Script language: Python
SVG

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Python

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SVG

Overview

- SVG Basics.

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- SVG with Python.

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- SVG Basics.
- SVG with Python.
- SVG Module.

SVG

SVG - Scalable Vector Graphics.

- Is XML (NS - http://www.w3.org/2000/svg).
- (established) standard for vector graphics:
  - Inkscape (OSS) / InDesign (Adobe).
  - native support in current browsers.
- Elements for primitives (Line, Text, Circle, Rect) and complexes (Path) structures.
- CSS (not in this tutorial).
- Script (not in this tutorial).

Documentation

- Rich literature online.
- W3C - `http://www.w3.org/Graphics/SVG/`
- W3Schools - `http://www.w3schools.com/svg/default.asp`
- ...

Basic document (standalone)

```
<svg xmlns="http://www.w3.org/2000/svg"
     version="1.1">
 <text x="100" y="100">SVG ist toll!</text>
</svg>
```

Basic document (Embedded)

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD␣XHTML␣1.1//EN"
"http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <title>Embbeded SVG</title>
  </head>
  <body>
    <h1>SVG ist toll!</h1>
    <svg xmlns="http://www.w3.org/2000/svg" version="1.1"
         width="200" height="200">
    ...
    </svg>
  </body>
</html>
```

Primitive

`Line <line x1="0"y1="0"x2="200"y2="200"/>`

x1	x Coordinate Starting point.
y1	y Coordinate Starting point.
x2	x Coordinate Ending point.
y2	y Coordinate Ending point.

`Rectangle <rect x="50"y="20"width="150"height="150"/>`

x	x Coordinate Top left.
y	y Coordinate Top left.
w	Width.
h	Height.

Primitive

`Cross <circle cx="100"cy="100"r="50/>`

cx	x Coordinate Middle point.
cy	y Coordinate Middle point.
r	Radius.

`Text <text x="0"y="15">I love SVG</text>`

x	x Coordinate Top left text box.
y	y Coordinate Top left text box.
...	...

Paths

```
<path d="M150␣0␣L75␣200␣L225␣200␣Z"/>
```

M or m	moveto	(x y)+
Z or z	closepath	-
L or l	lineto	(x y)+
C or c	cubic curve	(x1 y1 x2 y2 x y)+
Q or q	quadratic curve	(x1 y2 x y)+
A or a	eliptical arc	(rx ry x-axis-rotation large-arc-flag sweep-flag x y)+
...	...	...

- Capital letters or not (=absolute/relative coordinates).
- This list is not complete.

Attributes

The following attributes can be used with all elements (incomplete):

stroke	Line color	stroke="black"
stroke-width	line thickness	stroke-width="5px"
fill	Full color	fill="yellow"
style	CSS	style=ßtroke:black;fill:yellow"
transform	Transformation	transform="translate(100,200)"
		transform="rotate(90)"
		transform=ßcale(2)"

Exercise

Create a SVG document which use all the presented elements.

Id's

- Unique ID within the document.
- What for is it useful?

Id's

- Unique ID within the document.
- What for is it useful?
- $\rightarrow$ simplifies access via API (for example, XML module).

Grouping

- Grouping by elements.
- Make sense in the context of id's.
- Attributes such as stroke, stroke-width, transform, ... apply to all group members, if not overwritten.
  Example:

```
<g id="smiley">
  <circle cx="100" cy="100" r="95" stroke="black" stroke-width="2"
          fill="yellow" />
  <circle cx="125" cy="75" r="10" fill="black"/>
  <circle cx="75" cy="75" r="10" fill="black"/>
  <path d="M␣40,120␣q␣60␣80␣120␣0" stroke="black" stroke-width="10"
        fill="none"/>
</g>
```

Exercise

Write a script which read a SVG document (the document of the previous exercise for example) and colors all elements in red. use this module "xml.dom.minidom".

Exercise

- Write a module which works for all the presented elements (Text, Line, Cross, Rectangle, Path) available and work with xml.dom.minidom.
- Test the module in your example.
- Test the module in which you generate your example of Slide 6.