

**UNIVERSITY COLLEGE LONDON**

University of London

**EXAMINATION FOR INTERNAL STUDENTS**

For The Following Qualifications:-

*Eng.D. M.Sc.*

**Generative Space, Form and Behaviour**

**COURSE CODE : BENVAC05**

**DATE : 09-MAY-06**

**TIME : 14.30**

**TIME ALLOWED : 2 Hours**

**BENVAC05 Generative Space, Form and Behaviour**

ANSWER BOTH PARTS A AND B

**You must answer question 1 in PART A and 2 questions from PART B****PART A (Compulsory)****Answer all of question 1:**

1. Choose a specific implementation of generative, evaluative or simulation algorithm used in a design context. This may be based on any of the examples given in the course lectures or one of your own choosing.
  - a) Describe the function of the algorithm and its advantages over other techniques used for similar design problems. (15 marks)
  - b) Explain how the application of this algorithm enhances the user's creative process, and explain to what degree the algorithm itself can be considered to exhibit creativity. (15 marks)

**Total 30 marks for Part A****PART B****Answer TWO and only two of the following four questions (all sections of each):**

2.
  - a) Explain the differences and the similarities between *genetic algorithms* and *genetic programming*. (25 marks)
  - b) How might *genetic programming* be used in design? (10 marks)
3.
  - a) Class four cellular automata are capable of generating complex and unpredictable behaviour from very simple, deterministic rules. How can the same principle be used in generating form? (25 marks)
  - b) Describe some architectural systems that exhibit a similar kind of emergent complexity. (10 marks)

**(PART B CONTINUED OVERLEAF)**

(PART B CONTINUED)

- 4.
- a) Feedforward multilayer perceptrons and a Kohonen networks are both examples of artificial neural networks. Explain the difference between the two. (15 marks)
- b) Show how each of the above may be used. Give examples. (20 marks)
- 5.
- a) What are the conceptual differences between a standard CAD system, a parametric CAD system, and a programmable, generative CAD system? (15 marks)
- b) What are the practical advantages of each system? (10 marks)
- c) In *On Growth and Form*, D'Arcy Thompson suggests that the form of living things is not predetermined genetically, but is a result of precise mathematical principles and the physical environment. How is this concept similar to the working method implied in parametric design. (10 marks)

**Total for Part B: 70 marks**

END OF EXAM