Exercise 10: SVG files

Deadline: 11ᵗʰ June 2021

SVG is an XML-based vector image format for two-dimensional graphics with support for interactivity and animation. The SVG specification is an open standard developed by the W3C since 1999. SVG images and their behaviors are defined in XML text files. This means that they can be searched, indexed, scripted, and compressed. As XML files, SVG images can be created and edited with any text editor, as well as with drawing software.

Task 1

Define a parameterless `clearline` manipulator for the text input stream `istream`, that pulls off all characters until it encounters a newline character (this character must also be removed from the stream) or reaches the end of the file. Also define an `ignore(int x)` manipulator with a parameter *x*, that skips *x* characters from the text input stream unless a new line character is first removed or the stream ends.

Define parameterless manipulators for the text input stream `ostream`: `quot` that prints a quotation mark (`"`), `apos` that prints the apostrophe character (`'`), `amp` that prints the ampersand character (`&`), `lt` that prints a less than sign (`<`), `gt` that prints a greater than sign (`>`). Also define an `attr(string key, string value)` manipulator with parameters *key* and *value*, that prints an inscription of the form *key*`="`*value*`"`.

Task 2

XML documents are formed as element trees. An XML tree starts at a root element and branches from the root to child elements. An XML element can contains text, other elements (sub elements) or a mix of the above. XML elements can have attributes; attributes are designed to contain data related to a specific element.

Define the set of classes needed to store an XML document in memory. Implement the content of the XML element as a list collection. Implement the XML element attribute set as an unordered collection.

Define a stream operator (`<<`) for each of these classes so that you can write a valid and readable XML document to the output stream.

Task 3

Define the set of classes needed to hold the SVG document in memory. Your classes should represent graphical elements such as rectangles, lines, circles, ellipses, and polygons.

Create a simple drawing consisting of several different elements and save it to a file. Check what the generated drawing looks like by embedding it in a simple HTML document using the `<img>` tag.

You can find more information on the format of SVG documents on the web pages:

- https://www.w3.org/TR/SVG/
- https://www.w3schools.com/graphics/svg_intro.asp