

OLLSCOIL NA hÉIREANN
The National University of Ireland

THE NATIONAL UNIVERSITY OF IRELAND, GALWAY

SEMESTER 1 EXAMINATIONS 2002/2003

CT336

GRAPHICS AND IMAGE PROCESSING

H. Dip. (Software Design and Development), 3rd B. A. (IT), 4th B. A. (IT)

Professor D. Bell

Professor G. Lyons

Dr. A. Brennan

Candidates are required to answer **Four** questions.

All questions carry equal marks.

Time allowed: **TWO hours**

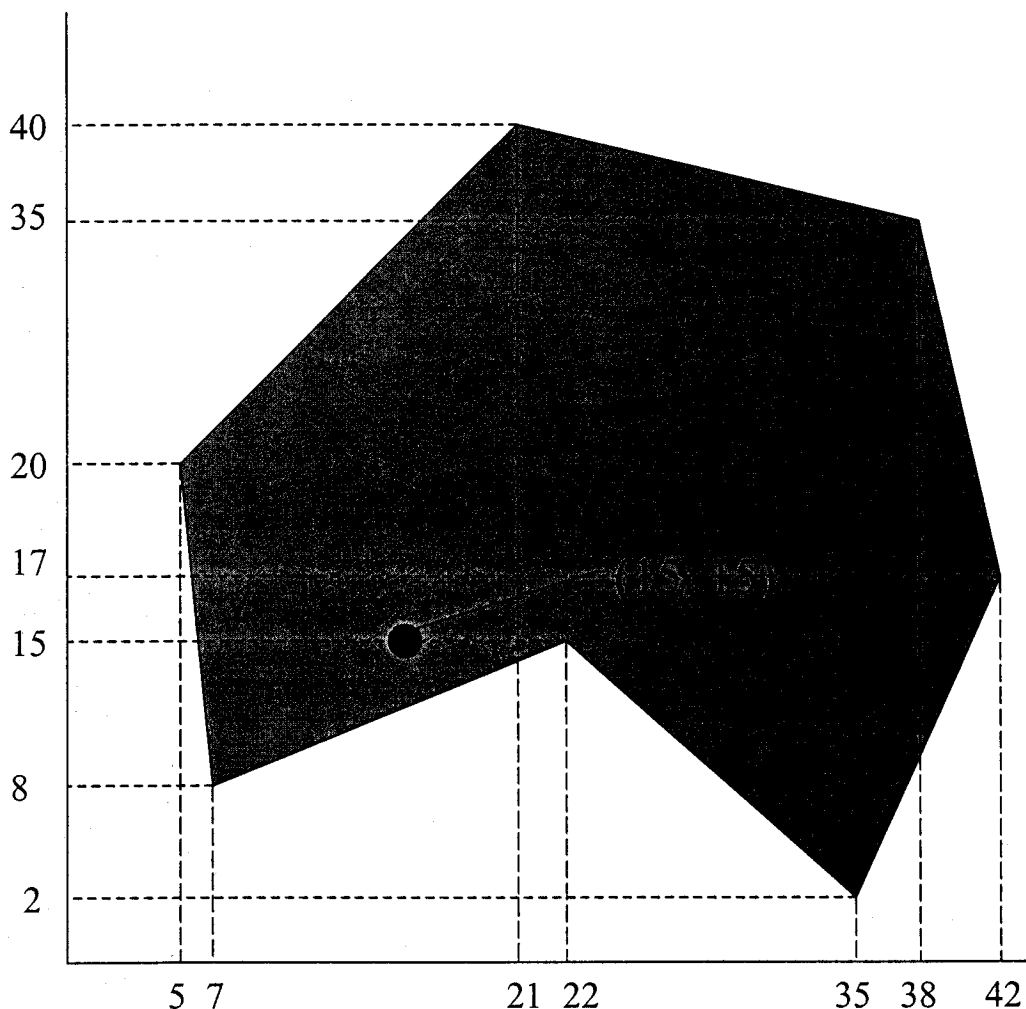
- Q. 1**
- Using the Huffmann encoding technique, compress the following; phrase; "Computer Systems" (12)
 - Discuss the evolutions in spoken language and written language (8)
 - Using the Run Length Encoding (RLE) technique, compress the following string of data AAAAABBBCCCCCAAAAATTTTTTTTTTTT. (5)
- Q. 2**
- Discuss the tri-stimulus theory and its applicability to computer graphics and the display of colour. (11)
 - What are the 6 steps to optimising web graphics ? (8)
 - Explain 3 of the following terms (use examples) – interlacing, lossless compression, pictographs (use an example), rebus (use an example). (6)
- Q. 3**
- Compare and contrast bitmap and vector drawings (outlining areas where each is best employed). (11)
 - Discuss the advantages and disadvantages of indexed colour. (8)
 - If the colour depth is set at 6 bytes. What is the assignment of bits for RGB? and the range of possible values for RGB respectively ? (6)

Q. 4

- Describe the six primary transformations in 2-D/3-D graphics (use examples). (10)
- Discuss in detail the main graphic principles relating to Balance. Use examples. (10)
- If the height and width of a half tone cell is 4 half tone spots, how many half tone cells can be generated? Draw the grey levels that can be simulated in these half tone cells. (5)

Q. 5

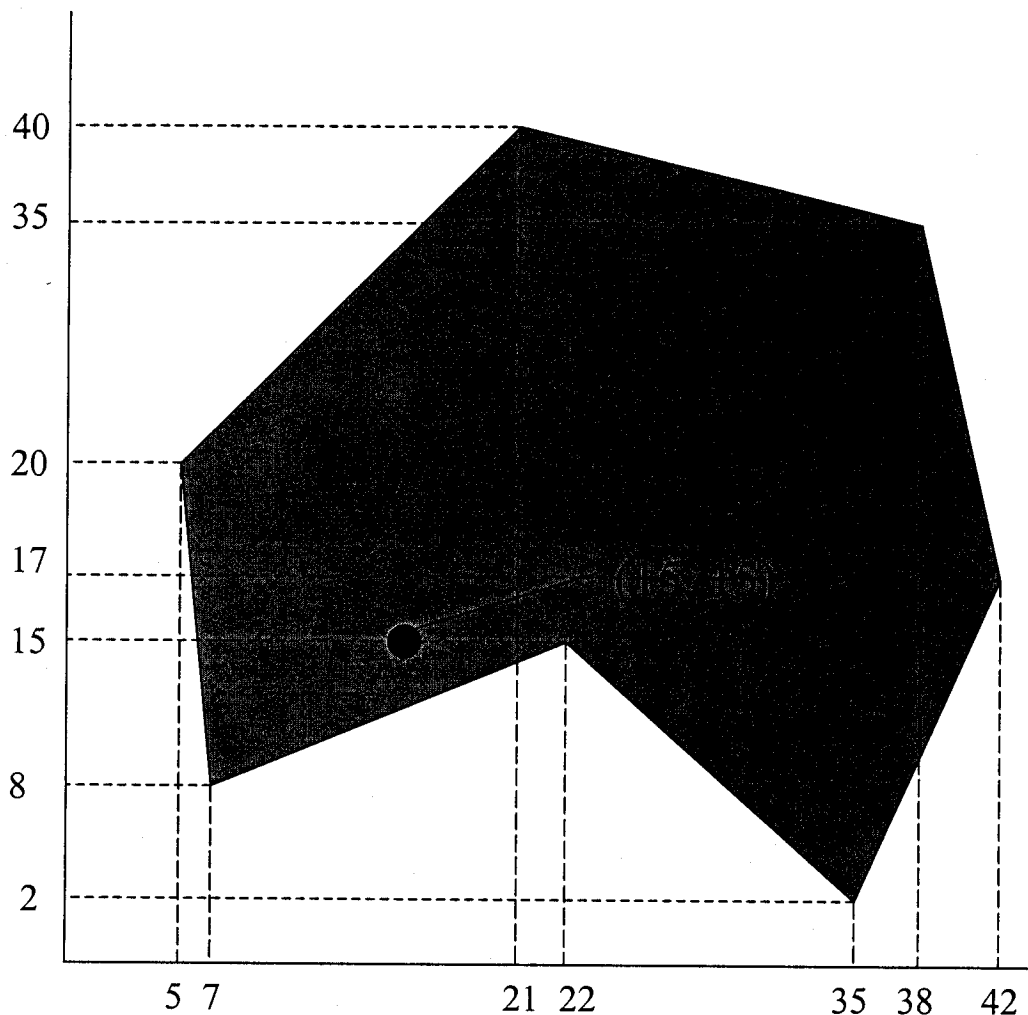
- Using the method for scaling relative to a fixed point, scale the following diagram relative to the fixed points where $F_x = 15$ and $F_y = 15$ and $S_x = 4$, $S_y = 2$. (13)
(draw the resultant scaled diagram)



- What are the differences between, complementary, split-complementary, triad and analogous colours? (6)
- If the printer resolution is 600 dpi and the screen resolution is 37 lpi, what is the width/height of each half tone cell? (6)

Q. 6

Rotate the following diagram by 40 degrees anticlockwise relative to the origin (0, 0).
(14)



- Explain the differences between emissive and non-emissive displays? (8)
- Explain 3 of the following terms –device co-ordinates, setpixel, interior and exterior clipping, subtractive colours. (3)

Q. 7

- Explain the working of the standard video monitor based on the CRT (cathode ray tube) design. (12)
- Visual Basic : Explain the difference between forms, controls, event subprocedures, events and methods. (7)
- Explain 3 of the following terms – design form, depth cueing, rendering frame buffer. (6)