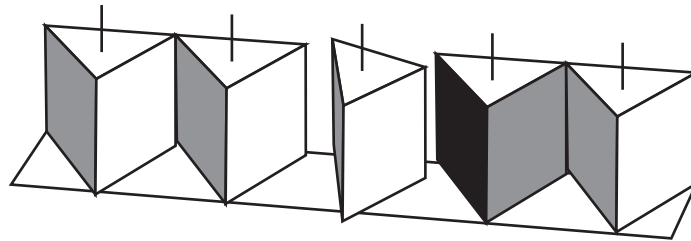


4 Computer Graphics and Image Processing (NAD)

- (a) Describe, in detail, an algorithm to perform error diffusion on a greyscale image. Your algorithm should take a greyscale image, with eight bits per pixel, and convert it to a black and white image, with one bit per pixel, at the same resolution. [8 marks]
- (b) An inventor produces a display where each pixel can have one of three values: white, mid-grey, or black. Such a display can be built by, for example, using rotating triangular blocks of painted wood. The figure shows the back view of a row of five pixels with the central pixel turning. From left to right the pixels are showing, to the front side: black, black, turning, white, black.



Modify your algorithm in part (a) to handle these three-valued pixels. [4 marks]

- (c) Describe, in detail, the modifications required to turn the display described above into a colour display. Your display, through use of an appropriate error diffusion algorithm, should be able to display error-diffused versions of 24-bit RGB colour images. [8 marks]