A Histogram in XForms

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1   **I have some data**

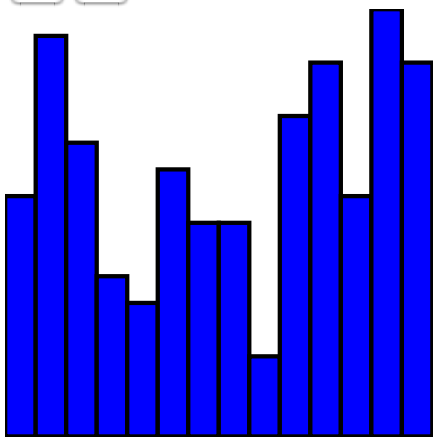
```
<data><y>9</y><y>15</y><y>11</y><y>6</y><y>5</y><y>10</y><y>8</y>
  <y>8</y><y>3</y><y>12</y><y>14</y><y>9</y><y>16</y><y>14</y></data>
```

And I want to look at the data as a histogram.

1   **Like this**

9	15	11	6	5	10	8	8	3	12	14	9	16	14

+ −



1   **Histogram**

Uses SVG

100×100 space

There are n values, so each rectangle is 100/n wide.

The range of the data is max - min

The vertical space is therefore divided over 100/range, which we'll call `vscale`

The height of the rectangle for each value v is `v × vscale`.

1   **SVG**

The SVG will look something like this:

```
<svg ...>
   <xf:repeat bind="values">
      <rect width="{...}"
            height="{...}"
            x="{...}"
            y="{...}"
            />
   </xf:repeat>
</svg>
```

Note: SVG coordinate system is 'upside down'. (0,0) is top left, and goes downwards and to the right.

1   **Horizontal space**

We load the data:

```
<instance id="data" src="data.xml"/>
```

Identify the values:

```
<bind ref="instance('data')/y" id="values"/>
```

The first thing we need is how many data values there are:

```
<bind ref="n" calculate="count(bind('values'))"/>
```

The width of each rectangle is:

```
<bind ref="width" calculate="100 div ../n" type="double"/>
```

1   **SVG**

Now we can fill in the horizontal values:

```
<svg ...>
   <xf:repeat bind="values">
      <rect width="{width}"
            height="{...}"
            x="{(position()-1) * width}"
            y="{...}"
            />
   </xf:repeat>
</svg>
```

1   **Vertical space**

Get the minimum and maximum values:

```
<bind ref="min" calculate="min(bind('values'))"/>
<bind ref="max" calculate="max(bind('values'))"/>
```

Calculate the range minimum and maximum, and the range:

```
<bind ref="rmin" calculate="min(0, ../min)"/>
<bind ref="rmax" calculate="max(0, ../max)"/>
<bind ref="range" calculate="../rmax - ../rmin"/>
```

And so the vertical scale is

```
<bind ref="vscale" calculate="100 div ../range" type="double"/>
```

Except if the range is zero (i.e. all values are zero), so we actually need

```
calculate="if(../range = 0, 1, 100 div ../range)"
```

1   **Height**

Ideally we would just say

```
height="{. * vscale}"
```

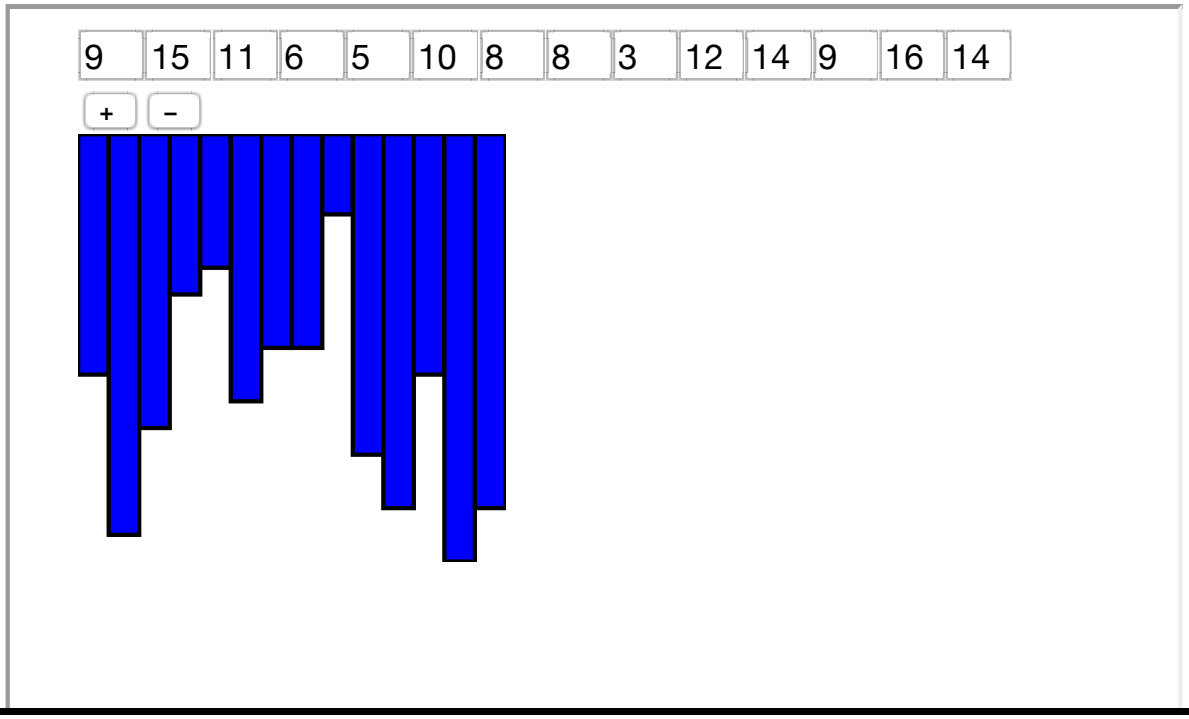
Incredibly, although SVG allows lines to have negative length, rectangles are not allowed to have negative height.

So we have to do some extra work.

```
height="{abs(.) * vscale}"
```

1   **Nearly there**

So now we have a row of rectangles, of the correct height, of the correct width, at the correct horizontal position:



1   **Vertical position**

Currently all rectangles start at SVG's vertical zero, and the other end of the longest (positive) bar is where zero really ought to be.

That value is `rmax`, so all we have to do is push all the bars down by the difference between its value and `rmax`. All negative values just have to start at `rmax`:

```
y="{vscale * if(. &lt; 0, rmax, rmax - .) }"
```

Giving the final result:

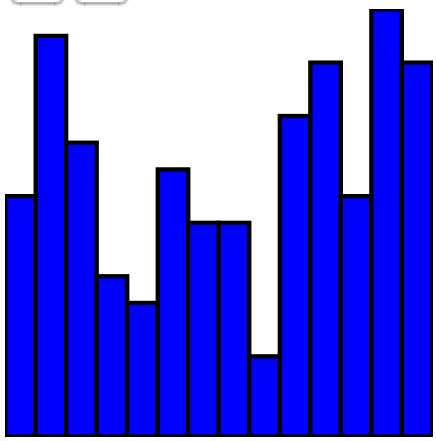
1   **SVG**

```
<svg ...>
   <xf:repeat bind="values">
      <rect width="{width}"
            height="{vscale * abs(.)}"
            x="{(position()-1) * width}"
            y="{vscale * if(. &lt; 0, rmax, rmax - .) }"
            />
   </xf:repeat>
</svg>
```

1   **Result (about 25 lines of XForms)**

9 15 11 6 5 10 8 8 3 12 14 9 16 14

\+ −



Source