SVG definice, gradienty, filtry

Cvičení 5

Z8144 Počítačová grafika v kartografii

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Filip Leitner

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SVG – DEFS

Slouží především k předdefinování znovupoužitelných prvků nebo stylů, které samy o sobě neposkytují žádnou vizuální reprezentaci.

Defs – definice objektů

```
<svg xmlns:xlink="http://www.w3.org/1999/xlink" width="250" height="120"
    style="background-color:white">
  <defs>
      <rect id="rect1" width="200" height="100" x="10" y="10" fill="green" stroke="black"
          stroke-width="3"/>
      <circle id="circ1" cx="10" cy="10" r="5" fill="white" stroke="black" stroke-width="3"/>
  </defs>
  <use xlink:href="#rect1"/>
  <use xlink:href="#circ1"/>
  <use x="200" xlink:href="#circ1"/>
  <use y="100" xlink:href="#circ1"/>
  <use x="200" y="100" xlink:href="#circ1"/>
</svg>
```
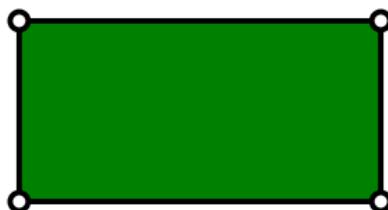
SVG – GRADIENTY

lineární $\times$ radiální

Lineární gradienty

```
<svg width="250" height="120">
  <defs>
    <linearGradient id="g1" x1="100%" x2="100%" y1="0%" y2="100%">
      <stop offset="0%" stop-color="white"/>
      <stop offset="60%" stop-color="blue"/>
      <stop offset="100%" stop-color="black"/>
    </linearGradient>
  </defs>
  <rect width="250" height="120" x="0" y="0" fill="url(#g1)"/>
</svg>
```

Radiální gradienty

```
<svg width="250" height="120" >
  <defs>
    <radialGradient id="g2" cx="10%" cy="10%" r="100%">
      <stop stop-color="red" offset="0%"/>
      <stop stop-color="orange" offset="50%"/>
    </radialGradient>
  </defs>
  <rect x="0" y="0" width="250" height="120" fill="url(#g2)" />
</svg>
```

Úloha 1
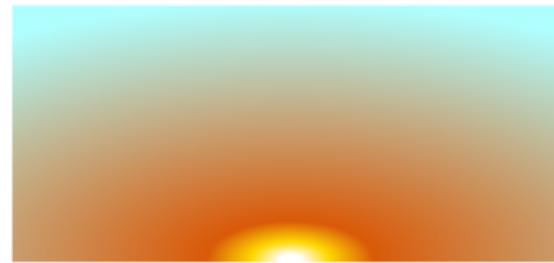
Umožňují změnu chování objektu

Gausovské rozostření (Gaussian Blur)

```
<svg width="250" height="120" style="background-color:white">
  <defs>
    <filter id="f1" width="200%" height="200%" x="-50%" y="-50%">
      <feGaussianBlur in="SourceGraphic" stdDeviation="15"/>
    </filter>
  </defs>
  <rect width="100" height="30" x="25" y="25" fill="red"
      filter="url(#f1)"/>
</svg>
```

Embedded/inlined SVG filters

```html
<html>
  <body>
    <svg xmlns="http://www.w3.org/2000/svg">
      <filter id="waves" x="-20%" y="-20%" width="140%" height="140%"
          filterUnits="objectBoundingBox" primitiveUnits="userSpaceOnUse"
          color-interpolation-filters="linearRGB">
        <feTurbulence type="turbulence" baseFrequency="0.01 0.01"
            numOctaves="1" seed="1" stitchTiles="noStitch"
            result="turbulence"/>
        <feDisplacementMap in="SourceGraphic" in2="turbulence" scale="20"
            xChannelSelector="G" yChannelSelector="A"
            result="displacementMap"/>
      </filter>
    </svg>

    <img src="..." style="filter: url(#waves);" alt="...">
  </body>
</html>
```

Embedded/inlined SVG filters

```
img {
  /* inline the SVG filter */
  filter: url('data:image/svg+xml,\
    <svg xmlns="http://www.w3.org/2000/svg">\
      <filter id="waves" x="-20%" y="-20%" width="140%" height="140%"
    filterUnits="objectBoundingBox" primitiveUnits="userSpaceOnUse"
    color-interpolation-filters="linearRGB">\
        <feTurbulence type="turbulence" baseFrequency="0.01 0.01"
    numOctaves="1" seed="1" stitchTiles="noStitch" result="turbulence" />\
        <feDisplacementMap in="SourceGraphic" in2="turbulence" scale="20"
    xChannelSelector="G" yChannelSelector="A" result="displacementMap" />\
      </filter>\
    </svg>#waves');
}
```

Přehled filtrů v SVG

https://www.w3.org/TR/filter-effects/

https://yoksel.github.io/svg-filters/#/docs/blur

Úloha 2

CSS FILTRE
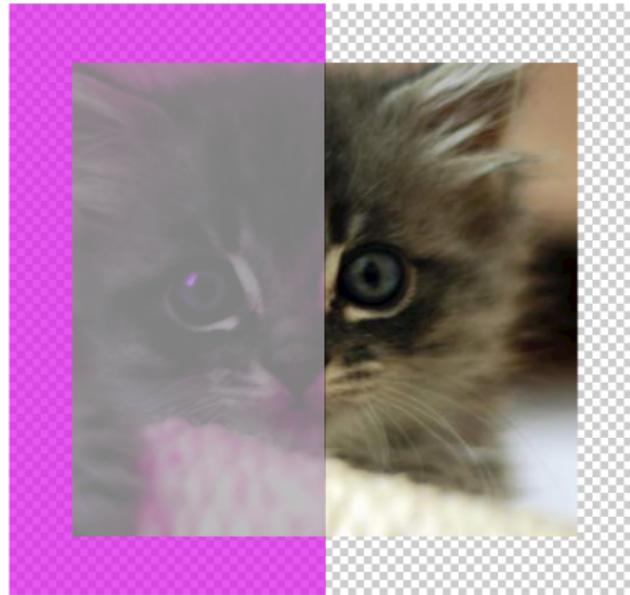
SVG FILTERS
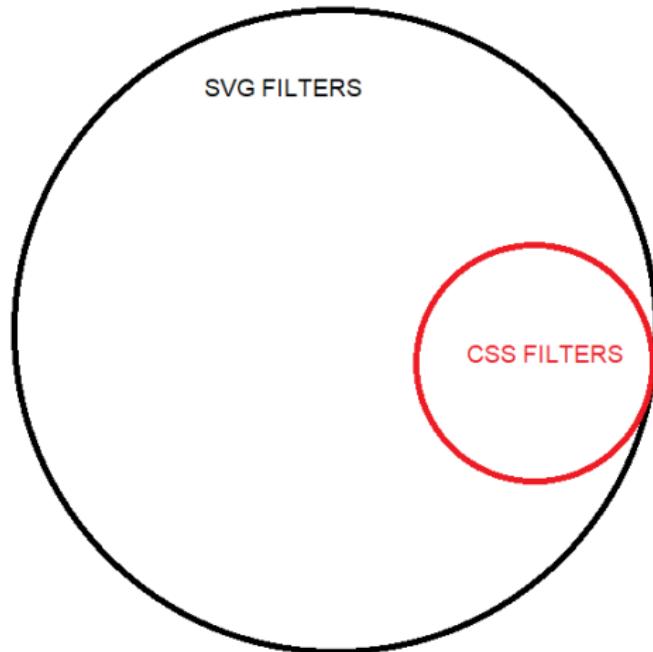
CSS FILTERS

```css
/* URL to SVG filter */
filter: url("filters.svg#filter-id");

/* <filter-function> values */
filter: blur(5px);
filter: brightness(0.4);
filter: contrast(200%);
filter: drop-shadow(16px 16px 20px blue);
filter: grayscale(50%);
filter: hue-rotate(90deg);
filter: invert(75%);
filter: opacity(25%);
filter: saturate(30%);
filter: sepia(60%);

/* Multiple filters */
filter: contrast(175%) brightness(3%);

/* Use no filter */
filter: none;

/* Global values */
filter: inherit;
filter: initial;
filter: unset;
```

SVG, JS – PŘIDÁVÁNÍ PRVKŮ

```html
<svg id="testsvg"></svg>
```

```javascript
const svg = document.getElementById('testsvg');
const xmlns = "http://www.w3.org/2000/svg";

const newElement = document.createElementNS(xmlns, 'rect');

newElement.setAttribute("x","10");
newElement.setAttribute("y","10");
newElement.setAttribute("width","100");
newElement.setAttribute("height","100");
newElement.style.stroke = "#000";
newElement.style.strokeWidth = "5px";
newElement.style.fill = "#f00";
svg.appendChild(newElement);
```

SVG, JS – PŘIDÁVÁNÍ PRVKŮ

```
<svg >
  <g id="g1"></g>
</svg>
```

```
const GROUP = document.getElementById('g1');
const xmlns = "http://www.w3.org/2000/svg";

const newElement = document.createElementNS(xmlns, 'path');

newElement.setAttribute("d","M 10 10 L 50 50 100 50");
newElement.style.stroke = "#000";
newElement.style.strokeWidth = "5px";
newElement.style.fill = "#f00";
GROUP.appendChild(newElement);
```

DRAG

Dokumentácia eventov

Global Event Attributes

oncancel , oncanplay , oncanplaythrough , onchange , onclick , onclose , oncuechange , ondblclick ,

ondrag , ondragend , ondragenter , ondragleave , ondragover , ondragstart , ondrop , ondurationchange ,

onemptied , onended , onerror , onfocus , oninput , oninvalid , onkeydown , onkeypress , onkeyup , onload ,

onloadeddata , onloadedmetadata , onloadstart , onmousedown , onmouseenter , onmouseleave ,

onmousemove , onmouseout , onmouseover , onmouseup , onmousewheel , onpause , onplay , onplaying ,

onprogress , onratechange , onreset , onresize , onscroll , onseeked , onseeking , onselect , onshow ,

onstalled , onsubmit , onsuspend , ontimeupdate , ontoggle , onvolumechange , onwaiting

Sorry, the page /en-US/docs/Web/SVG/Attribute/ondrag could not be found.

DRAG

Page not found

Sorry, the page `/en-US/docs/Web/SVG/Attribute/ondrag` could not be found.

Drag

Čo s tým?

DRAG

```
element.addEventListener("mousedown", startDrag);
element.addEventListener("mousemove", drag);
element.addEventListener("mouseup", endDrag);
element.addEventListener("mouseleave", endDrag);
```

Tutoriál

Úkol

- Pomocou JS vytvorte červený SVG 'box' a 'stôl'
- Box bude možné presúvať
- Ak box presuniete na stôl (približne) zmení sa jeho farba na zelenú

Díky za pozornost!