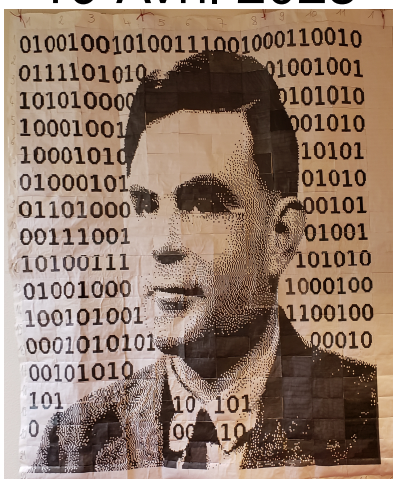
Pixel Art

Pascal Lafourcade
pascal.lafourcade@uca.fr

19 Avril 2023

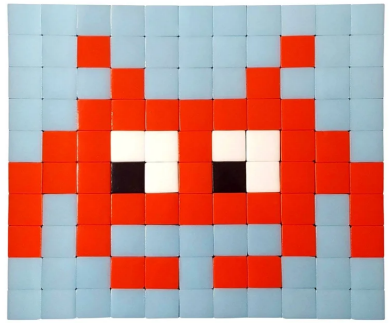


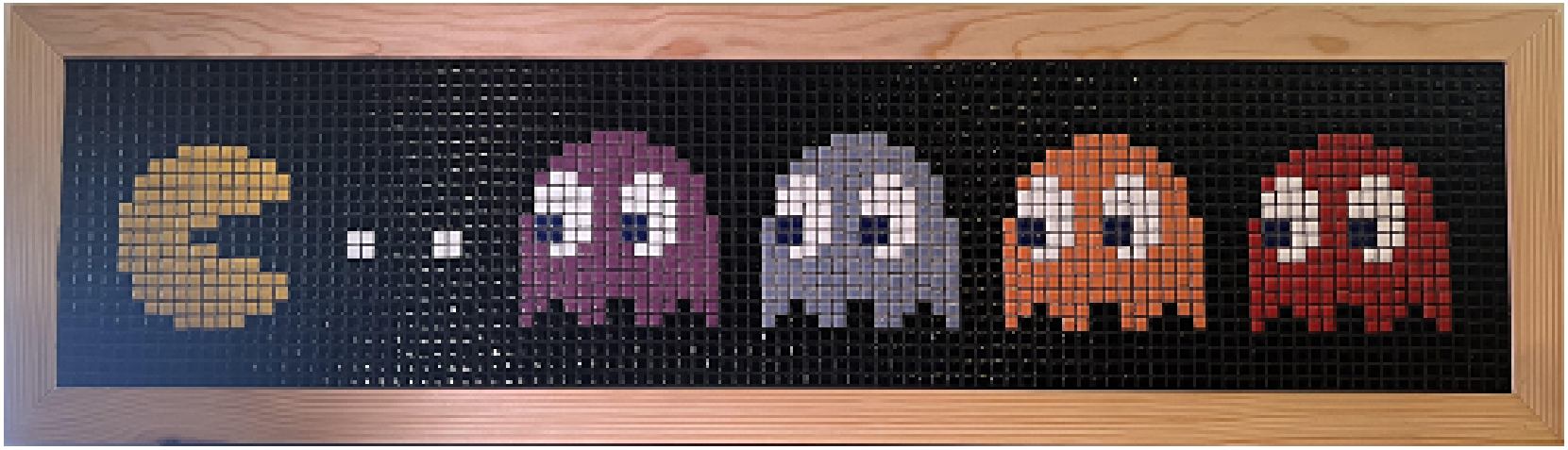
Mosaïque romaine

La chasse au lièvre : Mosaïque de Thysdrus

L’art de la mosaïque

Mosaïque et Pixel Art





Première image numérisée 5 $\times$ 5 cm, 1957

Walden le fils de Russell Kirsch.

176 $\times$ 176 $=$ 30 976 pixels

L'une des "*100 photographies qui ont changé le monde*"
Life magazine

Russell Kirsch (1929 - 2020)

Ingénieur au NIST

Inventeur du Pixel et du scanner

Pixel

Contraction de “*Picture element*”

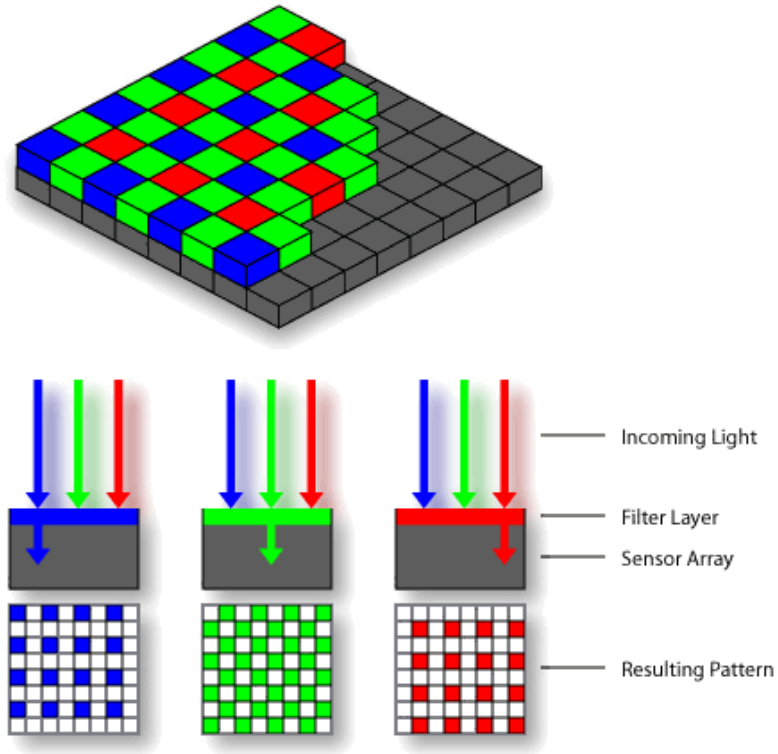
- noir et blanc : un bit ;
- 16 couleurs (standard VGA) : 4 bits ;
- 256 couleurs : 8 bits (1 octet) ;
- 1024 couleurs : 10 bits ;
- 65 536 couleurs : 16 bits ;
- 16 777 216 couleurs (true colors) : 24 bits.

Raw format

256 couleurs : 8 bits (1 octet)

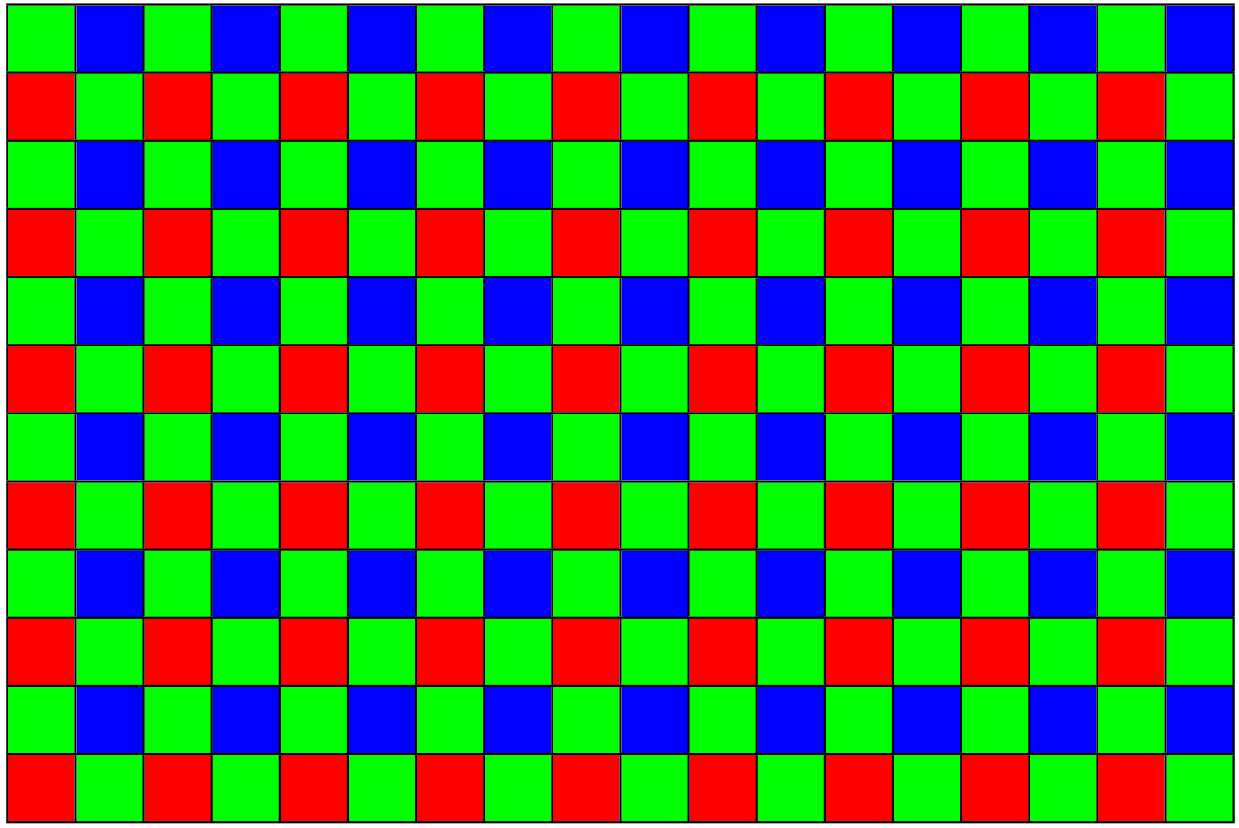
1024 couleurs : 10 bits ;

Raw format



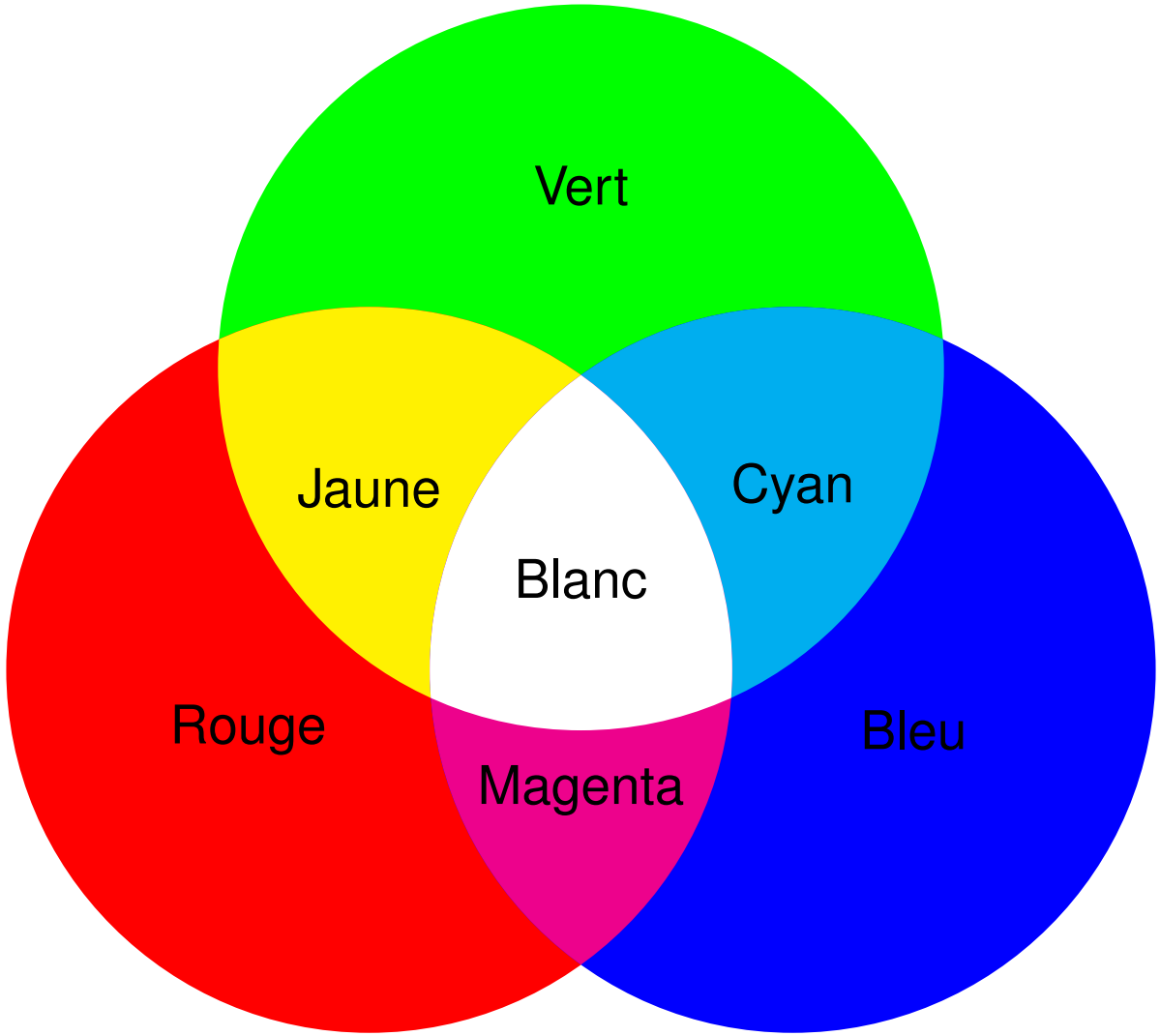
Matrice de Bayer

Matrice de Bayer 18 par 12

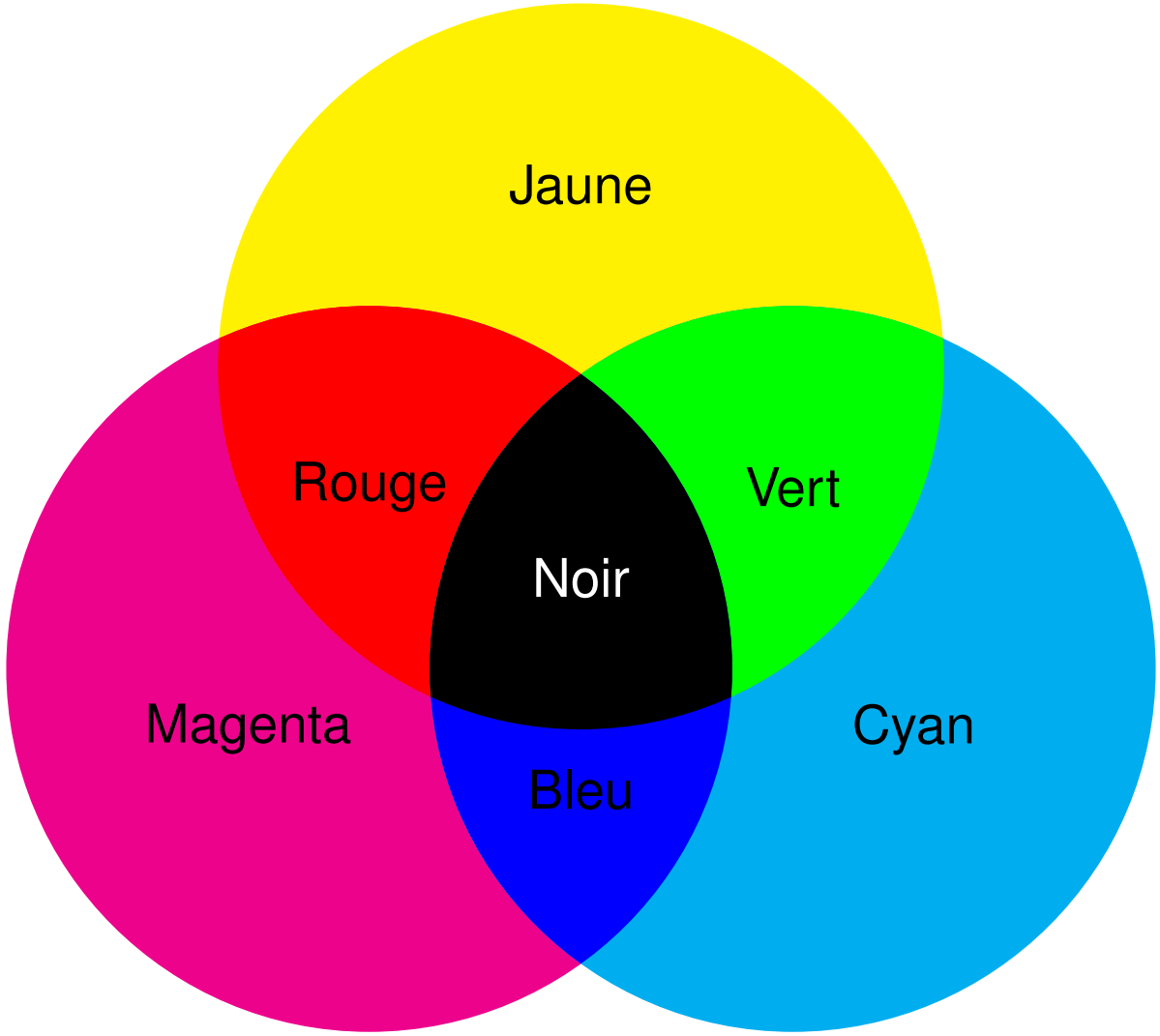


Moyenne sur 9 cellules, donne la valeur RVB du pixel

Couleurs : Synthèse additive (lumière)



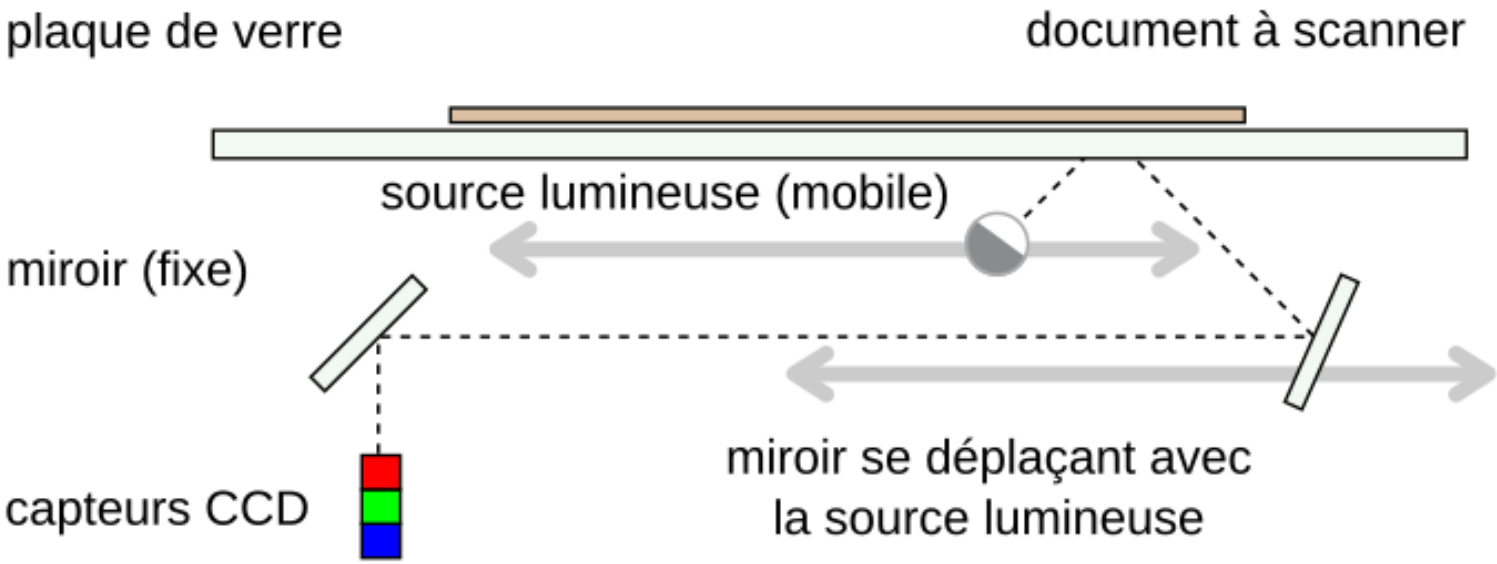
Couleurs : Synthèse soustractive (peinture)



Le premier télécopieur (fax), 1969

Mesure de la qualité en dpi (dot per inch)

Scanner à plat, 1990

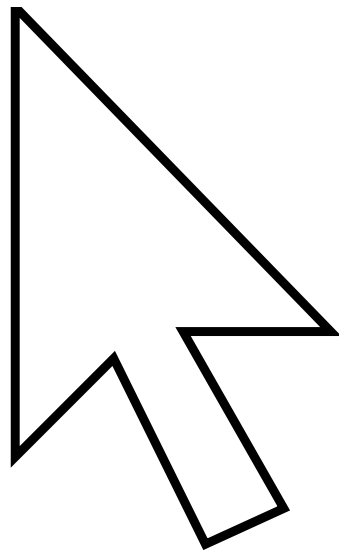


Autres scanners

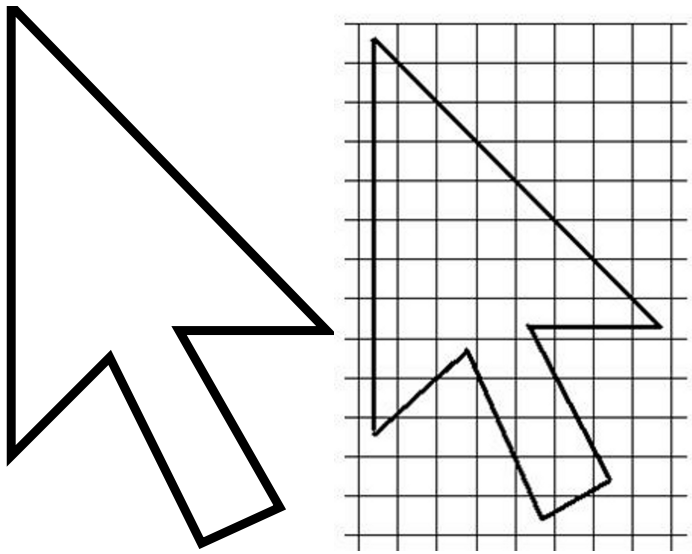


Scanner à défilement, à plat, à tambours.

Du continu au discret au numérique



Du continu au discret au numérique



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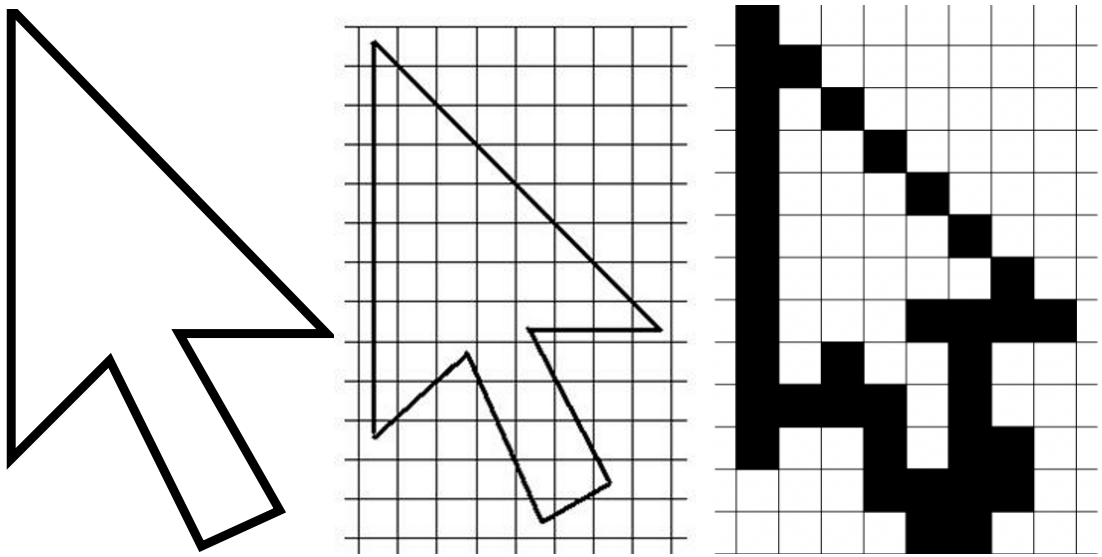
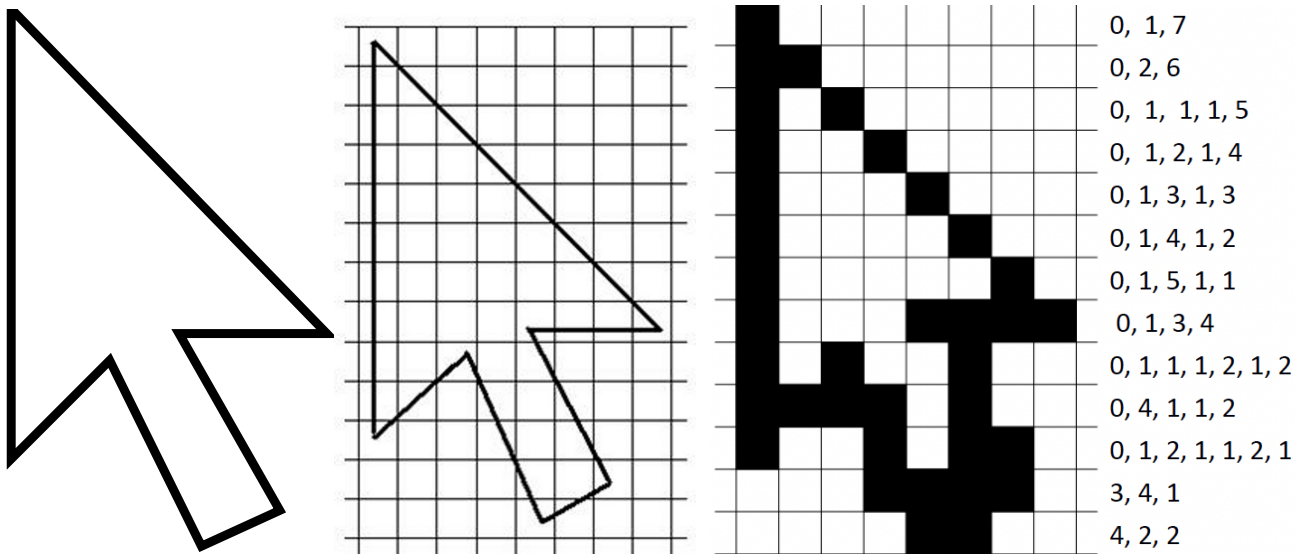
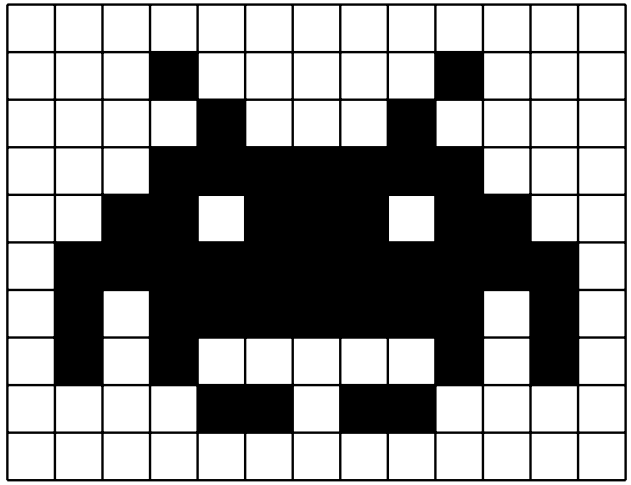


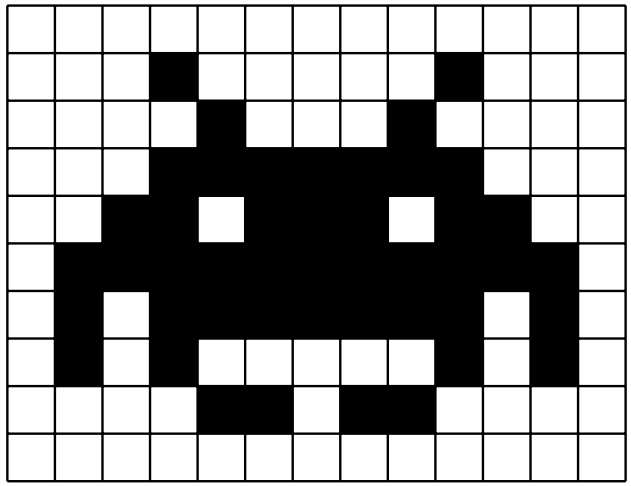
Du continu au discret au numérique



Encodage à vous de jouer (STYX 10×13)



Encodage à vous de jouer (STYX 10×13)



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3,7,3
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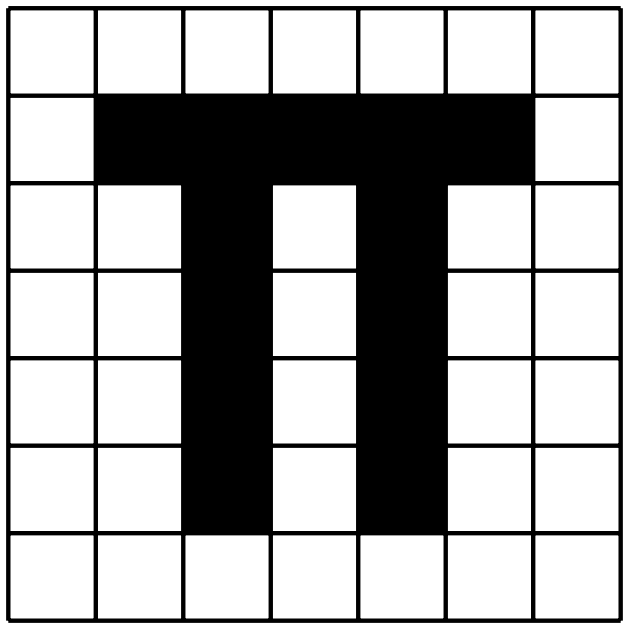
1,11,1
1,1,1,7,1,1,1
1,1,1,1,5,1,1,1,1
4,2,1,2,4
13

Décodage 7 × 7

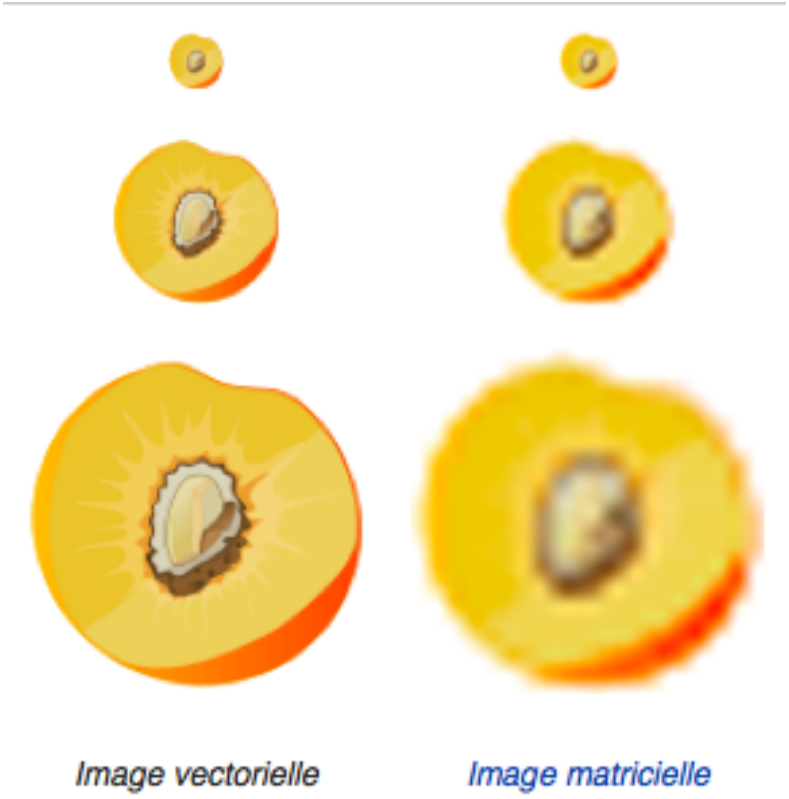
7
1,5,1
2,1,1,1,2
2,1,1,1,2
2,1,1,1,2
2,1,1,1,2
7

Décodage 7×7

7
1,5,1
2,1,1,1,2
2,1,1,1,2
2,1,1,1,2
2,1,1,1,2
7



Formats d'images



`BMP`, `TIFF`, `GIF`, `JPEG` ou `JPG`, `PNG`, `PBM`, `PGM`, `PPM` ...

Images matricielles

Fichier : 1Maison.txt

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```

Images matricielles

Fichier : 1Maison.txt

```
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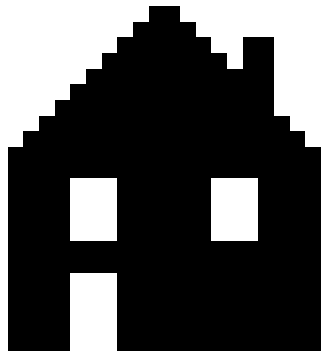
```

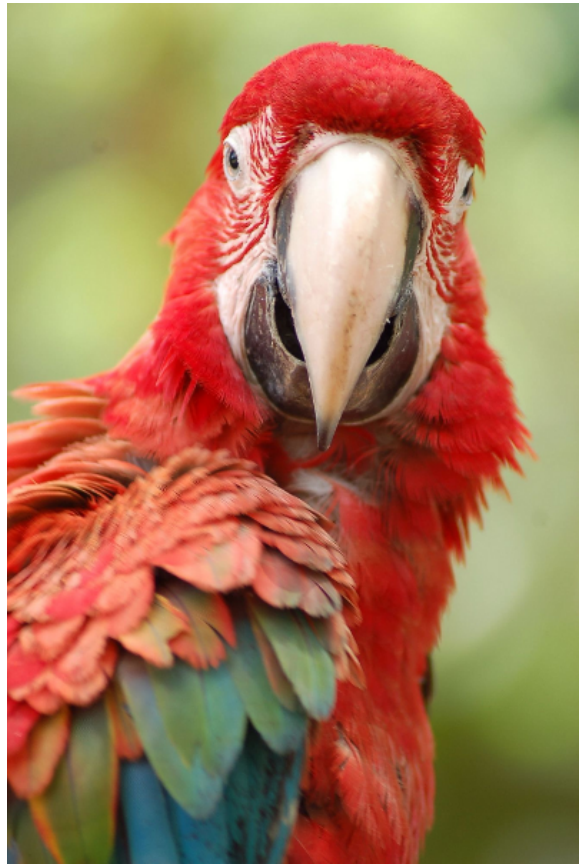
GNU Image Manipulation Program (GIMP)



Coco en Gris

```
P2
400
603
255
178 178 180 181 182 182 180 182 183 184 184 185 187 186
```

Coco en Couleur



```
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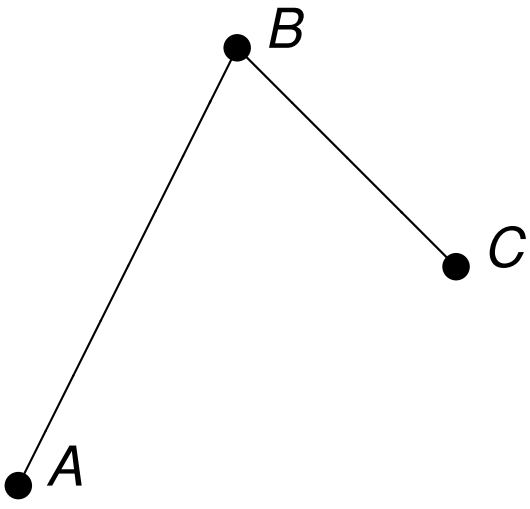
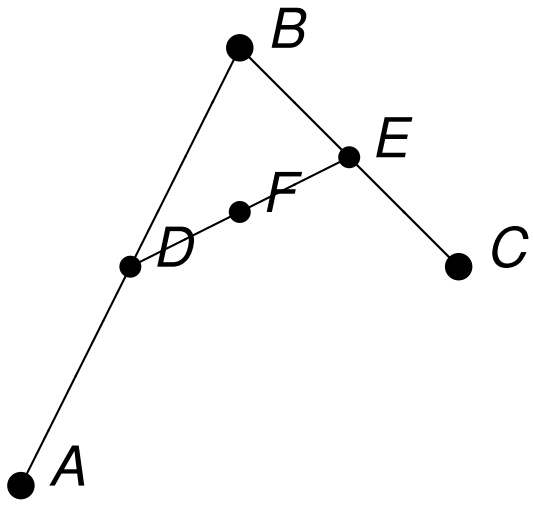
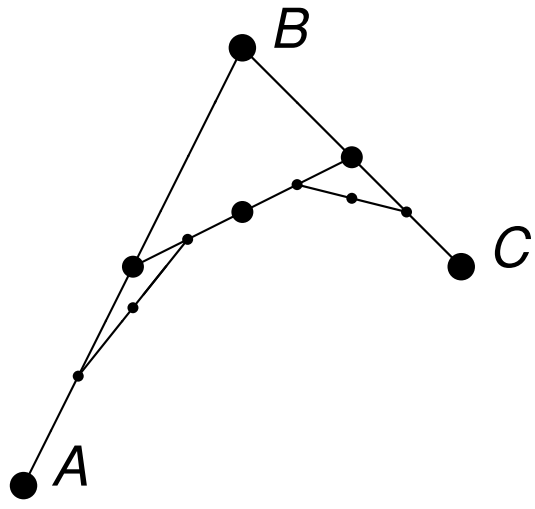
603
255
174 185 114 174 186 115 176 188 117 177 188 117 178 189
```

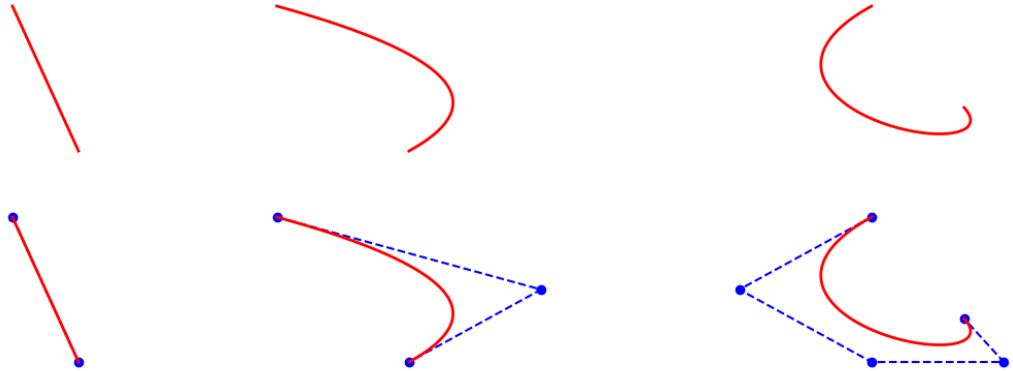
Images vectorielles : Pierre Bézier







Courbes de Bézier, formule explicite



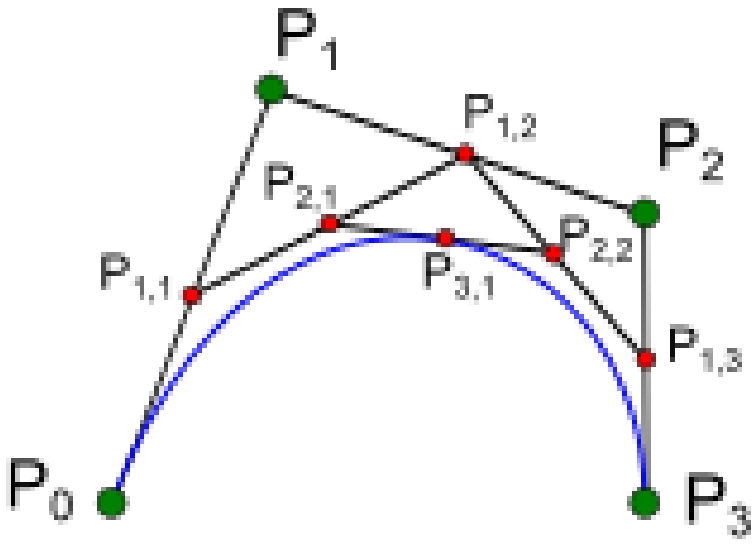
$$F_{P_0,\ldots,P_N}(t) = \sum_{k=0}^{N} \binom{N}{k} t^k (1-t)^{N-k} P_k$$

Les *polynômes de Bernstein* d'ordre N :

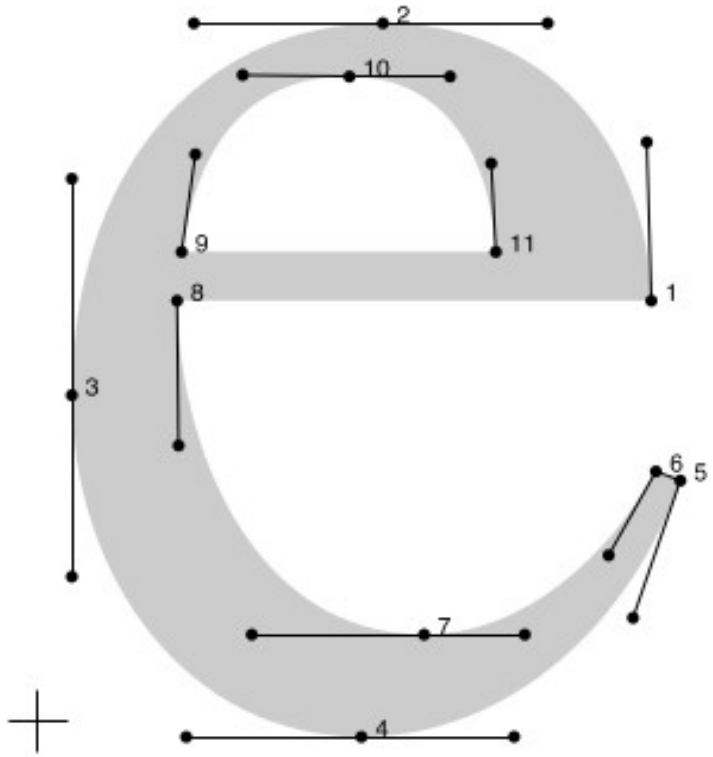
$$\forall k = 0 \ldots N, \quad B_k^{(N)}(t) = \binom{N}{k} t^k (1-t)^{N-k}$$

$$F_{P_0,\ldots,P_N}(t) = \sum_{k=0}^{N} B_k^{(N)}(t) P_k$$

Casteljau

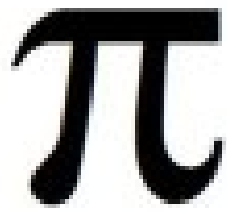


Caractère « e » en postscript



Cryptographie visuelle

Moni Naor et Adi Shamir en 1994



Cryptographie visuelle

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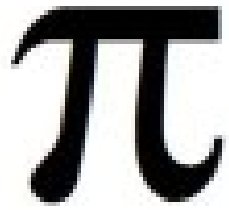
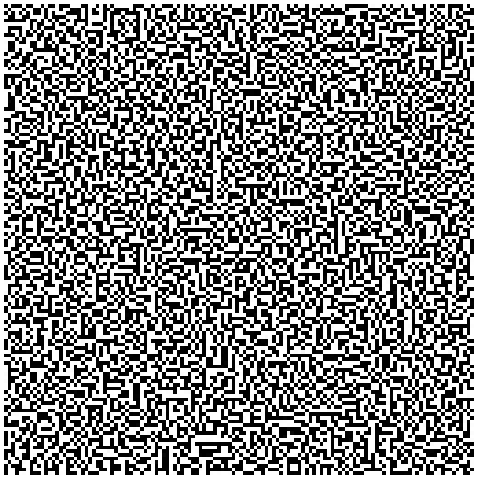
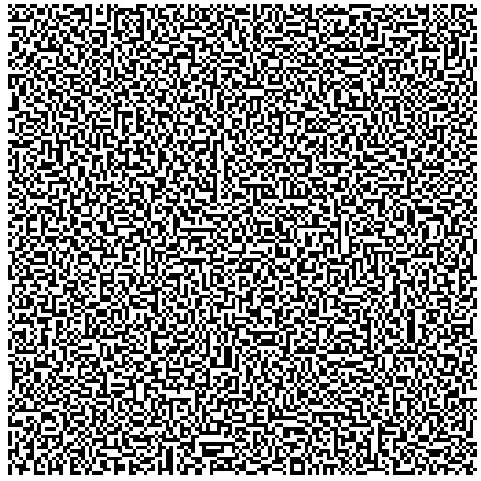
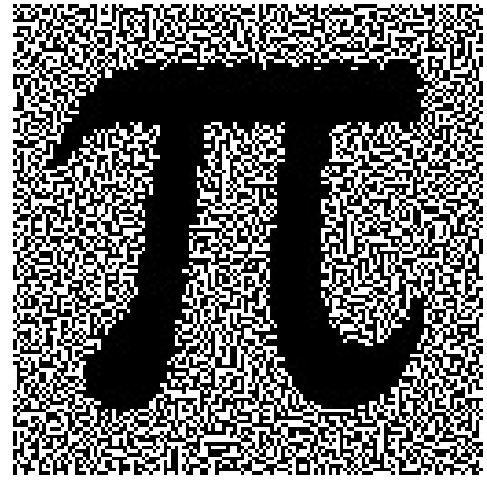
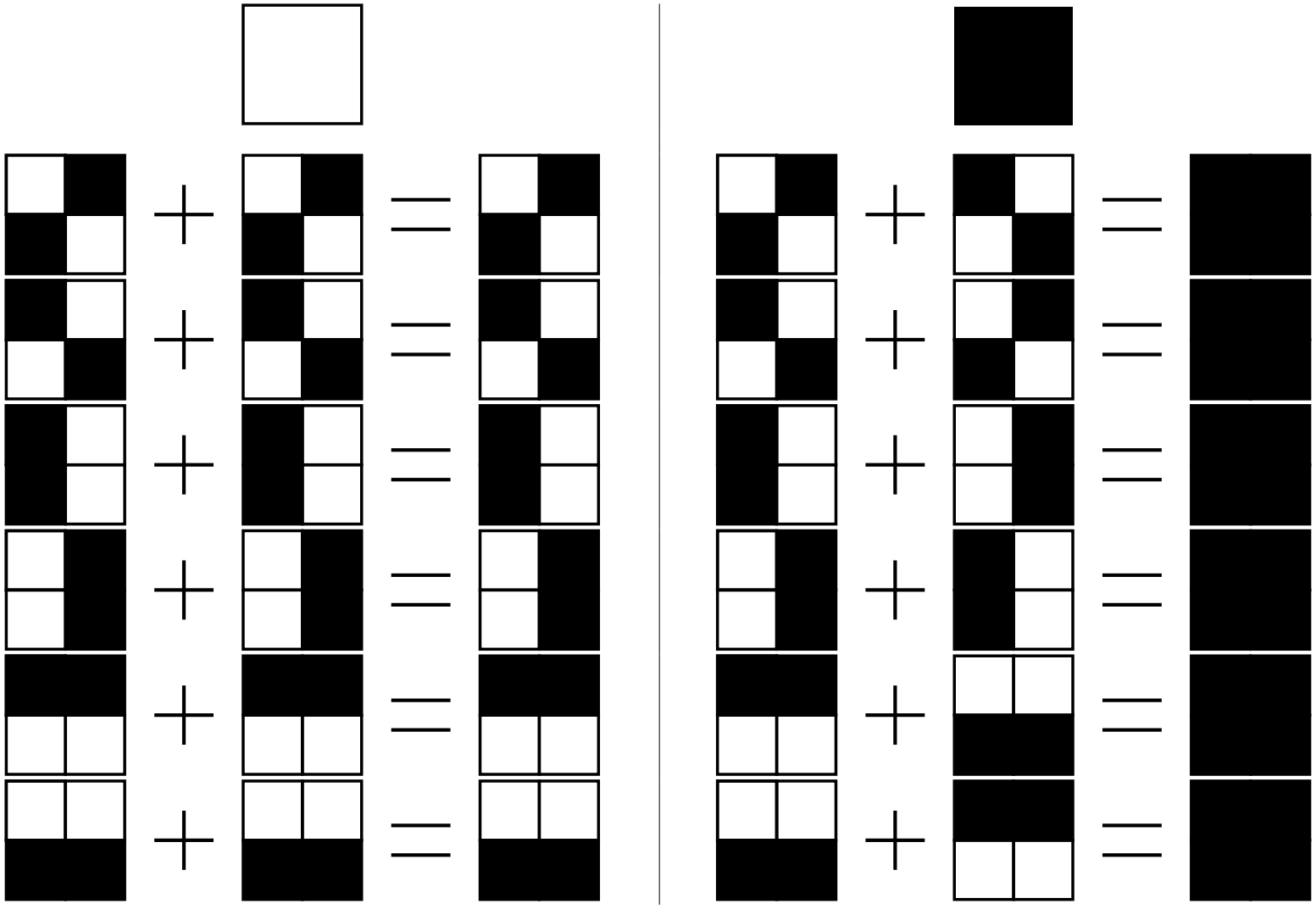




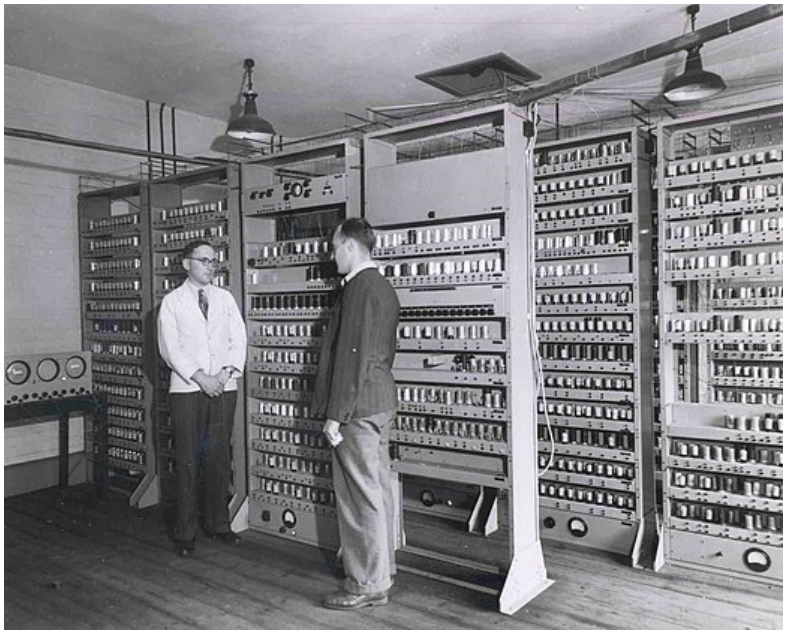




Cryptographie visuelle

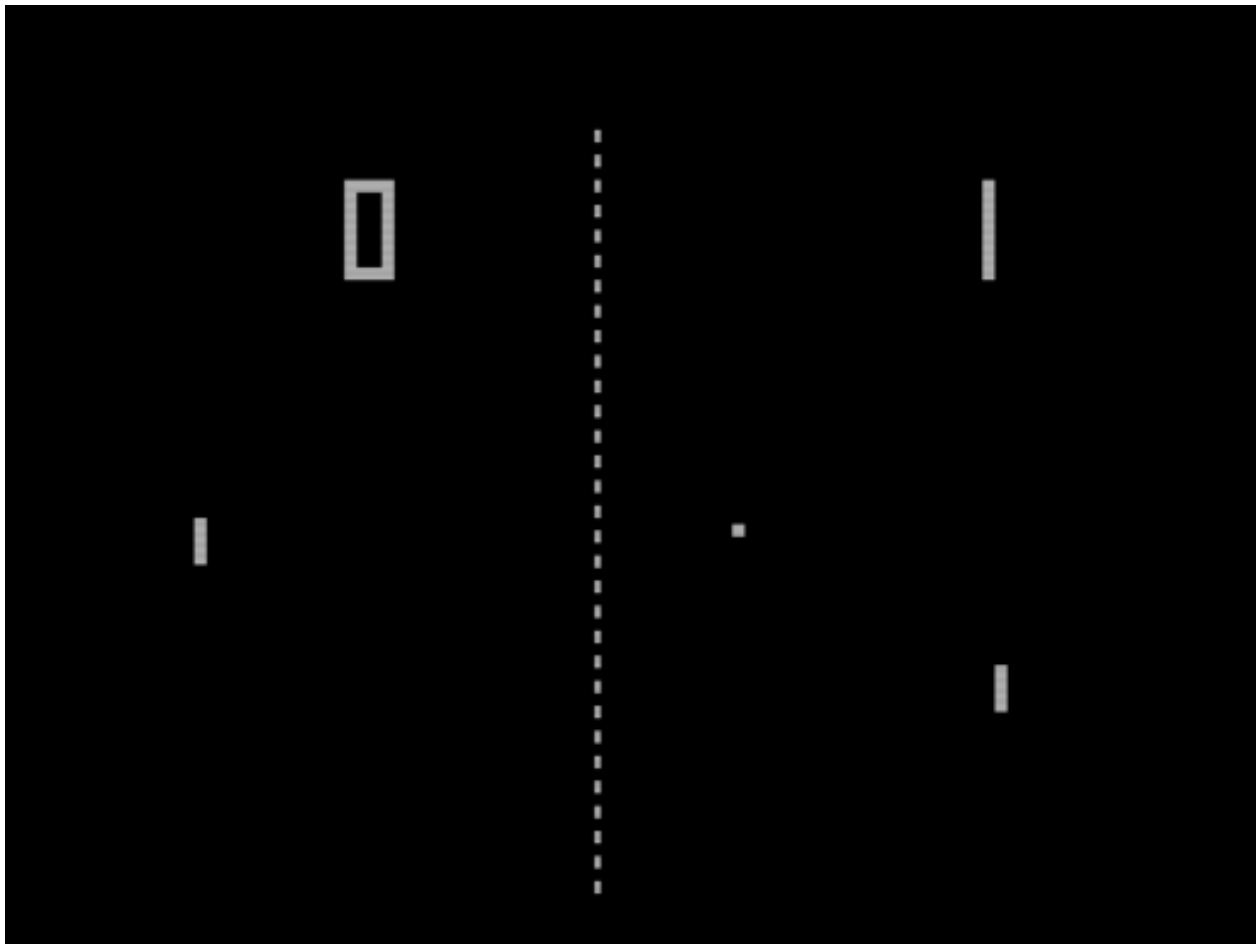


Premier Jeu vidéo graphique : OXO 1952



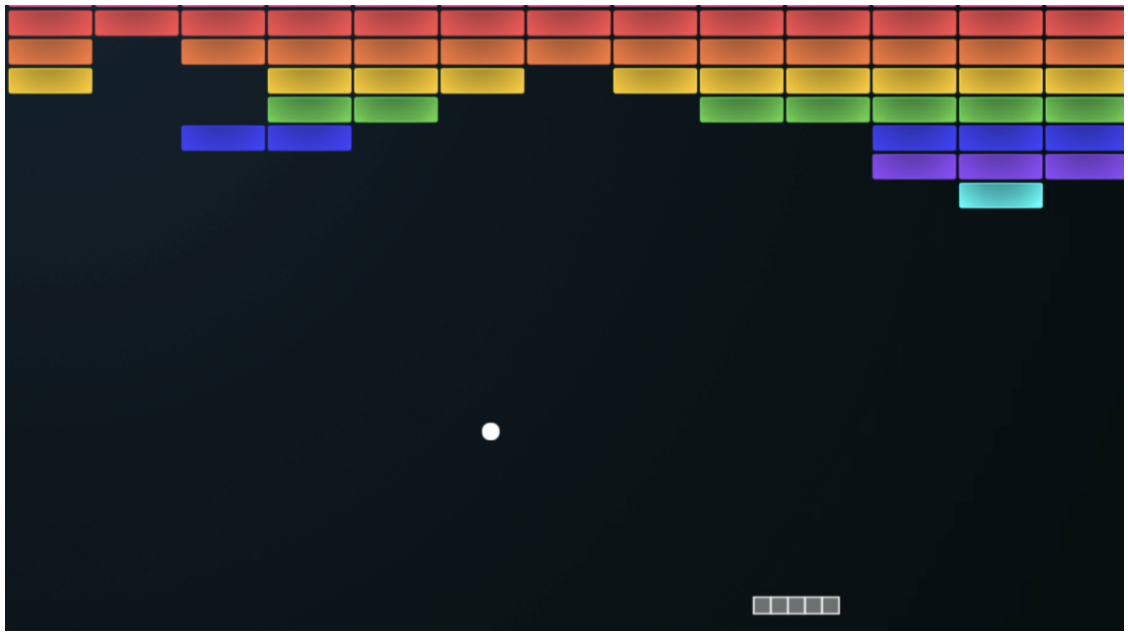
Inventé parBritannique Alexander S. Douglas

Jeu d'arcade : Pong, Atari 1972



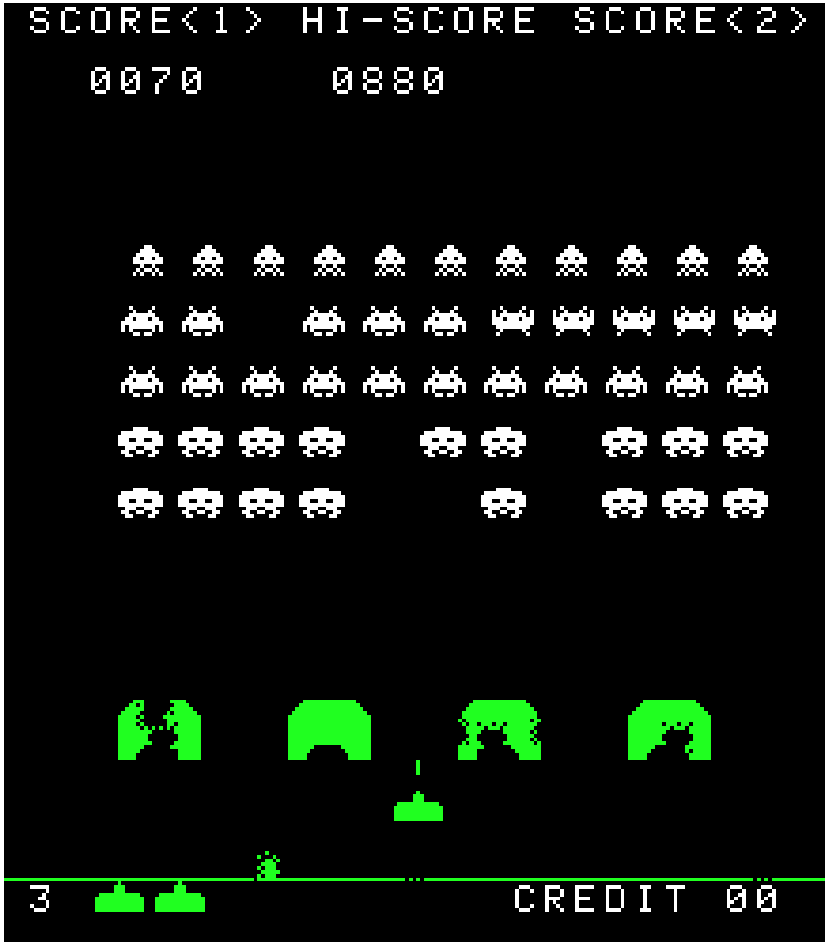
Par Allan Alcorn

Breakout, Atari 1976



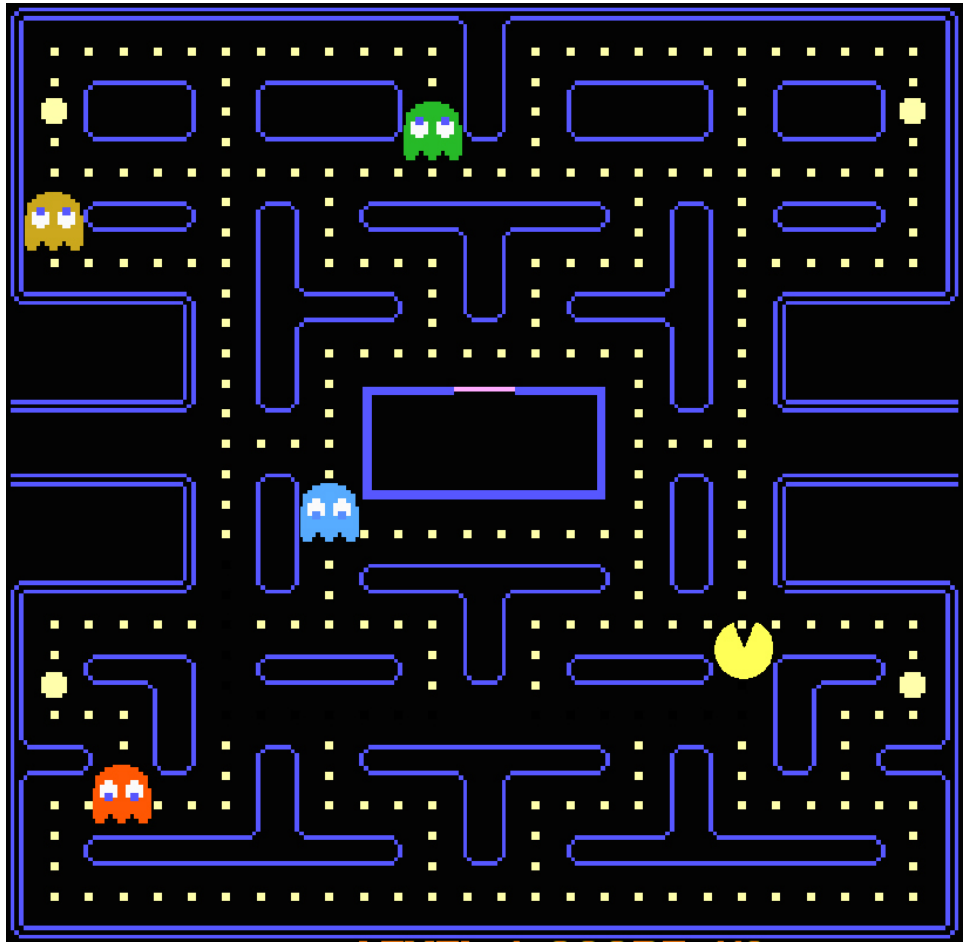
Par Nolan Bushnell

Space Invaders par Taito en 1978



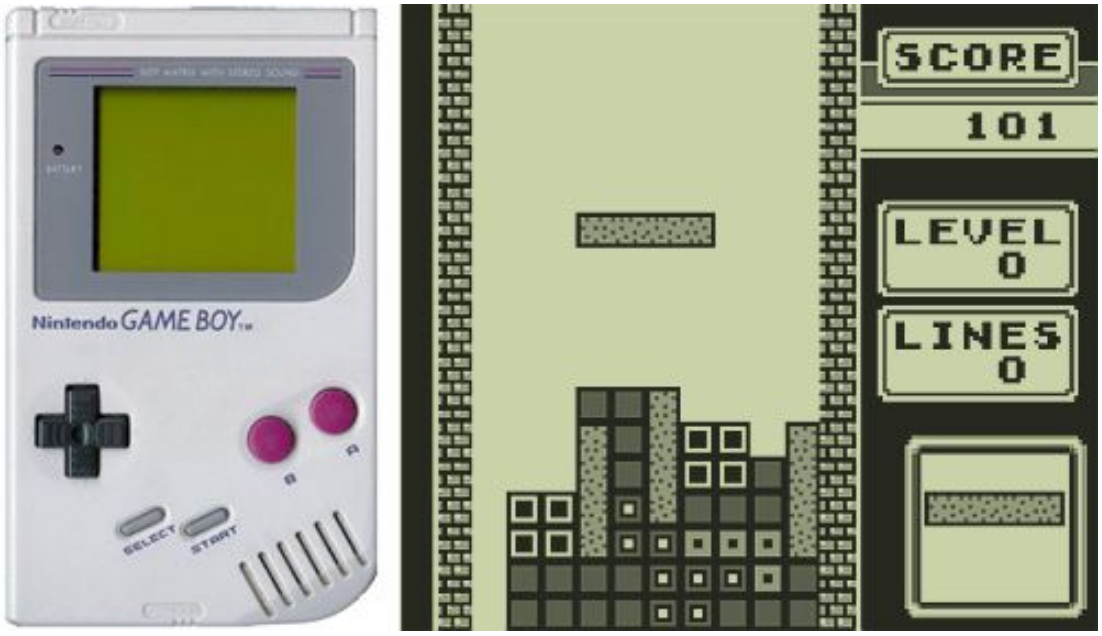
Par Tomohiro Nishikado

Pac-Man, Namco 1980



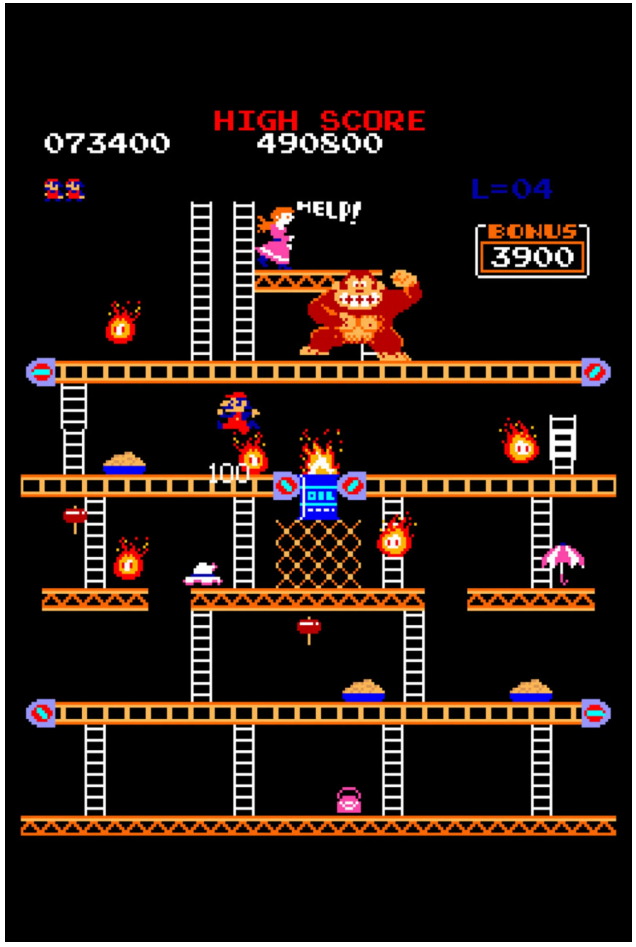
Par Tōru Iwatan

Tetris, 1984



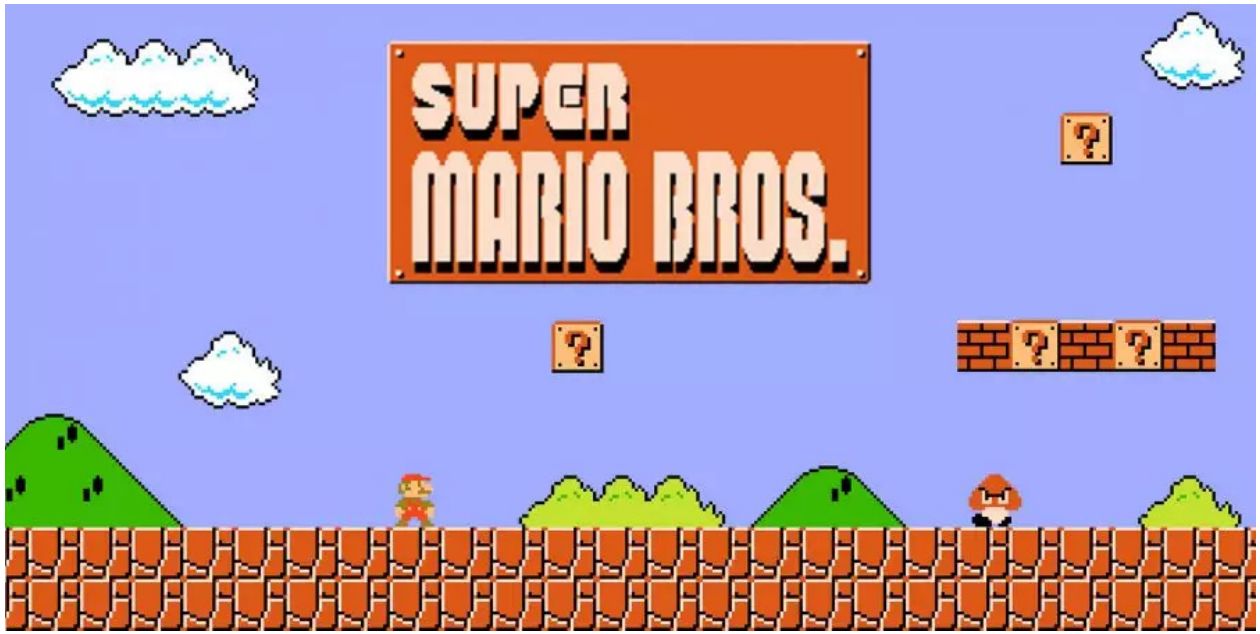
Par Alekseï Pajitnov

Donkey Kong, Nintendo en 1985



Gunpei Yokoi et Shigeru Miyamoto

Super Mario Bros, Nintendo en 1985



Par Shigeru Miyamoto

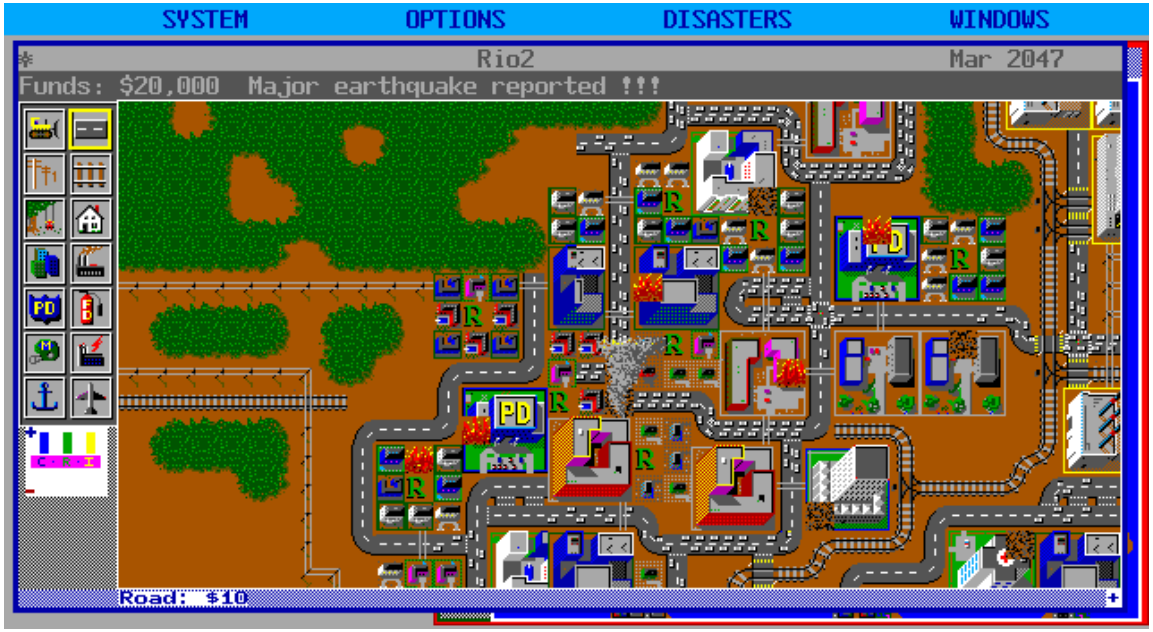
The Legend of Zelda, Nintendo 1986

Par Shigeru Miyamoto et Takashi Tezuka

Sonic, Sega en 1991

Par Naoto Ōshima, Yuji Naka, Hirokazu Yasuhara

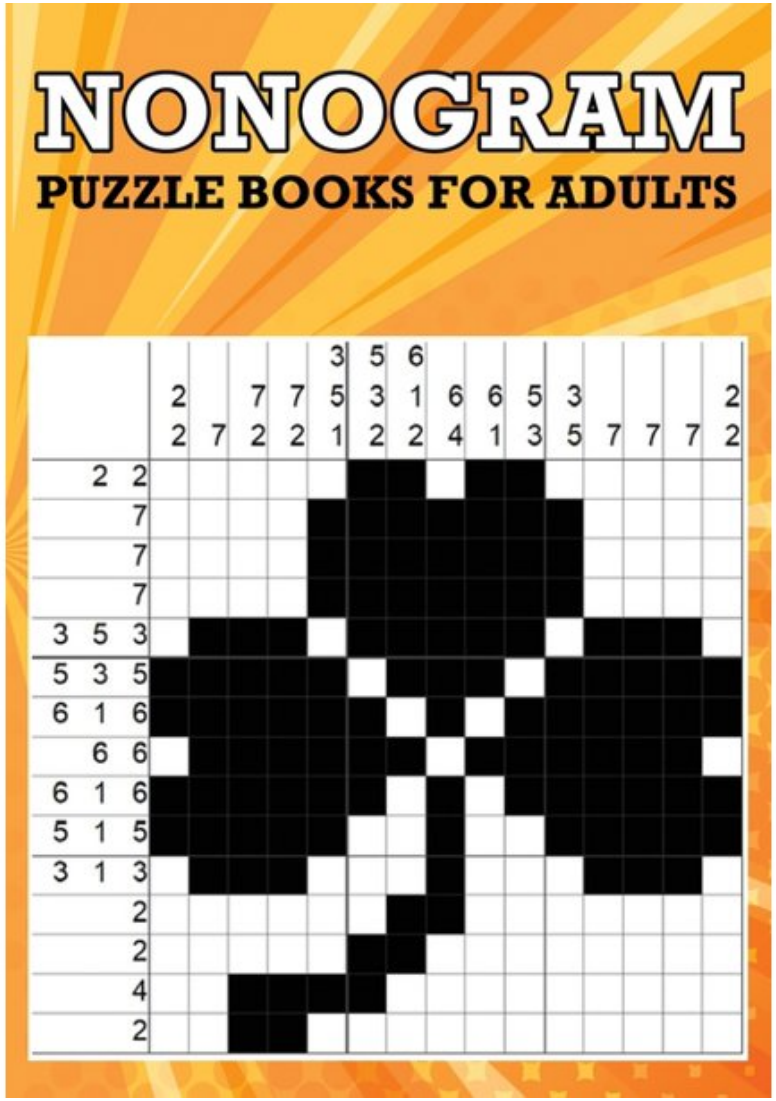
SimCity, 1989



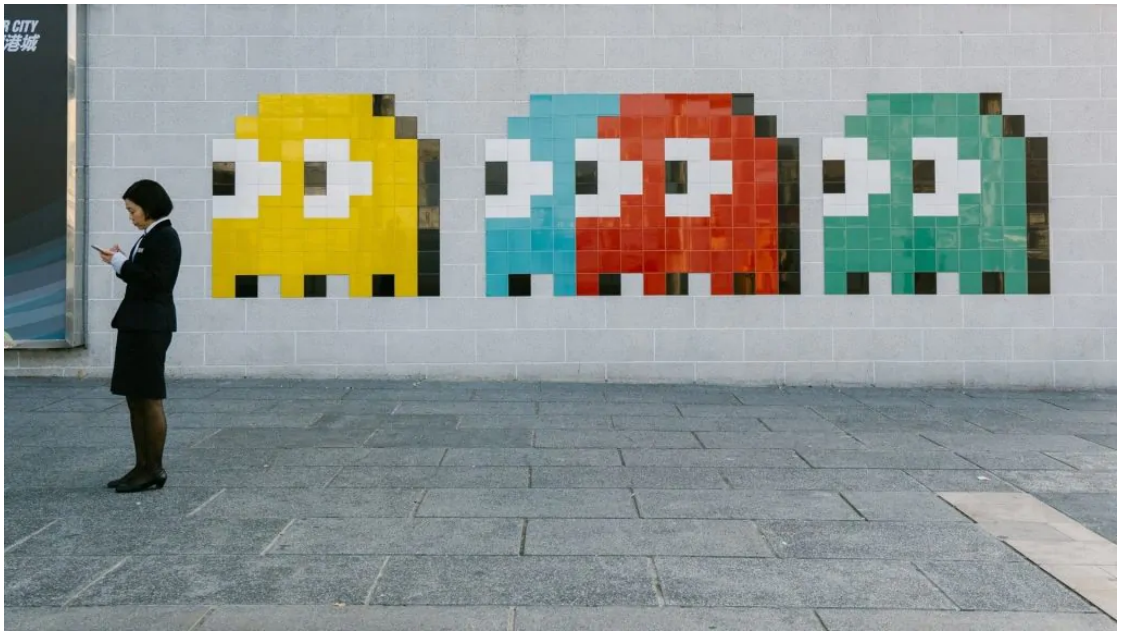
Par Will Wright

Jeu sur Amiga, Amstrad CPC, Atari ST, Commodore 64, DOS et Mac OS, en 1990 sur ZX Spectrum et enfin en 1991 sur Amiga CDTV, Super Nintendo et Windows 3.x.

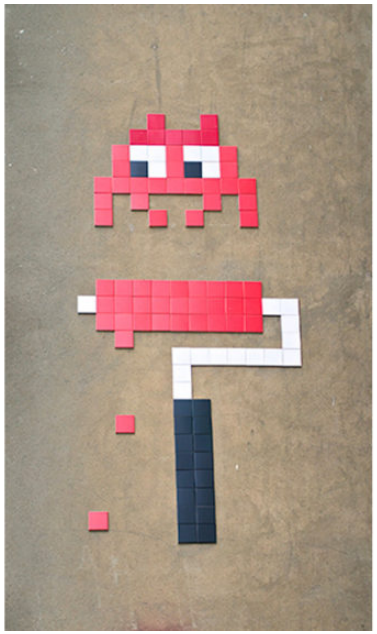
Tomographie : Hanjie, Nonogram, Picross...



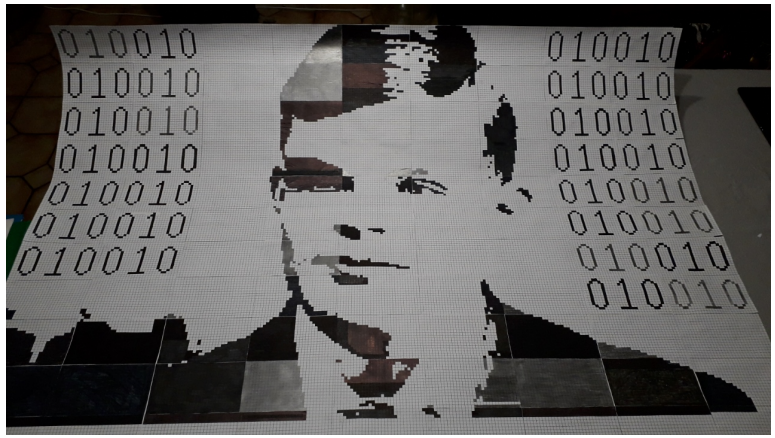
Real Life ...



Real Life ...


Posters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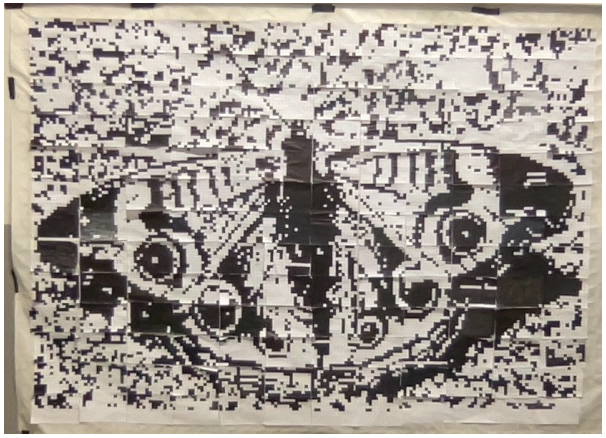

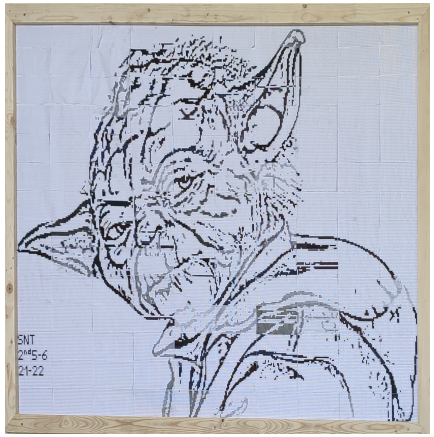
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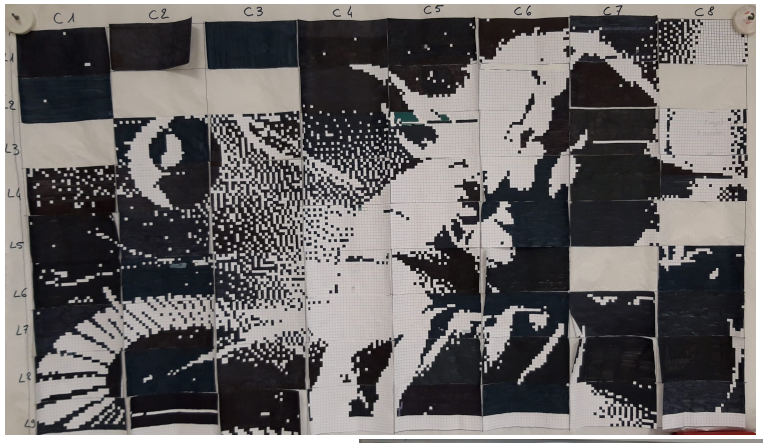
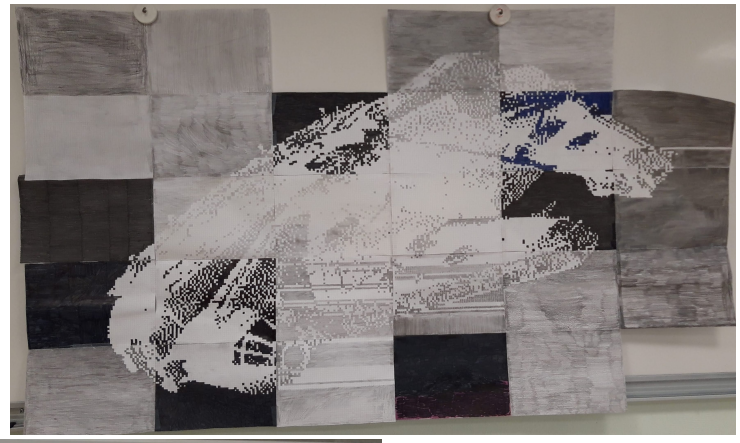
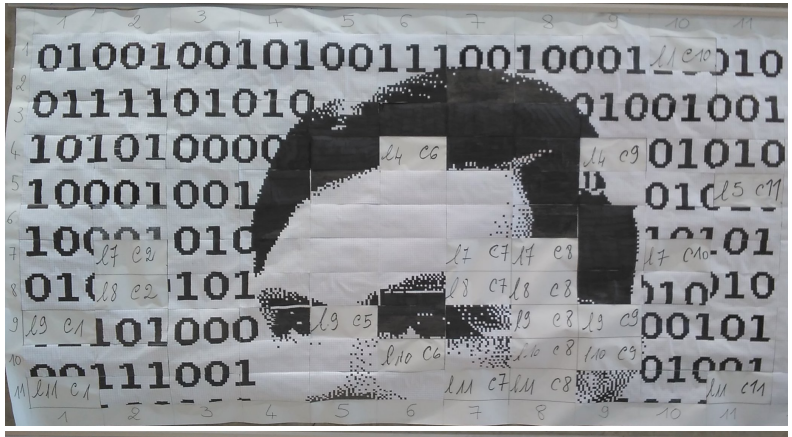
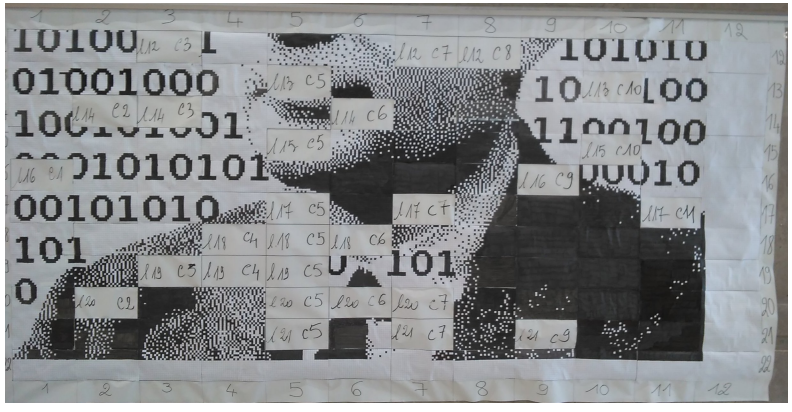
21-22

Posters

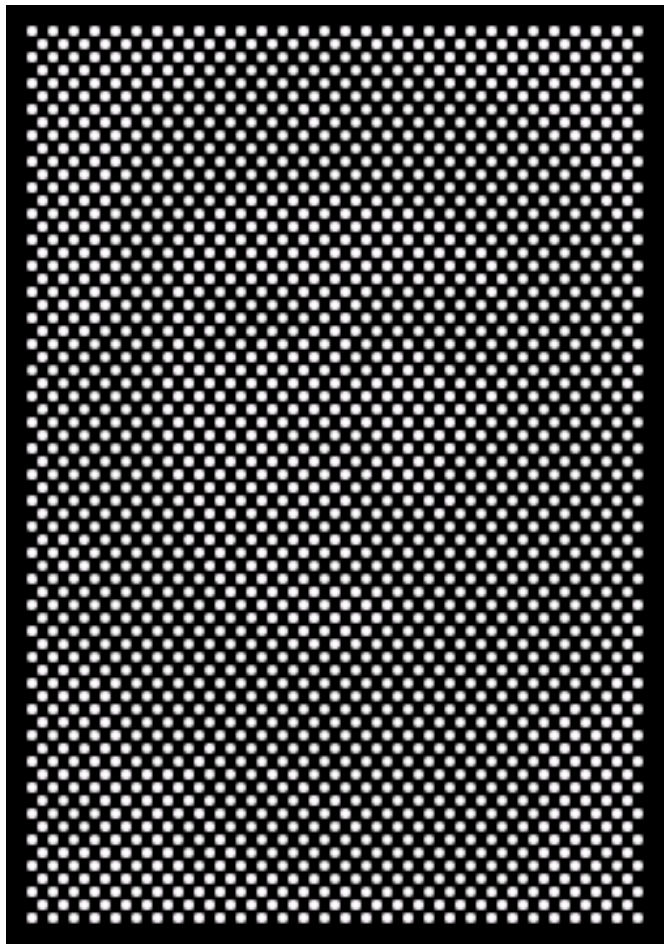




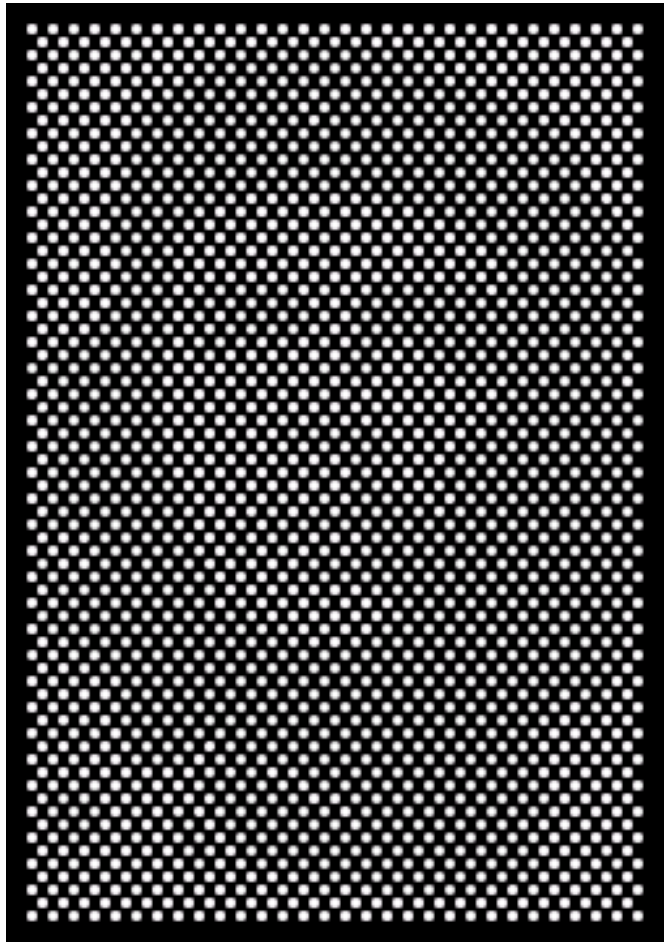


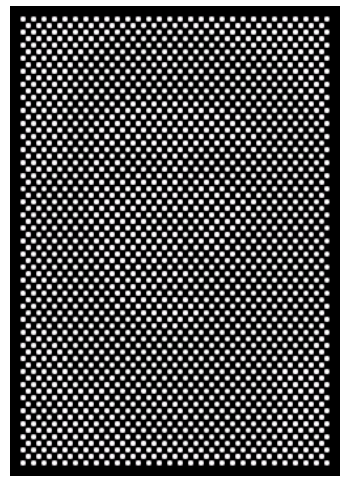


Qui est-ce ? by Calv, 2009



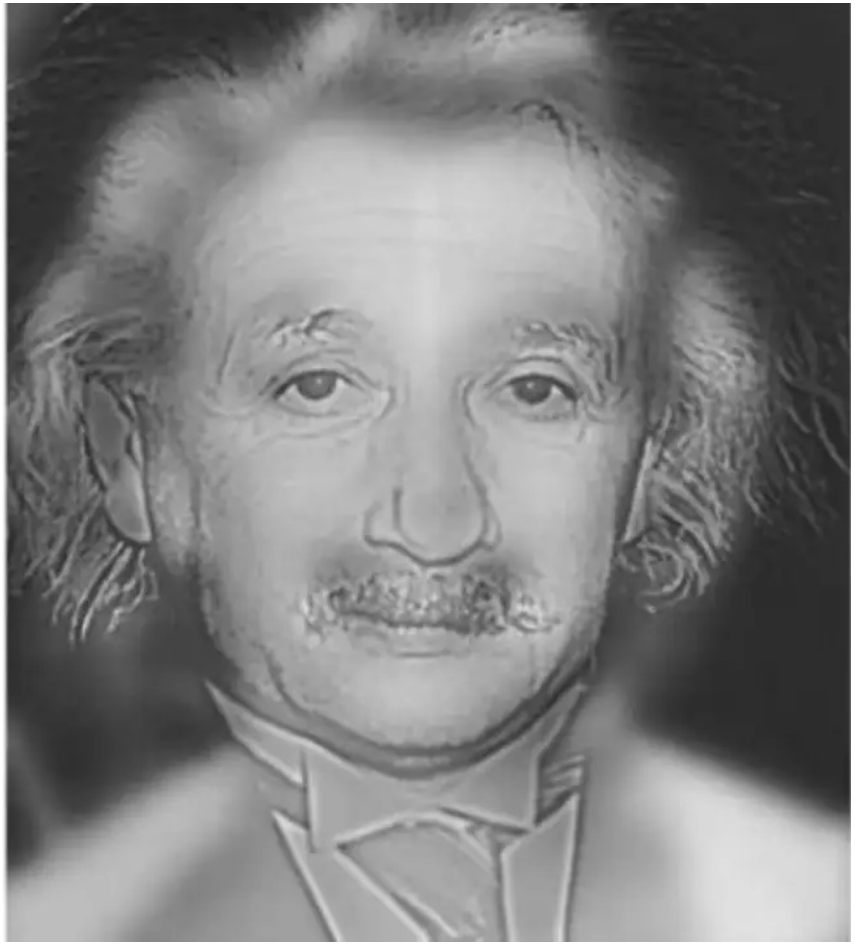
Qui est-ce ? by Calv, 2009



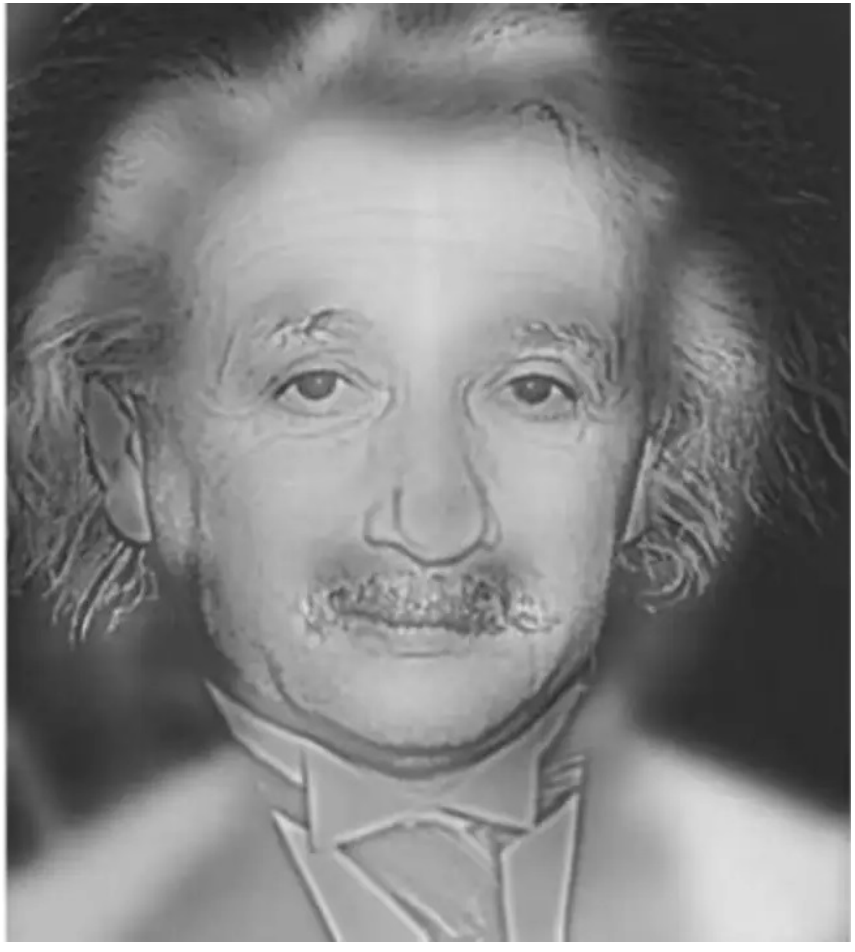


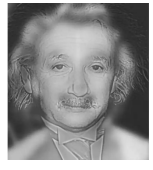
My Wife and My Mother-in-Law, 1915 William Ely Hill

MIT, 2009

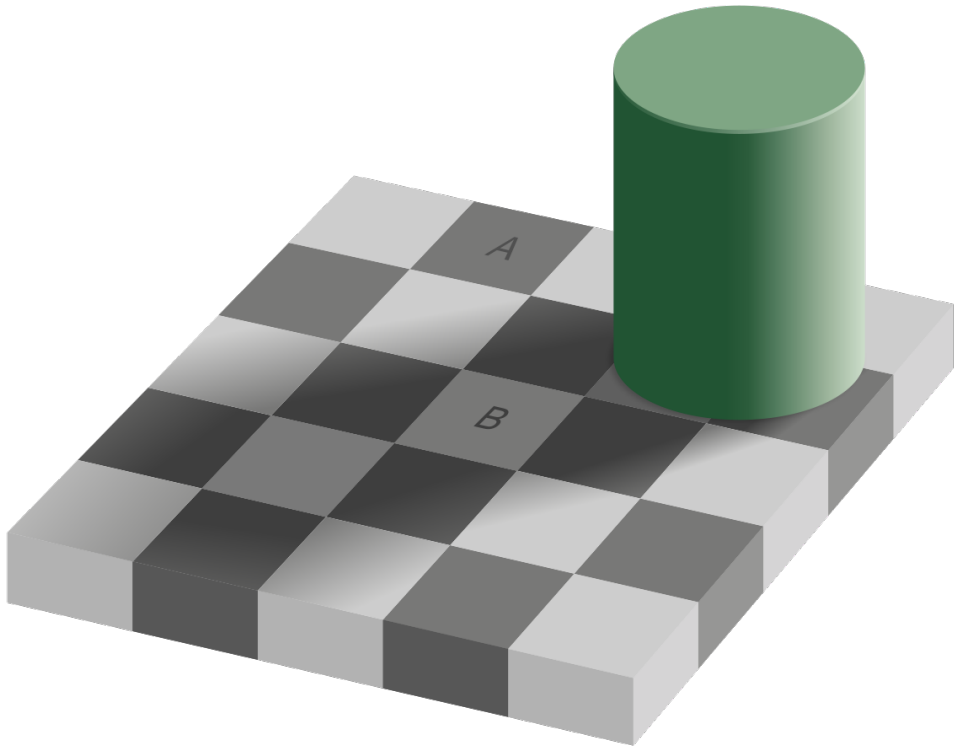


MIT, 2009

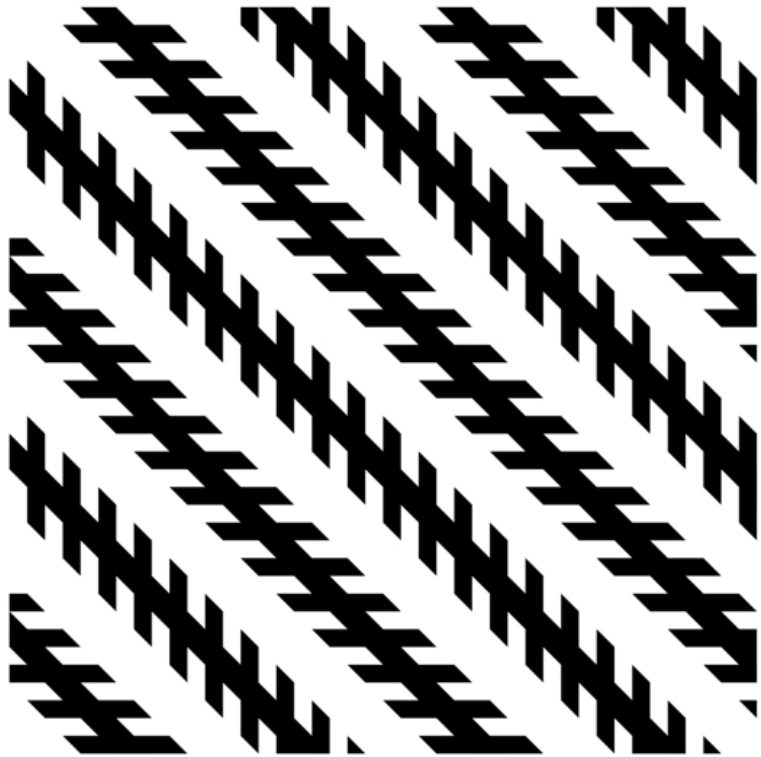




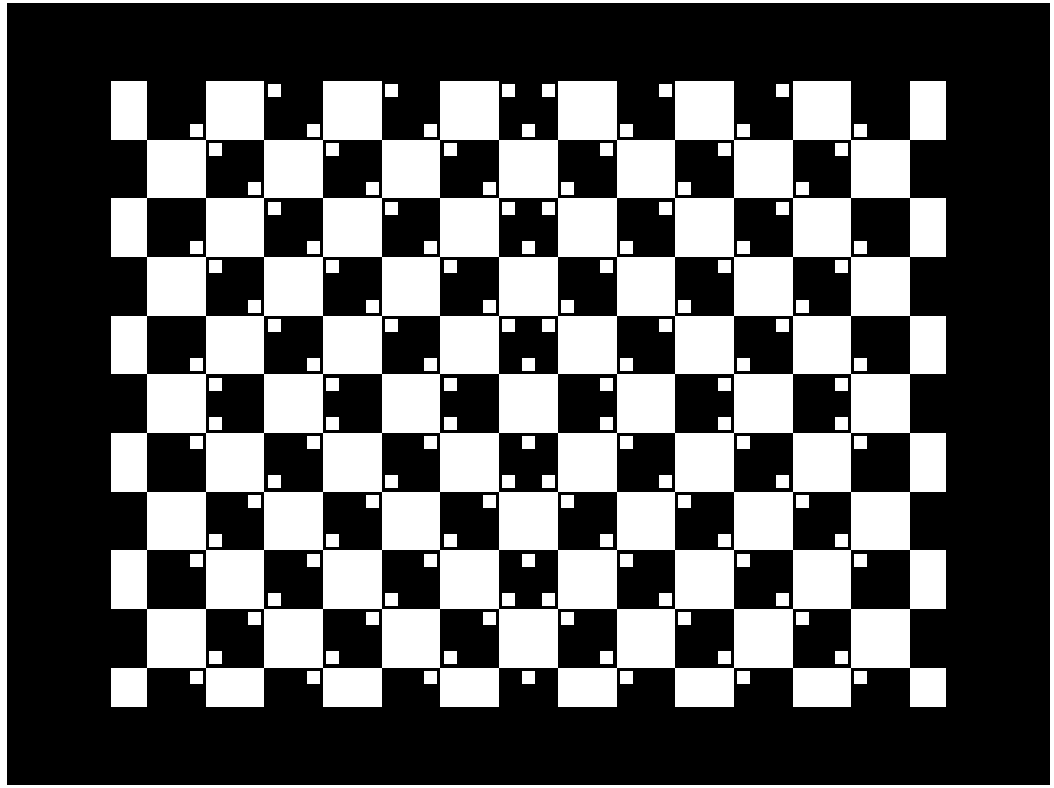
Échiquier d'Adelson



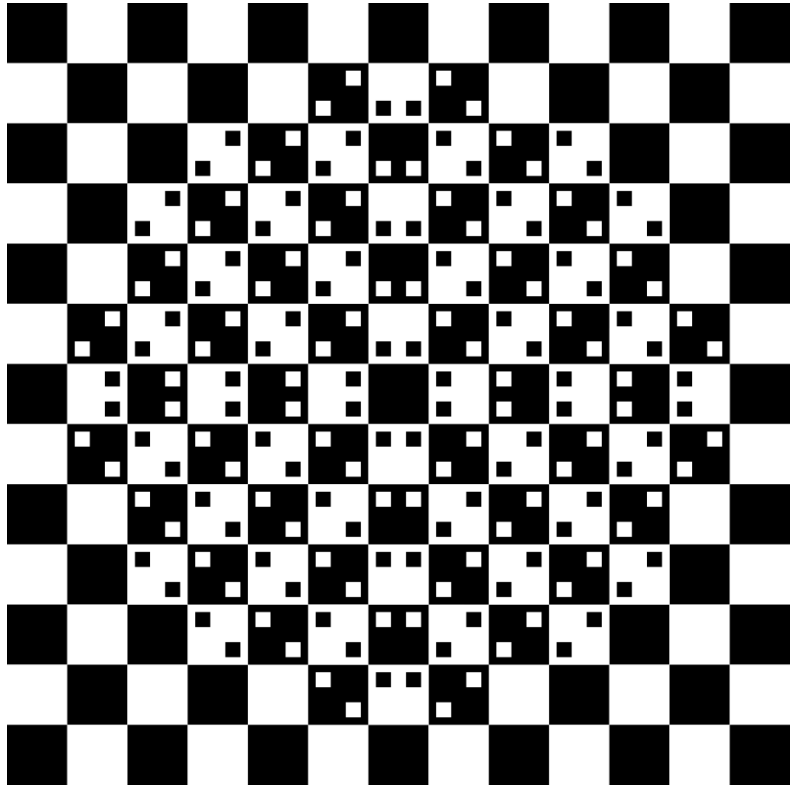
Zollner, 2013



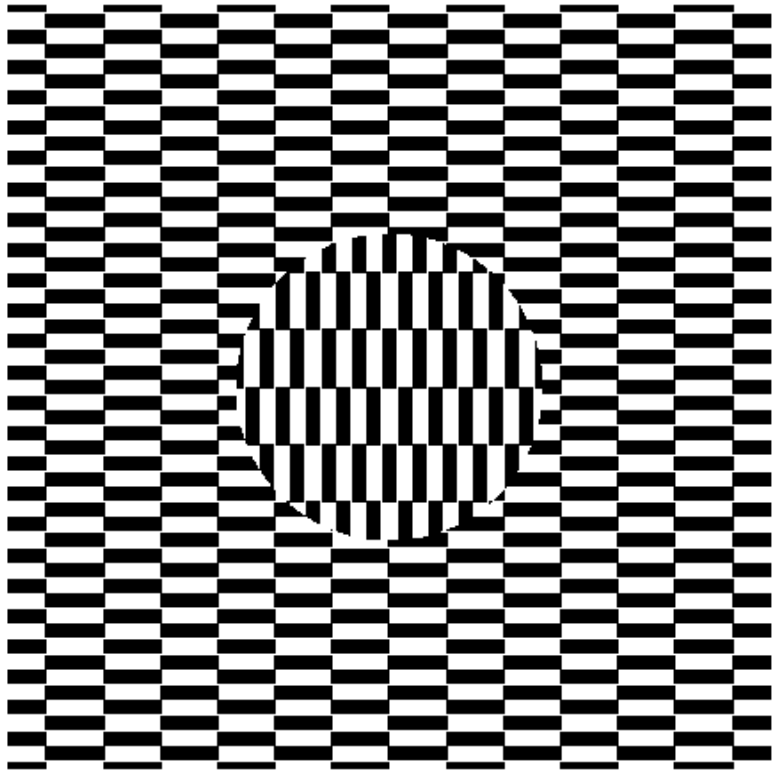
Forever 14, 2013



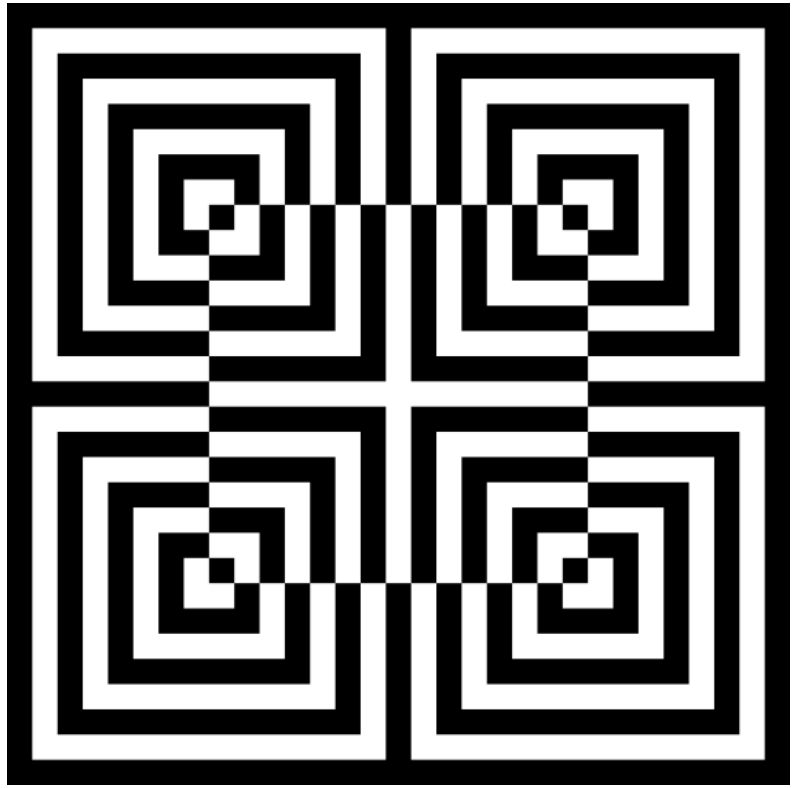
Hall checker, 2020



L'illusion d'Ouchi et la perception du mouvement



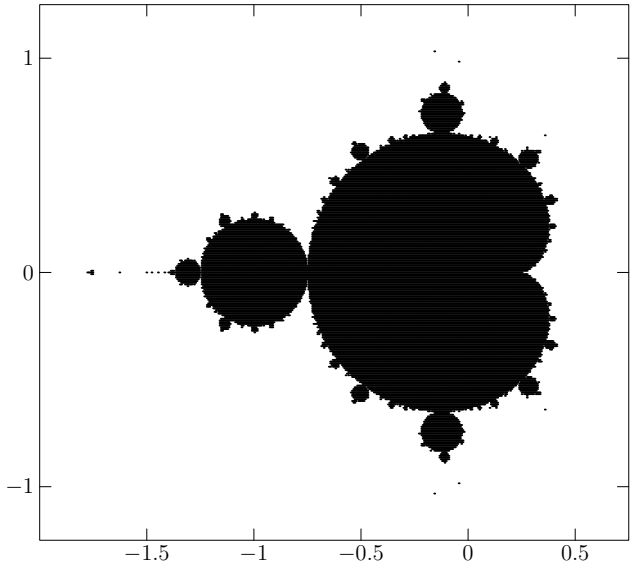
Mouvement



Conclusion

« Une formule peut être très simple
et créer un univers d'une complexité infinie. »
Benoît Mandelbrot, 2010.

$$\begin{cases} z_0 = 0 \\ z_{n+1} = z_n^2 + c \end{cases}$$



Une fractacle est un moyen de voir l'infini.

Merci de votre attention !

Derrière les images numériques se cachent des pixels !

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