Computer Graphics and Image Processing

(a) Most liquid crystal displays divide a pixel into three sub-pixels coloured red, green, and blue. Explain why this is so. [4 marks]

(b) Some liquid crystal displays divide a pixel into four sub-pixels coloured red, green, blue, and white. Explain why this might be useful, what advantages it has, and what limitations it has. [6 marks]

(c) Compare and contrast half-toning and error diffusion. Include in your answer an explanation of the situations in which each is superior to the other. [6 marks]

(d) One method of anti-aliasing is to sample at high resolution, $n \times n$ higher than the final image, and then to average each block of $n \times n$ pixels to give a single pixel value. Discuss the advantages and disadvantages of using

(i) Gaussian blurring, and

(ii) median filtering

in place of simple averaging. [4 marks]