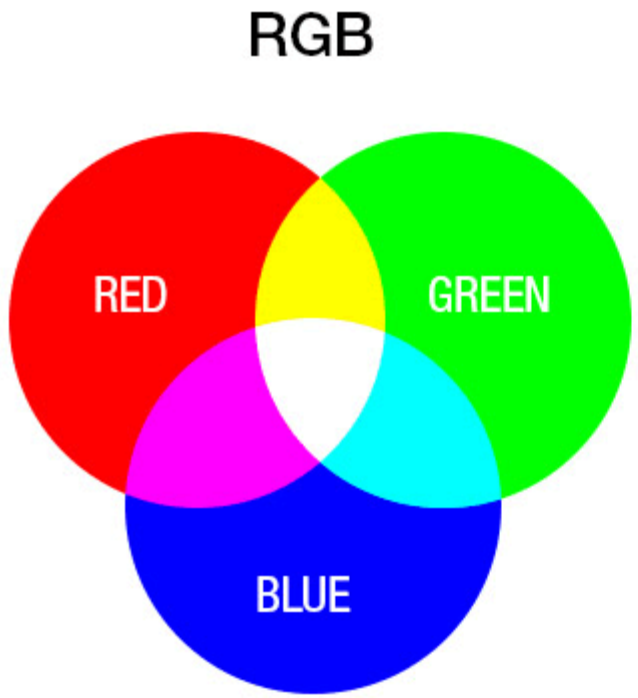
GRAFIKA KOMPUTEROWA

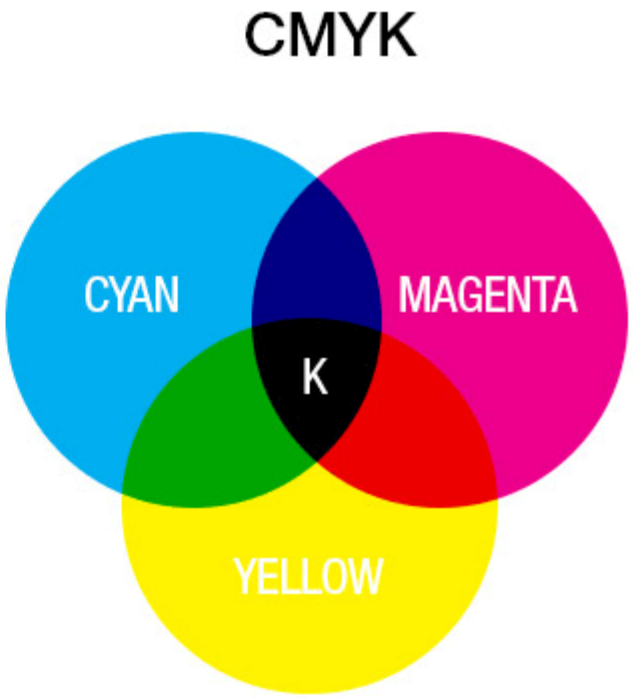
MODELE BARW

W jaki sposób reprezentować kolor?

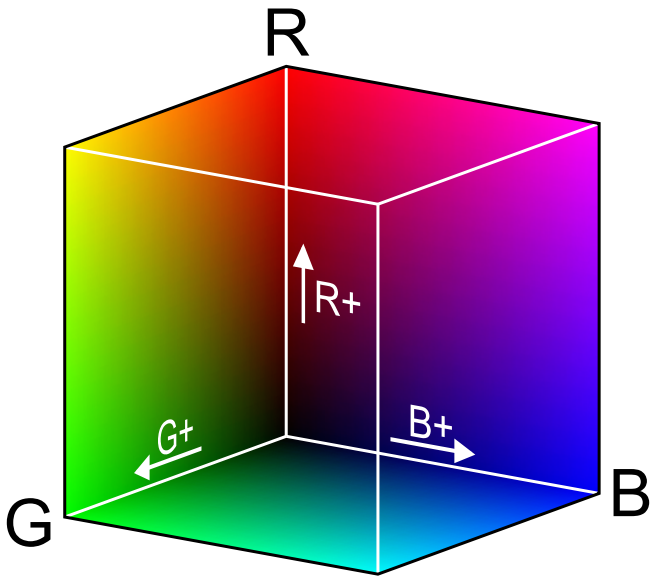
RGB – obrazki (addytywny → dodaj do czarnego)

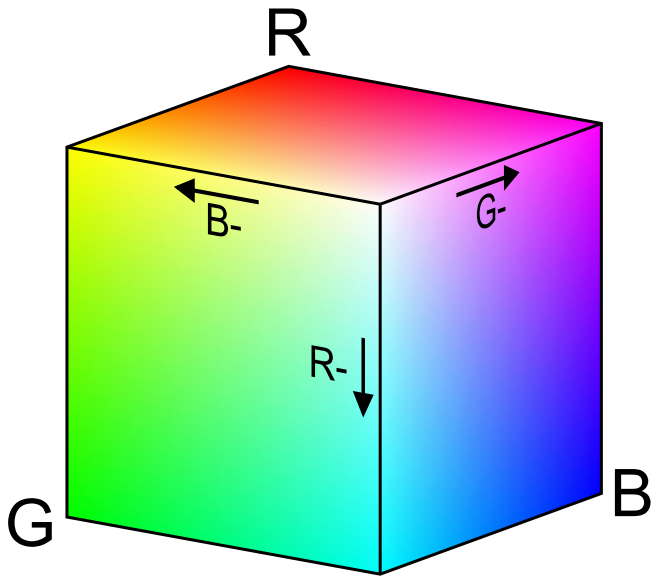
CMYK – wydruki (subtraktywny → odejmij od białego)

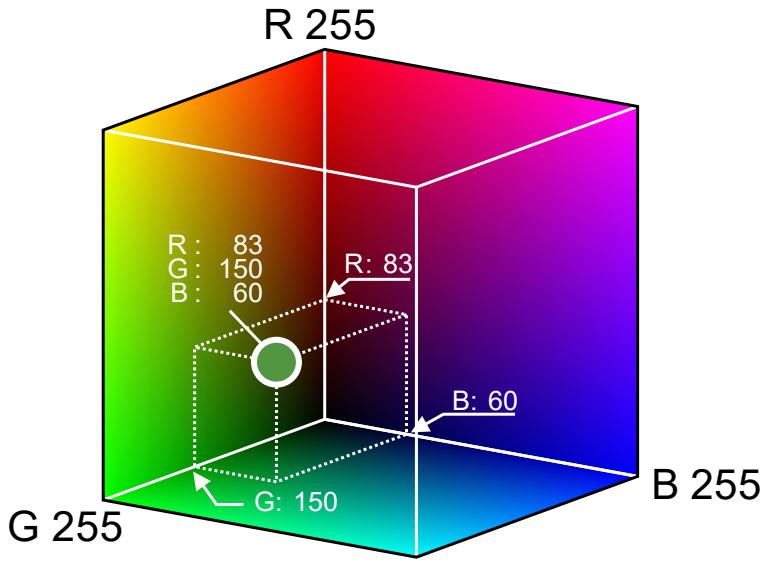




kostka RGB







HLS (hue, lightness, saturation) (Barwa, Jasność, Nasycenie)

HSV (hue, saturation, value) (Barwa, Nasycenie, Wartość)

https://web.cs.uni-paderborn.de/cgvb/colormaster/web/color-systems/cmy.html

https://spec.oneapi.io/oneipl/0.6/concepts/color-models.html#primary-secondary-colors-rgb-cmyk-models

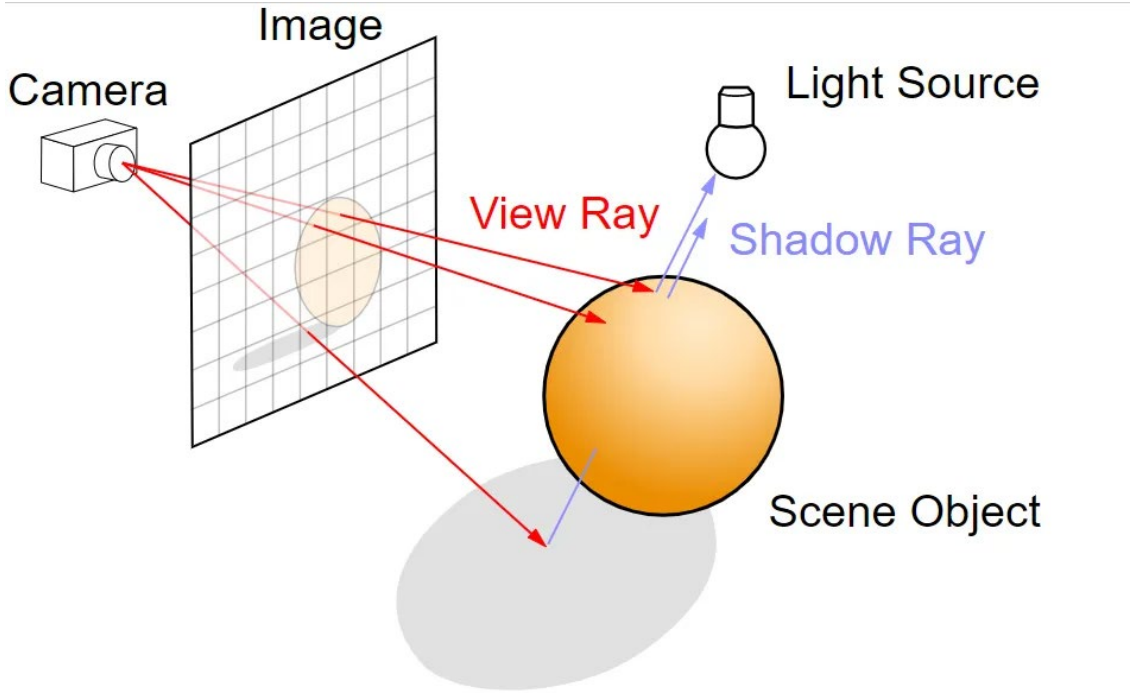
https://programmingdesignsystems.com/color/color-models-and-color-spaces/index.html

GRAFIKA 3D

W jaki sposób generować realistyczną scenę?

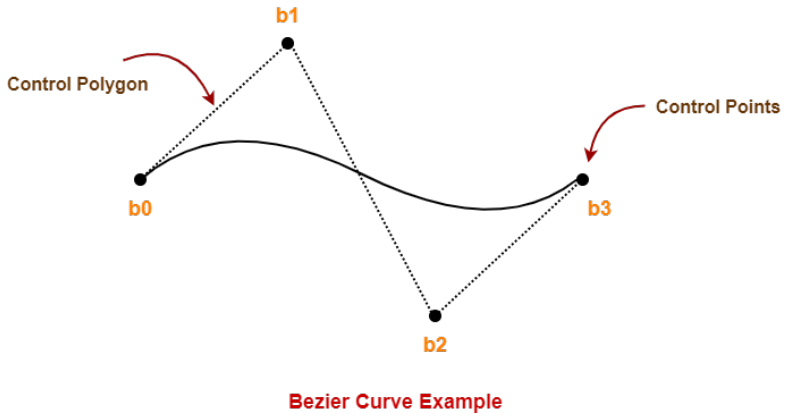
Renderowanie

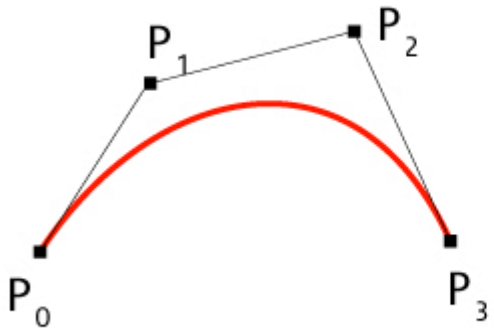
Geometria analityczna do obliczenia rzutu na płaszczyznę

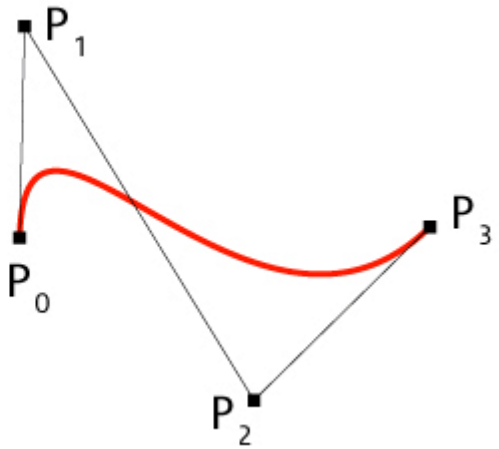


Modelowanie kształtów

Krzywe Beziera

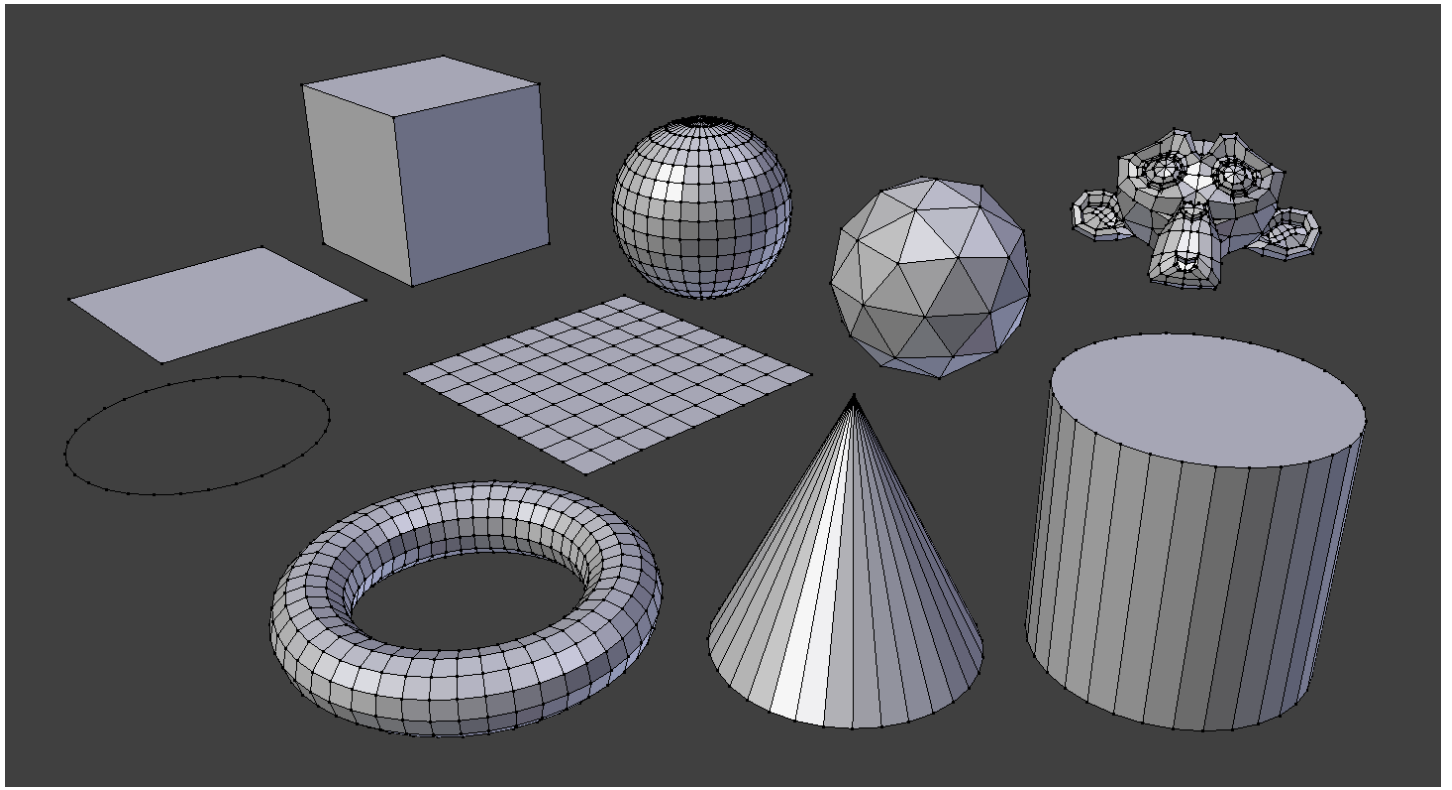






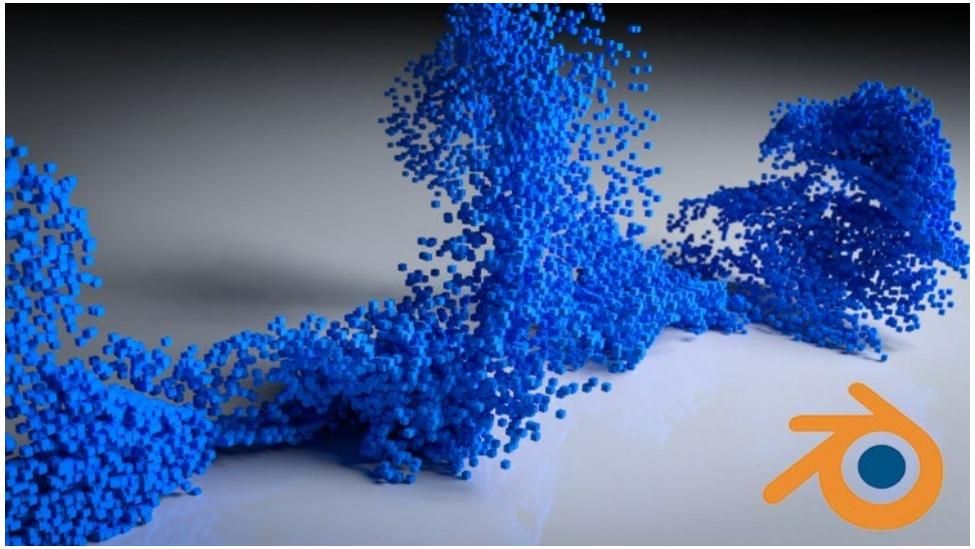
Modelowanie kształtów

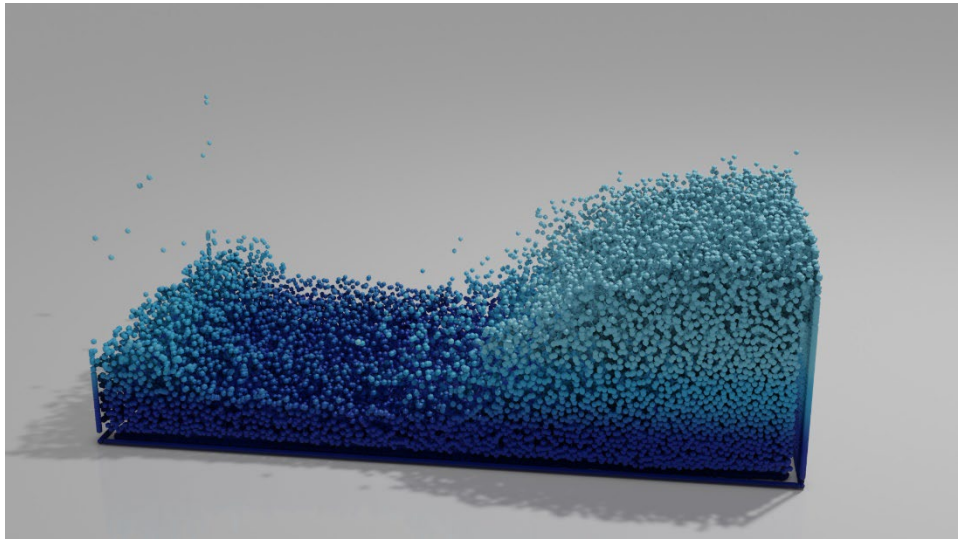
Siatki



Modelowanie kształtów

Systemy cząstek

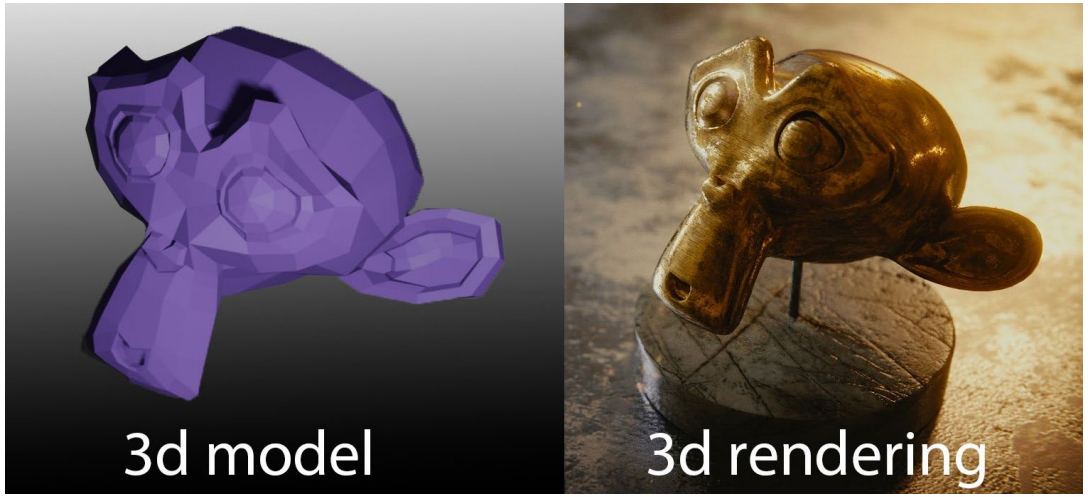


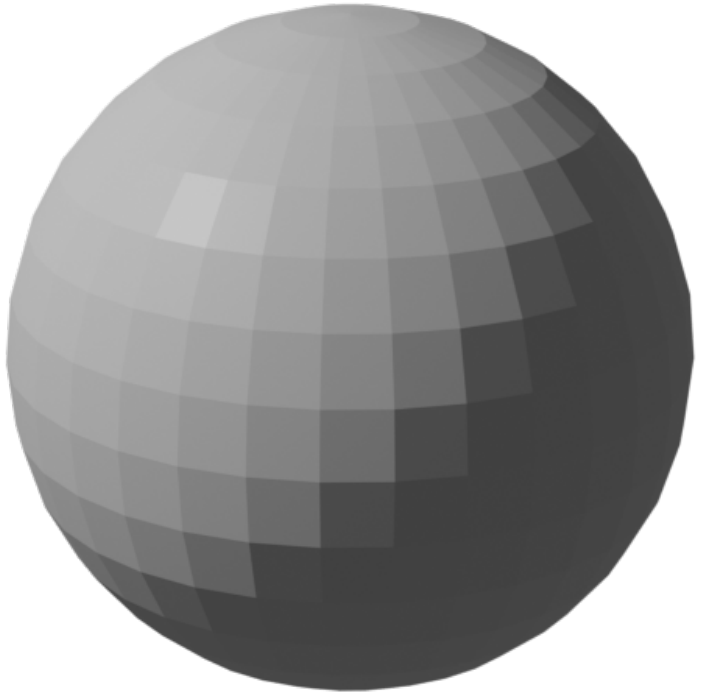


Teksturowanie

odbicia, rozpraszanie i załamanie światła (refrakcja), cienie

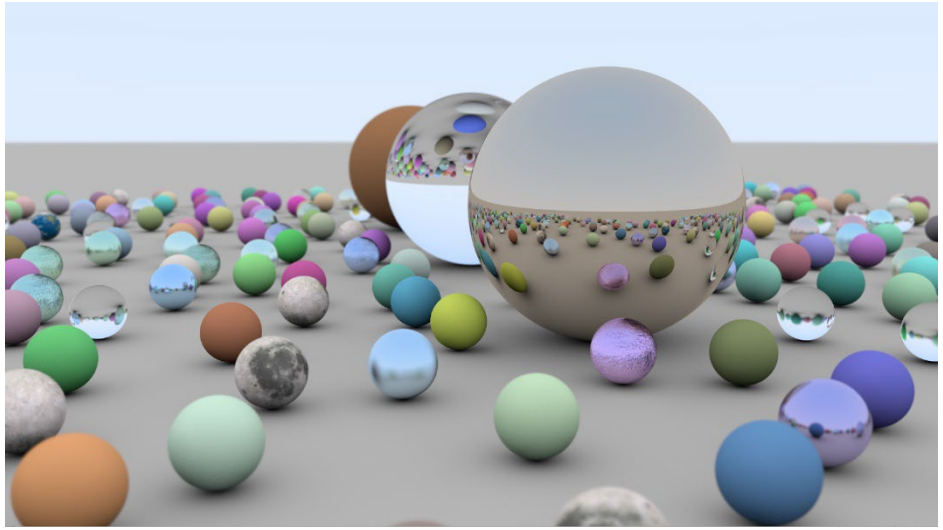
Renderowanie





Renderowanie

Śledzenie promieni (ang. *raytracing*)



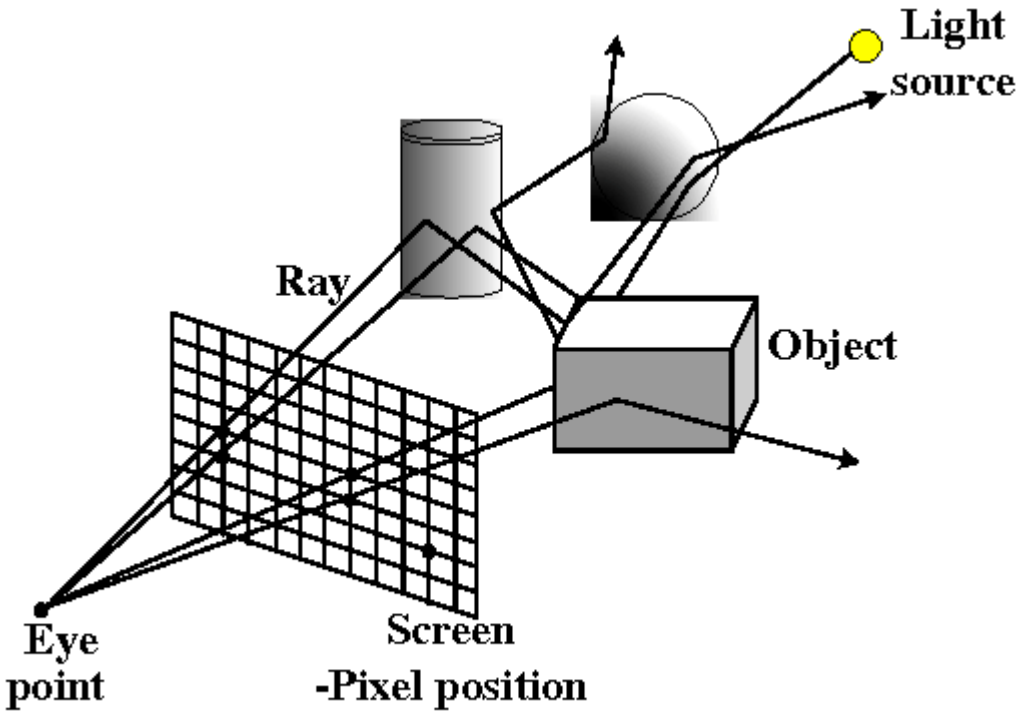


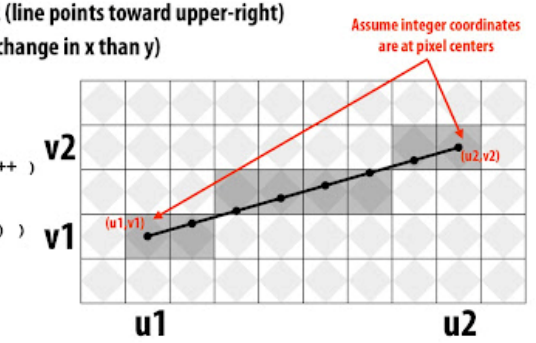
Figure 1. Concept of backward ray tracing

NISKOPOZIO MOWO

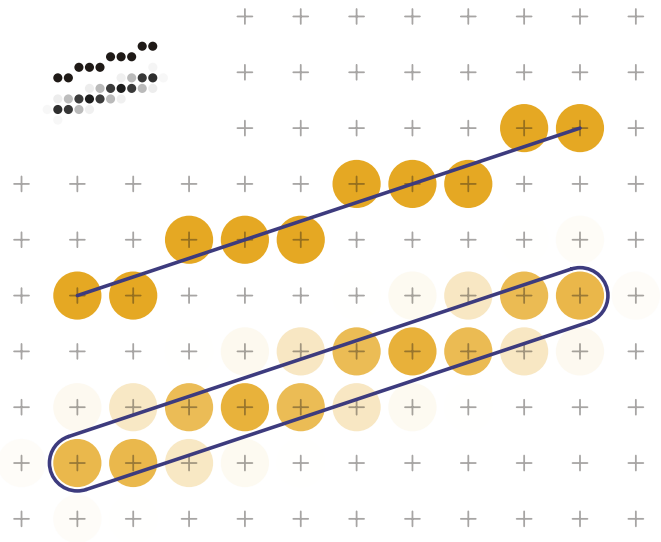
Incremental line rasterization

- Let's say a line is represented with integer endpoints: (u1,v1), (u2,v2)
- Slope of line: s = (v2-v1) / (u2-u1)
- Consider a very easy special case:
  - u1 < u2, v1 < v2 (line points toward upper-right)
  - 0 < s < 1 (more change in x than y)

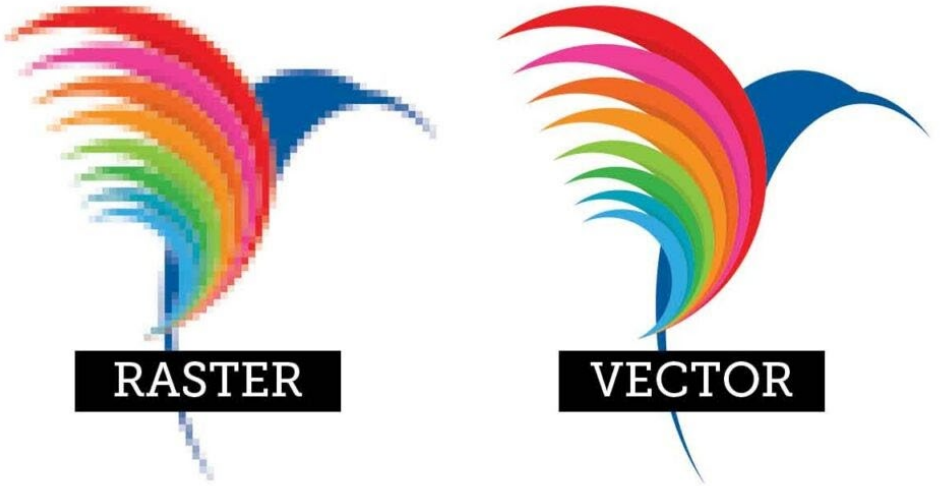
```
v = v1;
for( u=u1; u<=u2; u++ )
{
   v += s;
   draw( u, round(v) )
}
```

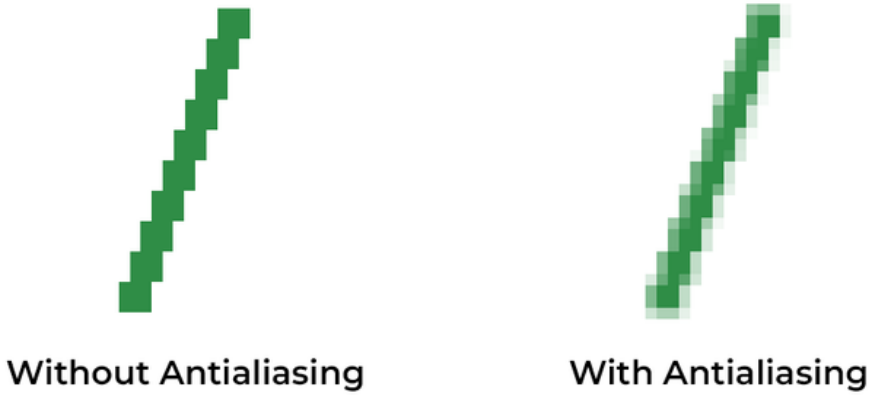


Common optimization: rewrite algorithm to use only integer arithmetic (Bresenham algorithm)

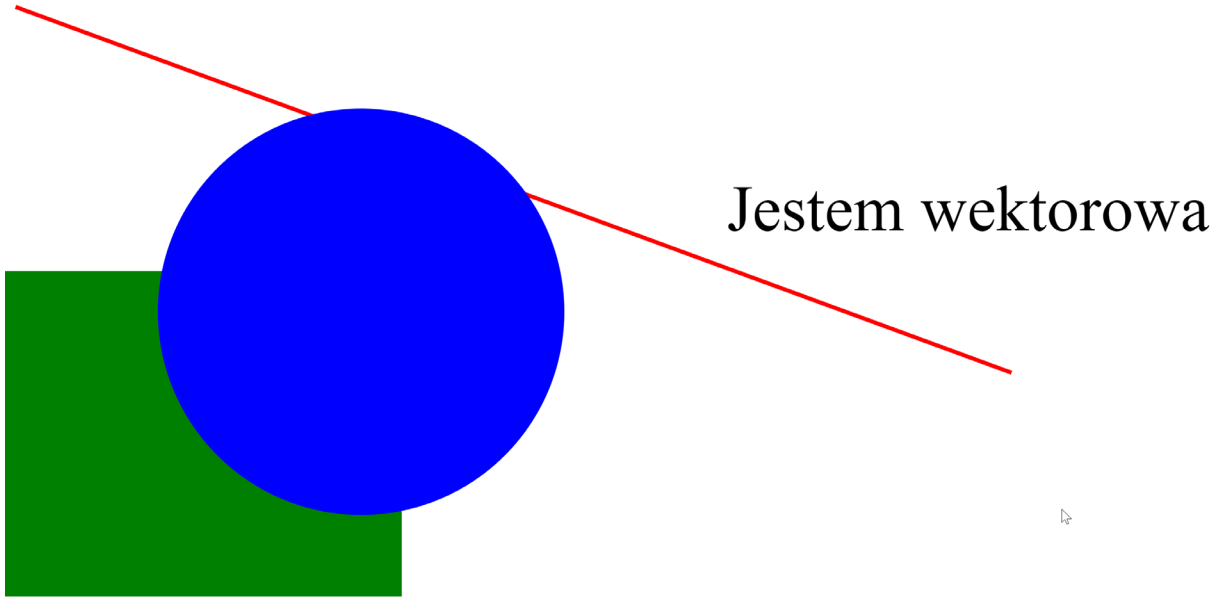


Rasteryzacja





GRAFIKA WEKTOROWA




```svg
<svg xmlns="http://www.w3.org/2000/svg">
  <rect
     width="100" height="80"
     x="0" y="70"
     fill="green" />
  <line
     x1="5" y1="5"
     x2="250" y2="95"
     stroke="red" />
  <circle
     cx="90" cy="80"
     r="50"
     fill="blue" />
   <text x="180" y="60">
     Jestem wektorowa
   </text>
</svg>
```