3 Computer Graphics and Image Processing (PR)

(a) What are the main criteria to be considered in the design of a line drawing algorithm for a raster graphics display? [2 marks]

(b) Describe an algorithm to fill a series of pixels running from \((x_0, y_0)\) to \((x_1, y_1)\) that meets these criteria, explaining why it does so. Answers should consist of more than a fragment of pseudo-code. [6 marks]

(c) A new volumetric display stores an image as a three-dimensional array of volume elements or voxels. Reformulate the design and implementation of the line-drawing algorithm to fill a series of voxels running from \((x_0, y_0, z_0)\) to \((x_1, y_1, z_1)\). [6 marks]

(d) How would this line-drawing algorithm be used to draw Bézier curves in three dimensions? [6 marks]