

Marking Scheme for Question 1

Basics of Computational Finance and Economics

- (a) What is computational finance and economics? [10%]

[Marking scheme:

Students were told in the lectures that there is no concrete definition of computational finance and economics. Like Artificial Intelligence and many other relatively new disciplines, computational finance and economics is defined by the research activities in the community. Students are expected to name some of the research activities in the community, such as forecasting, artificial markets, automated bargaining.]

- (b) How do advances in hardware and software impact the research in finance and economic research? Justify your answer carefully. [30%]

[Marking scheme:

10% will be awarded to each and any valid points. Below are examples of valid points. Answers must show students' true understanding of these points.

What can be done now:

Large scale simulation
Data warehouse
Building complex models
Efficient exploration of models
Decision support

Enabling technology:

Must faster machines
Much cheaper memory
Agent-technology
Evolutionary computation
experimental game theory, constraint satisfaction

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- (c) Describe two examples research areas in computational finance and economics. How are these two research areas affected by the advances in hardware and software? [60%]

[Marking scheme:

Marks will be awarded to any valid examples, 30% per example. Below are two valid examples, each of which was covered in one 3-hour lecture plus research papers. Other examples include artificial stock market, risk modelling.

Example 1: Financial forecasting, e.g. EDDIE

This is enabled by

- the availability of data,
- advances in data mining technology (such as neural networks and evolutionary computation) and
- faster computers (which allows one to explore more models more quickly)

Example 2: Automated bargaining

This is enabled by

- better model generation and evaluation tools such as genetic programming,
- constrained fitness functions (which improves search efficiency) and
- faster computers (which allows very large number of rounds of generation and test).

For each example, 15% will be awarded for correct description of the research agenda (i.e. what is being investigated and why); 15% will be awarded to correct description of why they are affected by advances in hardware and software. The former is bookwork and the latter demands true understanding of the subject.

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