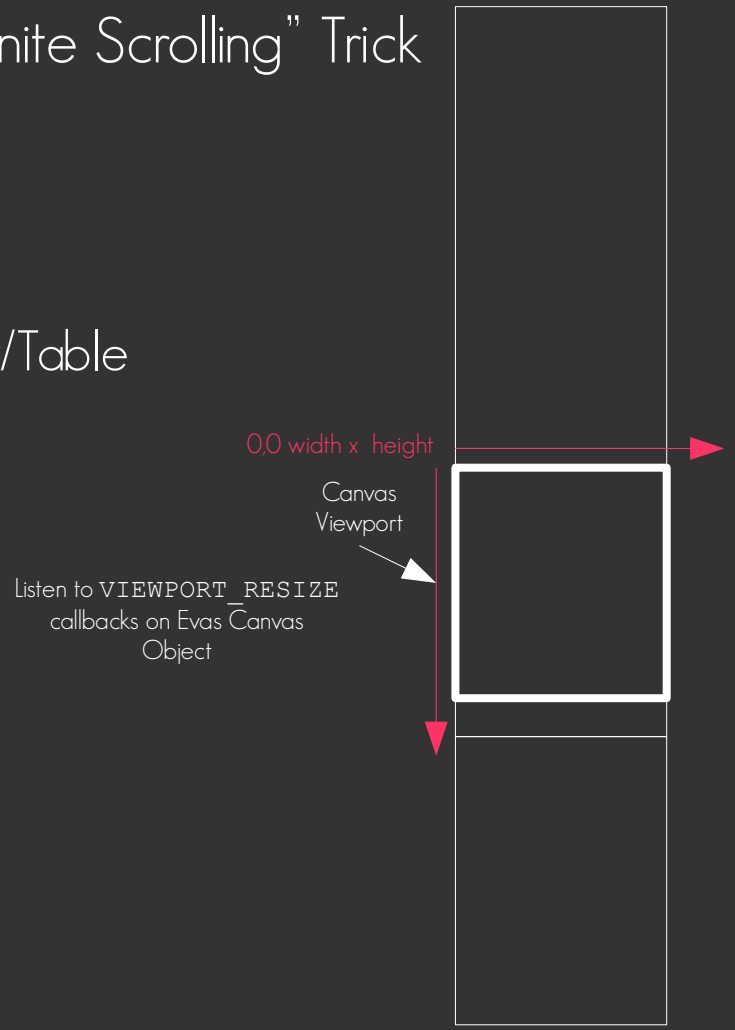

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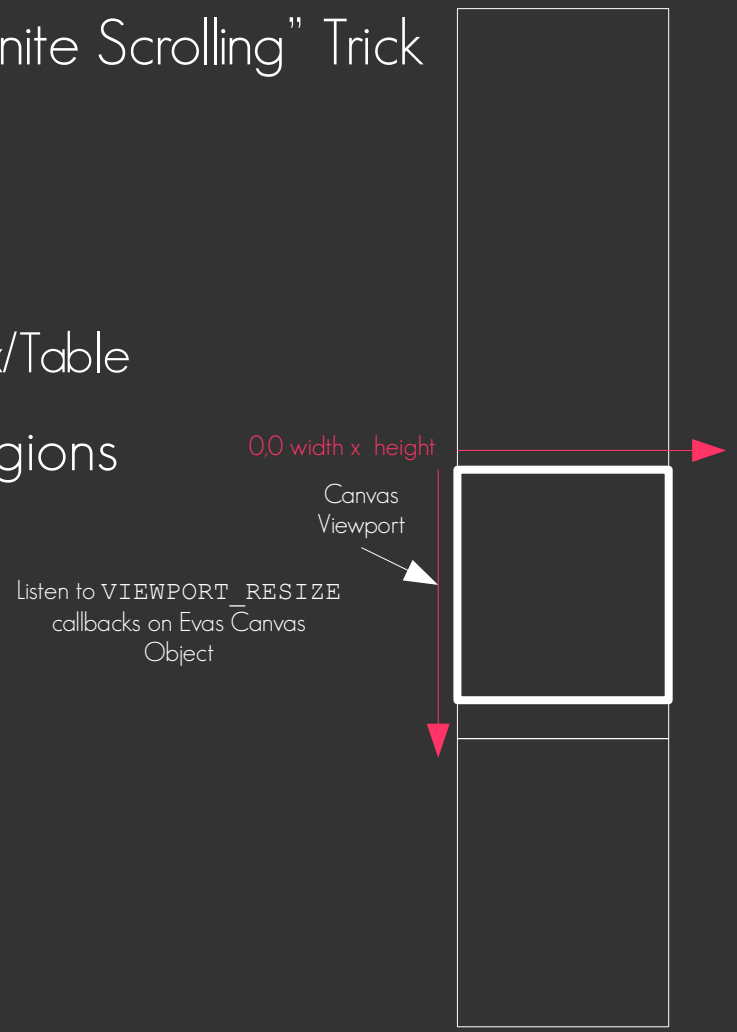

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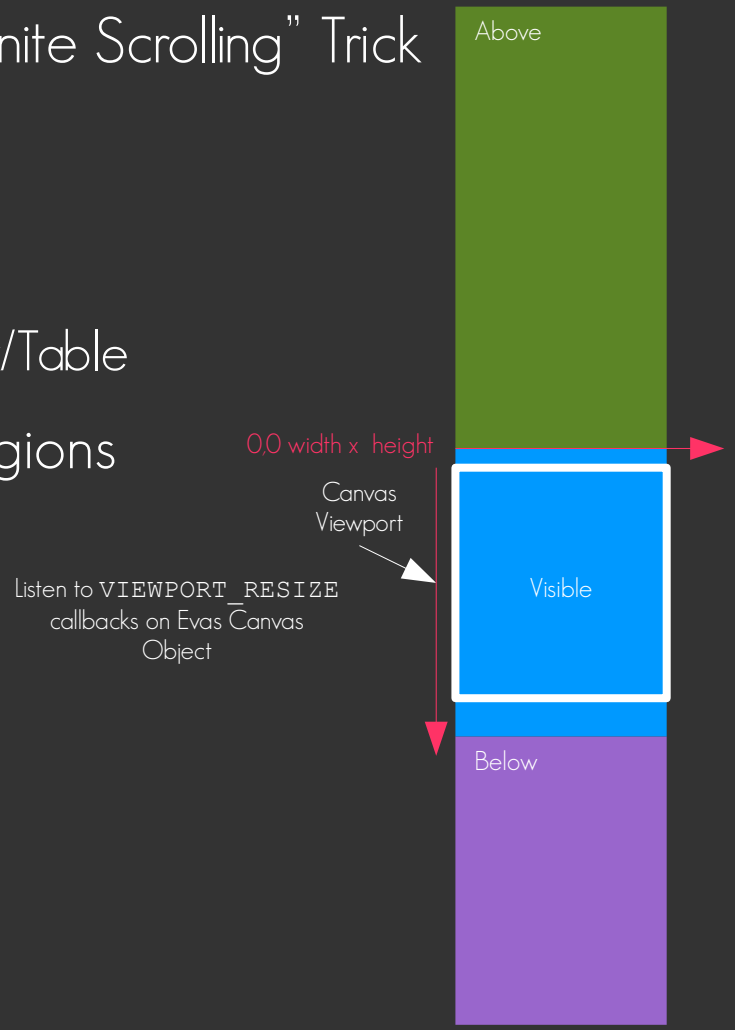

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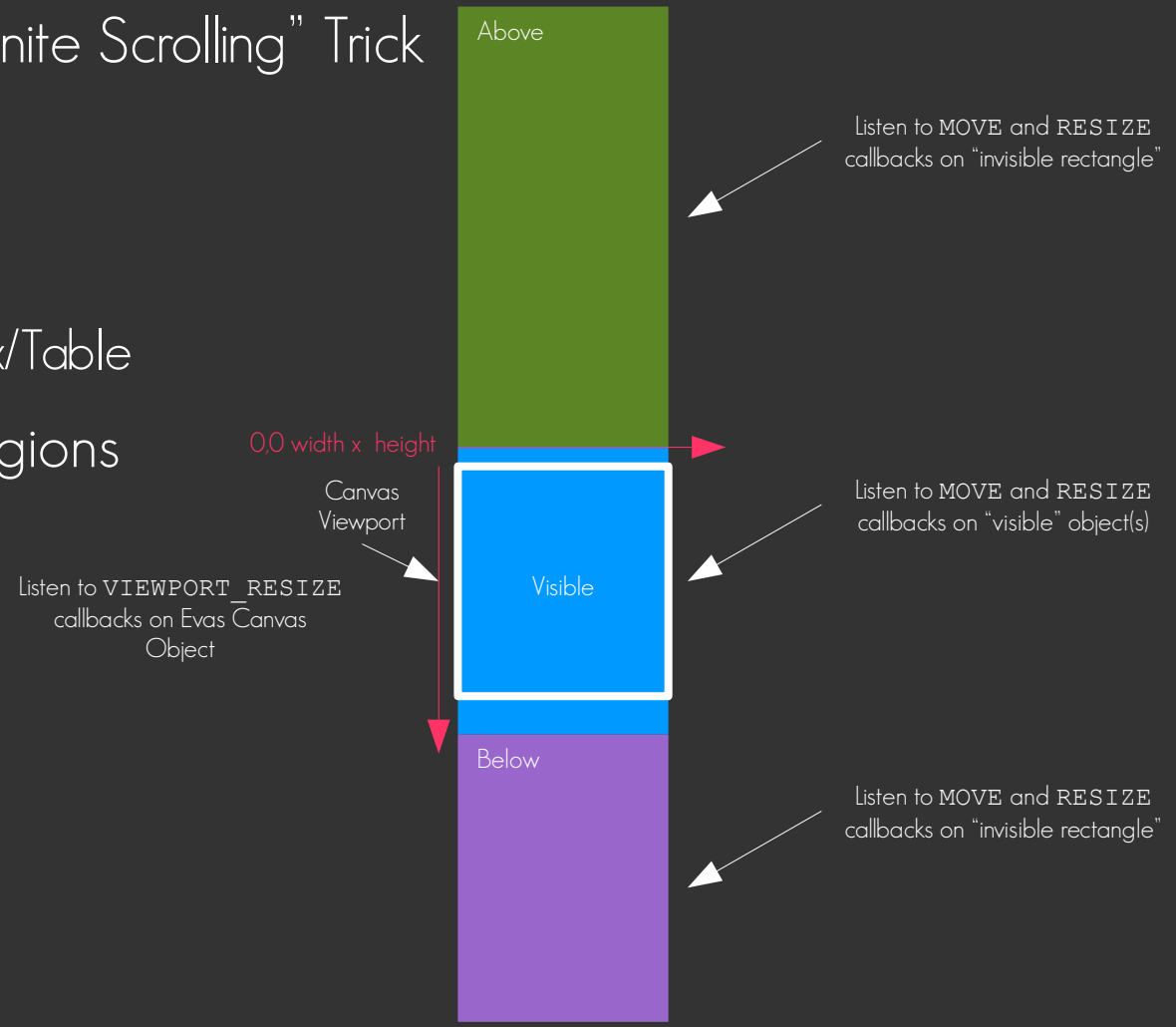

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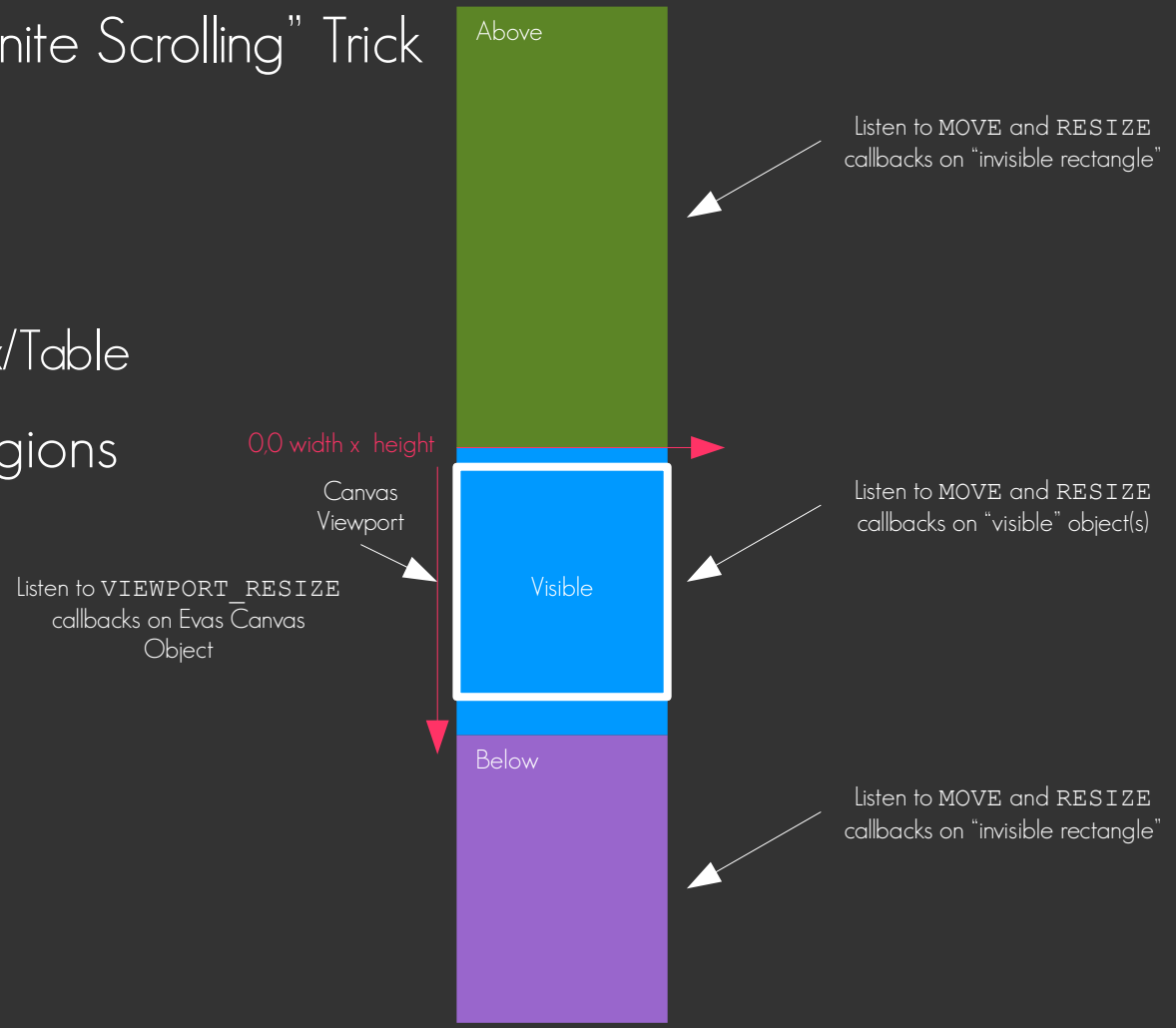

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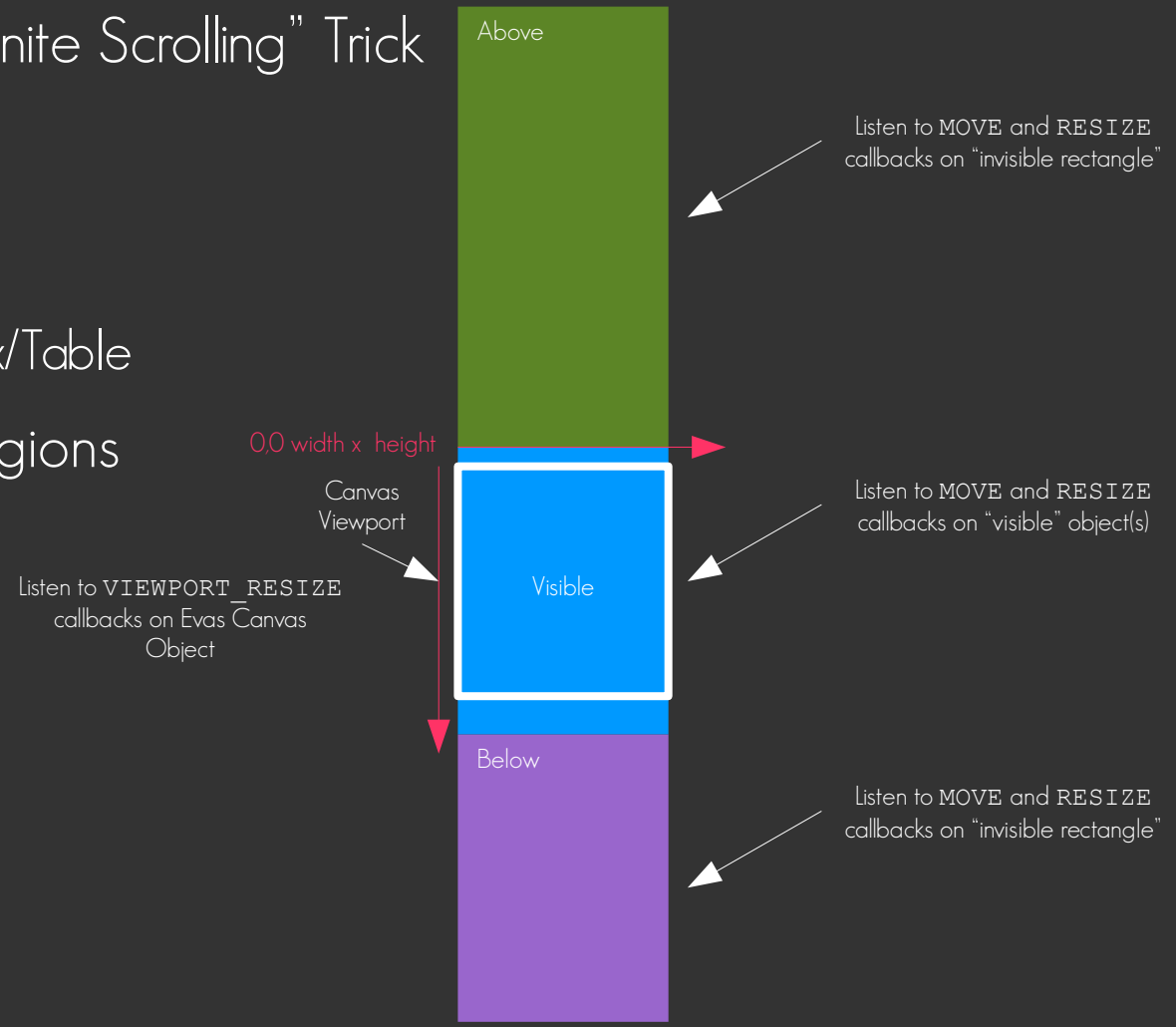

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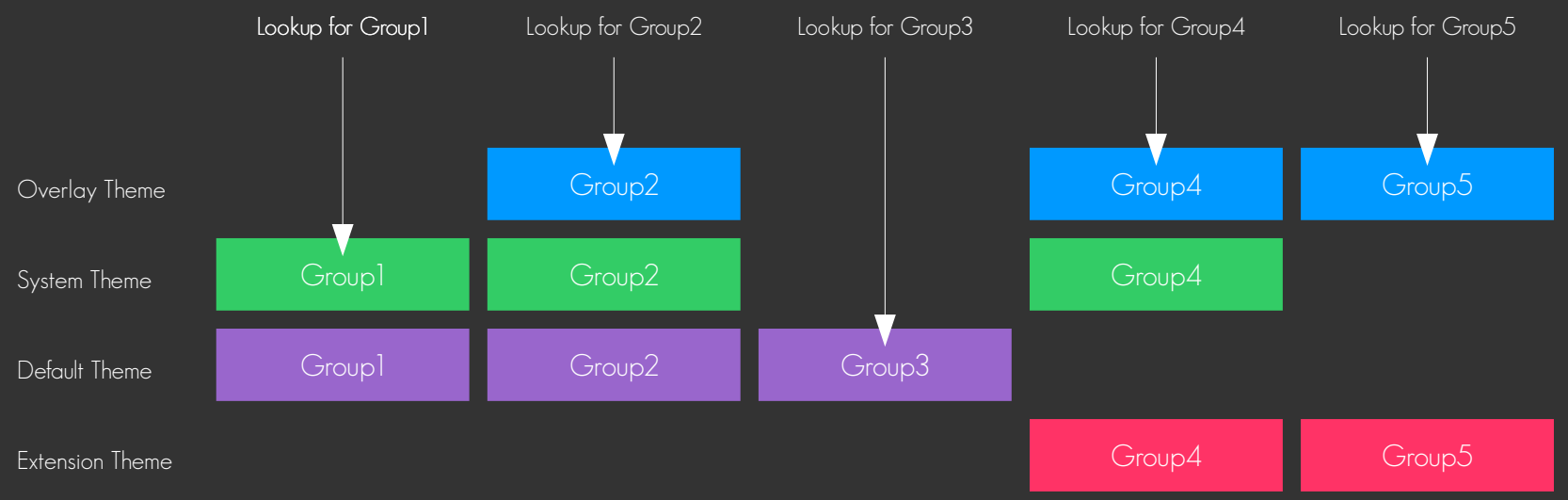
Theme Style Lookup



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EDC

```
collections {
  images {
    image: "icon.png" LOSSY 80; // encode icon.png with lossy 80% quality
  }
  group { name: "my/group"; // name of this group int he collections
    parts {
      part { name: "base"; type: RECT; // a "base" part that is a rect
        description { state: "default" 0.0; // the default state
          color: 255 128 0 255; // orange
        }
        description { state: "active" 0.0; // an active state
          color: 255 255 0 255; // yellow
        }
      }
      part { name: "icon"; // icon part - default type is image
        description { state: "default" 0.0; // the default state
          rel2.relative: 0.5 1.0; // rel2 (bottom right) relative to middle
          image.normal: "icon.png";
        }
      }
      part { name: "label"; type: TEXT; // label part
        description { state: "default" 0.0; // the default state
          rel1.to: "icon"; // top-left relative to the icon
          rel1.relative: 1.0 0.0; // relative to top-right of icon
          color: 255 255 255 255; // white
          text.font: "Sans"; text.size: 10; // 10 px Sans font
          text.text: "Hello"; // text content to show
        }
        description { state: "active" 0.0; // an active state
          inherit: "default" 0.0; // copy state from default then modify
          color: 0 0 0 255; // black
          text.text: "Clicked"; // a new text label
        }
      }
    }
```

Layer

Layer

Layer

```
  programs {
    program { // when mouse button 1 is down on label
      signal: "mouse,down,1"; source: "label";
      action: STATE_SET "active" 0.0; // set state to active
      transition: SINUSOIDAL 0.5; // over 0.5 sec with sinusoidal interp
      target: "label"; // do it to label
      target: "base"; // do it to base
    }
    program { // when mouse button 1 is released on label
      signal: "mouse,up,1"; source: "label";
      action: STATE_SET "default" 0.0; // set state to default
      transition: SINUSOIDAL 1.0; // over 1 sec with sinusoidal interp
      target: "label"; // do it to label
      target: "base"; // do it to base
    }
  }
}
}
```

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  - Eflete is even better and is almost pure-GUI EDJE file editing
    - Coming in future - you can download source from git.enlightenment.org
- EDC files go through CPP so you can use #include, #define, #ifdef etc.

EDC

```
#define IMAGE(x) images.image: x LOSSY 80
#define DEF “default” 0.0
#define ACT “active” 0.0
#define TRANS(x) SINUSOIDAL x
#define TARGETS target: “label”; target: “base”
#define SIGSRC(x, y) signal: x; source: x
collections {
  IMAGE(“icon.png”);
  group { name: "my/group";
    parts {
      part { name: "base"; type: RECT; // a "base" part that is a rect
        description { state: DEF;
          color: 255 128 0 255; // orange
        }
        description { state: ACT; // an active state
          color: 255 255 0 255; // yellow
        }
      }
      part { name: "icon"; // icon part - default type is image
        description { state: DEF;
          rel2.relative: 0.5 1.0; // rel2 (bottom right) relative to middle
          image.normal: "icon.png";
        }
      }
      part { name: "label"; type: TEXT; // label part
        description { state: "default" 0.0; // the default state
          rel1.to: "icon"; // top-left relative to the icon
          rel1.relative: 1.0 0.0; // relative to top-right of icon
          color: 255 255 255 255; // white
          text.font: "Sans"; text.size: 10; // 10 px Sans font
          text.text: "Hello"; // text content to show
        }
        description { state: ACT; // an active state
          inherit: "default" 0.0; // copy state from default then modify
          color: 0 0 0 255; // black
          text.text: "Clicked"; // a new text label
        }
      }
    }
```

```
    programs {
      program { SIGSRC(“mouse,down,1”, “label”);
        action: STATE_SET ACT; // set state to active
        transition: TRANS(0.5); // over 0.5 sec with sinusoidal interp
        TARGETS;
      }
      program { SIGSRC(“mouse,up,1”, “label”);
        action: STATE_SET DEF; // set state to default
        transition: TRANS(1.0);
        TARGETS;
      }
    }
  }
}
```

Last - 3D Effects

You don't need OpenGL

2.5D Mapping

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2.5D Mapping

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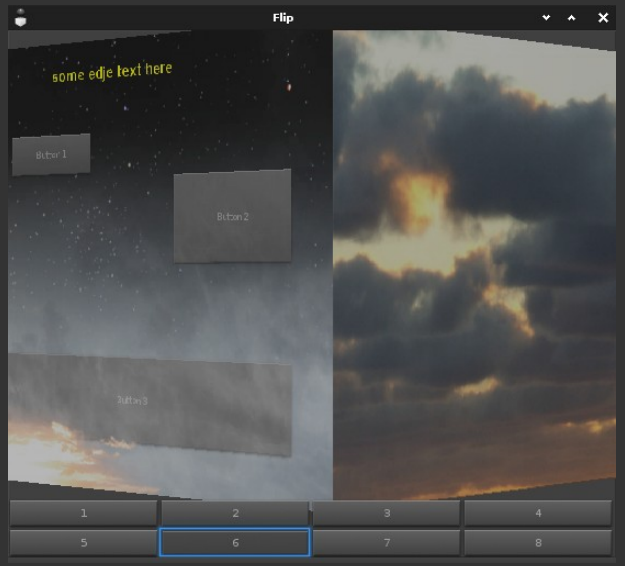
- With imagination you can do 3D simple 3D objects with multiple maps



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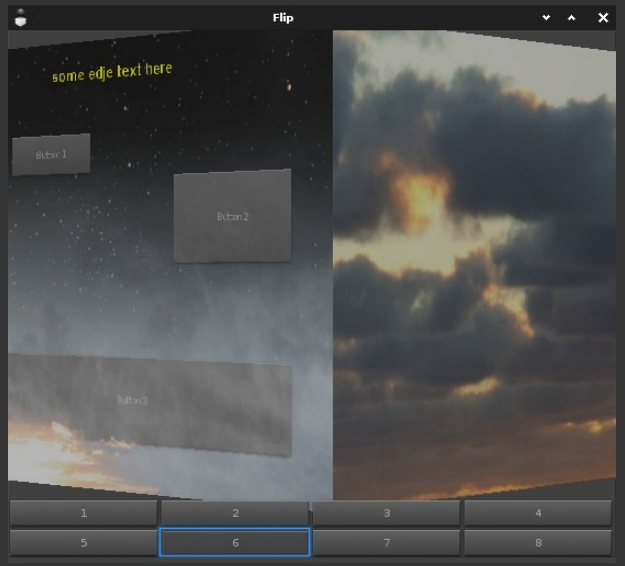

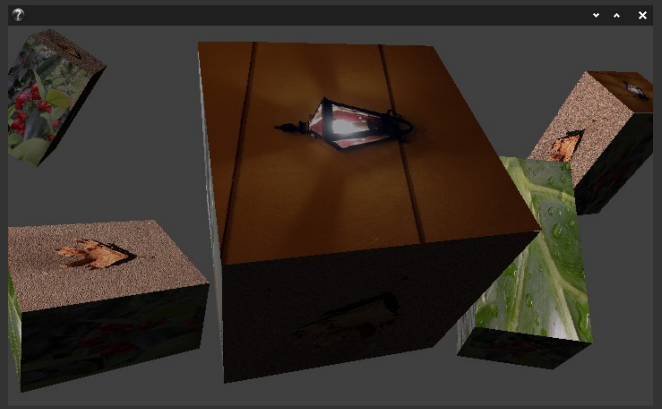

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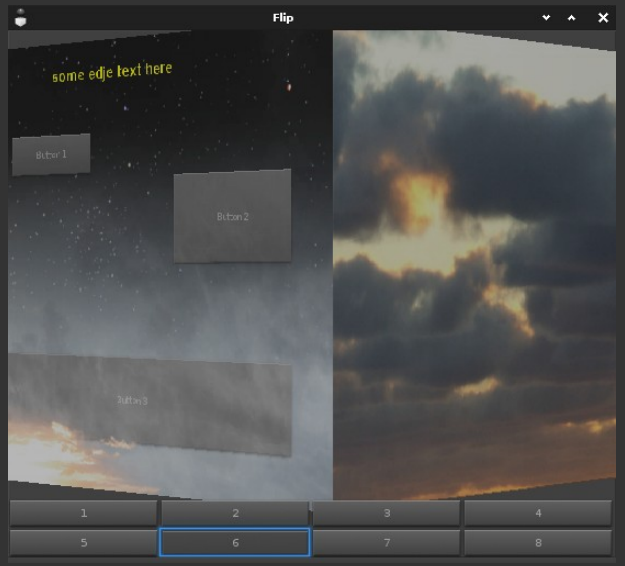

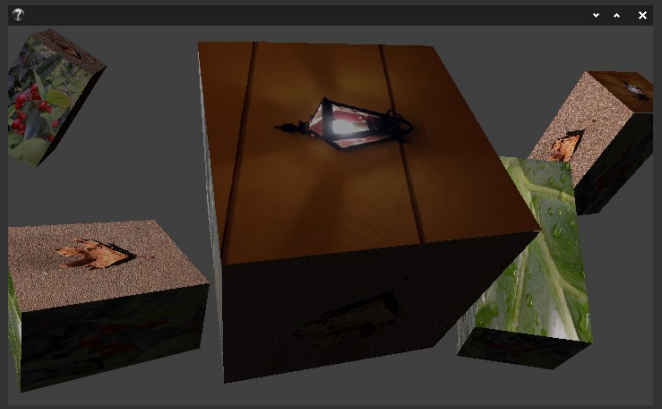

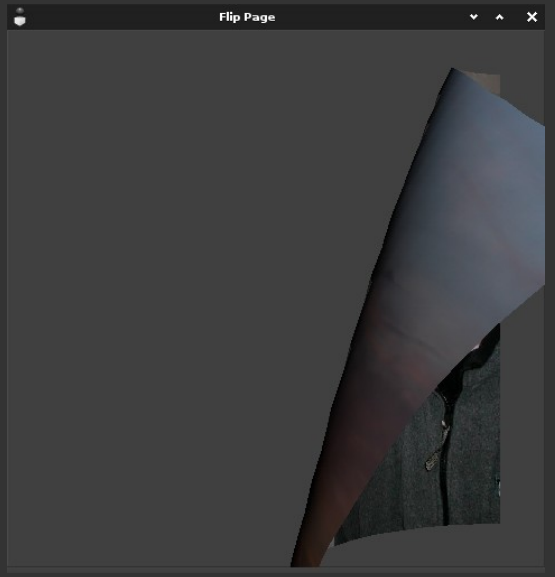

2.5D Mapping

```
Evas_Map *m = evas_map_new(4); // new 4 point map - only 4 points are actually guaranteed to work

evas_map_util_points_populate_from_object(m, obj); // fill map points from current object geometry

evas_map_util_3d_rotate(m, 30.0, 20.0, 10.0, center_x, center_y, 0); // rotate map around a center point

evas_map_util_3d_perspective(m, center_screen_x, center_screen_y, 0, pixels_from_camera_to_screen_plane);

evas_object_map_set(obj, m); // set map for this object

evas_map_free(m); // free it - object will retain a reference and release when it is done

evas_object_map_enable_set(obj, EINA_TRUE); // enable the map that is set
```

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- Many more ways to use maps to "map an object somewhere else"
- Is useful even for 2D rotations as well

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  - Real humans are here and happy to talk to you

Links

- http://developer.tizen.org
  - SDK, API Documentation and more
- http://www.enlightenment.org
  - Upstream EFL API development project
- http://git.enlightenment.org/core/elementary.git/tree/data/themes
  - Lots of sample EDC files for Edje (a complete theme within this tree of files)
- http://git.enlightenment.org/core/elementary.git/tree/src/bin
  - Lots of sample code showing how to use lots of Elm APIs
- http://developer.tizen.org/forums
  - Tizen developer forums for help and advice
- http://www.tizen.org/community/mailing-lists
  - Mailing lists for Tizen development
- http://www.tizen.org/community/irc
  - Internet Chat for Tizen
- https://www.enlightenment.org/contact
  - IRC and E-Mail information for EFL upstream development