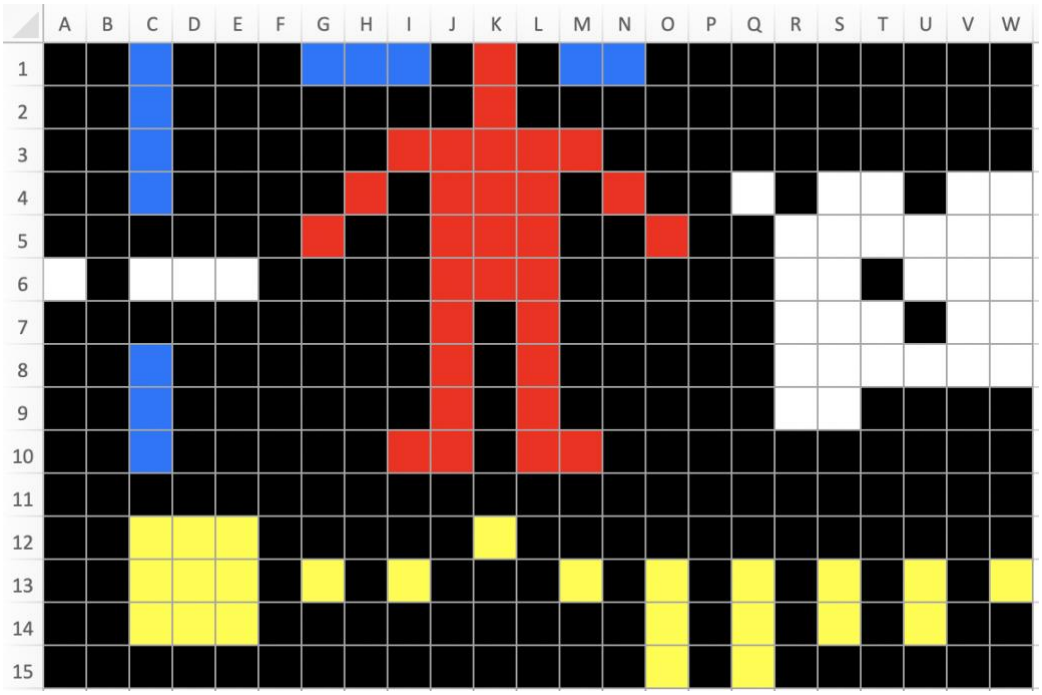
Arecibo Message 👽 - Compression Run Length Encoding

Answer sheet - decoded, colour

The resulting image should look like this.



The red humanoid represents humans on Earth and its height is given by the vertical blue bar to the left enclosing a number in white (it is the number 14 - you would calculate the figure's height by multiplying 14 by the wavelength in which the message was sent: 12.6cm = 176.4cm). The large white block on the right is the population of Earth (as it was in 1974, about 4 million). In yellow below the Solar System has nine planets (as Pluto is still included, not being recategorised as a dwarf planet until 2006).

Binary - encoded frequency / data pairs

(2 0) (1 1) (3 0) (3 1) (1 0) (1 1) (1 0) (2 1) (11 0) (1 1) (7 0) (1 1) (14 0) (1 1) (5 0) (5 1) (12 0)
(1 1) (4 0) (1 1) (1 0) (3 1) (1 0) (1 1) (2 0) (1 1) (1 0) (2 1) (1 0) (2 1) (6 0) (1 1) (2 0) (3 1)
(2 0) (1 1) (2 0) (7 1) (1 0) (3 1) (4 0) (3 1) (5 0) (2 1) (1 0) (3 1) (9 0) (1 1) (1 0) (1 1) (5 0)
(3 1) (1 0) (2 1) (2 0) (1 1) (6 0) (1 1) (1 0) (1 1) (5 0) (6 1) (2 0) (1 1) (6 0) (1 1) (1 0) (1 1)
(5 0) (2 1) (6 0) (1 1) (5 0) (2 1) (1 0) (2 1) (35 0) (3 1) (5 0) (1 1) (14 0) (3 1) (1 0) (1 1) (1 0)
(1 1) (3 0) (1 1) (1 0) (1 1) (1 0) (1 1) (1 0) (1 1) (1 0) (1 1) (1 0) (1 1) (2 0) (3 1) (9 0) (1 1)
(1 0) (1 1) (1 0) (1 1) (1 0) (1 1) (16 0) (1 1) (1 0) (1 1) (6 0)

If you compressed the data completely you could express it as (99 1) (246 0) but you'd lose the message's structure!

AQA Teaching Guide: Run Length Encoding: https://filestore.aqa.org.uk/resources/computing/AQA-8525-TG-RLE.PDF
Craig 'n' Dave on Run Length Encoding; https://www.youtube.com/watch?v=UyOARO7UVdw