



University College Dublin  
An Coláiste Ollscoile, Baile Átha Cliath

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**AUTUMN TRIMESTER EXAMINATIONS**  
**ACADEMIC YEAR 2019/2020**

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**COMP 30240 & COMP 41400**  
**Multi-Agent Systems**

**Assignment Project Exam Help**

Prof. J. Pitt

Dr Chris Bleakley

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**Time Allowed: 2 Hours**

**Instructions for Candidates**

Answer any two questions. All questions carry equal marks  
Total marks available 100

Student Number

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**Instructions for Invigilators**

Collect both answer sheet and question paper at the end of the exam

- Q.1. (a) Explain in detail what is understood by the term *Belief Desire Intention Architecture (BDI)*.

[10 Marks]

- (b) Explain and describe those data structures typically utilised within BDI models to deliver the concepts of *Beliefs*, *Belief Rules*, *Events/Perceptions*, *Commitments* and *Plans*.

Illustrate your answer with diagrams and in particular illustrate the interaction between such data structures in delivering deliberative reasoning.

[ 20 Marks ]

- (c) Describe the core constructs provided within AgentSpeak(L).

Within your answer provide illustrative examples for each class of construct.

**Assignment Project Exam Help** [ 20 Marks ]

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- Q.2. (a) Explain the essence of Speech Act Theory and why this has been so influential within the development of Multi-Agent Systems (MAS).

[ 15 Marks ]

- (b) Briefly contrast *weak migration* and *strong migration* within agent mobility.

[ 10 Marks ]

- (c) Explain in detail three broad approaches in adopting agents to deliver *Intelligent Wireless Sensor Networks (WSNs)*.

[ 25 Marks ]

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- Q.3. (a) Sandholm identified a desirable set of properties often associated with multi-agent negotiation protocols. Describe these.

[ 15 Marks ]

- (b) Explain briefly why auctions often form an important mechanism within multi-agent systems.

[ 5 Marks ]

- (c) Identify and briefly explain the dimensions under which auction protocols can be characterised.

[ 10 Marks ]

- (d) Explain in detail the *Vickrey Auction*.

Your answer should include pseudo code to illustrate the process.

Assignment Project Exam Help [ 5 Marks ]

- (e) Comment briefly why the Vickrey Auction has received such attention within the multi-agent systems literature.

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[ 5 Marks ]

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Q.4. (a) Explain the term *Social Robotics*.

[ 5 Marks ]

(b) Explain briefly what is meant by *reactive reasoning* and *deliberative reasoning*, subsequently explain why it is important to accommodate both *reactive* and *deliberative* reasoning within *social robotics*.

Illustrate your answer with examples.

[ 10 Marks ]

(c) Describe in detail the Social Robotic Architecture, explaining each of the constituent architectural layers together with their interactions.

[ 20 Marks ]

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(d) Compare & contrast the Social Robotics Architecture with the *Saphira* robot architecture.

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[ 15 Marks ]

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