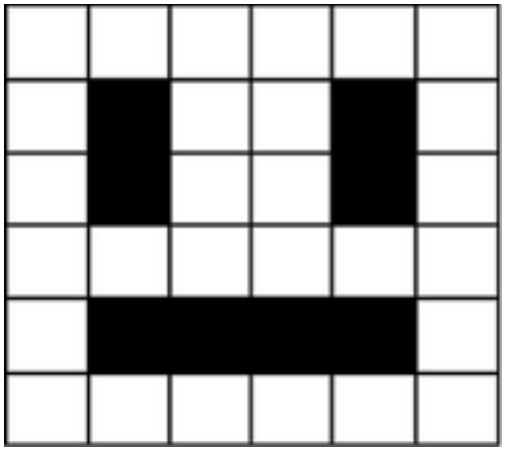
CSULB
CECS100

Lab 7
How do computer store images

To store an image on a computer, the image is broken down into tiny elements called pixels. A pixel (short for picture element) represents one color. An image with a resolution of 1024 by 798 pixels has 1024 x 798 pixels (817,152 pixels).

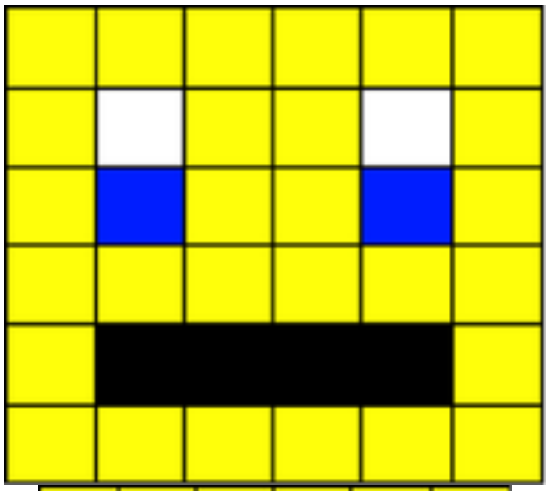
In order for the computer to store the image, each pixel is represented by a binary value. We call this representation of colors a “bit-plane”. Each bit doubles the number of available colors i.e. 1-bit would give us 2 colors, 2-bits would give us 4 colors and 3-bits would give us 8 colors etc.
In a monochrome (two color) image, like the example below, just 1 bit is needed to represent each pixel e.g. 0 for white and 1 for black.



Images are stored in scan lines. Each line is encoded from left to right, top to bottom. The image here would receive the following binary values:

0	0	0	0	0	0
0	1	0	0	1	0
0	1	0	0	1	0
0	0	0	0	0	0
0	1	1	1	1	0
0	0	0	0	0	0

In an image that uses 4 colours, 2 bits are needed for each pixel. The following example uses two bits to store the following colours:
00 – White; 01 – Black; 10 – Yellow; 11 – Blue



10	10	10	10	10	10
10	00	10	10	00	10
10	11	10	10	11	10
10	10	10	10	10	10
10	01	01	01	01	10
10	10	10	10	10	10

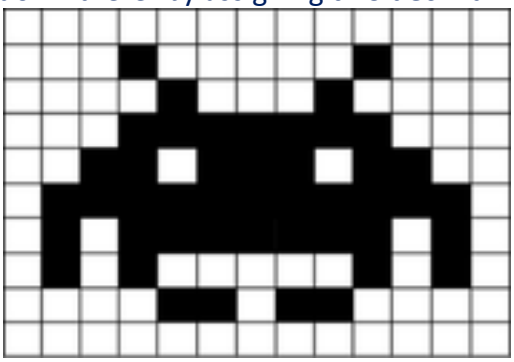
In order for the computer to interpret the image, the computer needs to know the following:

- Color depth – how many bits represent each pixel
- Resolution - Width & Height (in pixels)

We call this extra piece of information “metadata”.

Part I

- Open a spread sheet
  - Draw the picture -down there- by assigning **two decimal values to each cell**.



- Copy and paste the values from spreadsheet to your document

- Then create an image using conditional formatting (0-white, 1- black)
- Home > Conditional Formatting > New Rule
- Copy and paste the spread sheet again to your document (showing the colors this time)
- **Explain how a 16 color** image can be represented in binary

On the same spread sheet create **an image of your initials** using your own choice of colors and values.

Part II

Create a table with each character (letter) of your name written in **ASCII** code and **unicode**
Include all the values (The char, bin, dec, hex) in the table