OLLSCOIL NA hÉIREANN
THE NATIONAL UNIVERSITY OF IRELAND

COLÁISTE NA hOLLSCOILE, CORCAIGH
UNIVERSITY COLLEGE CORK

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CS3311 Middleware

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Time 1.5 Hours

Answer All Questions
Total Marks 70

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ENSURE THAT YOU HAVE THE CORRECT EXAM PAPER

Question 1 [20 marks]

Distributed applications consist of software components running on computing platforms that can be different in terms of hardware and software.

a. What challenges of distributed systems are tackled by middleware?

[5 marks]

b. Adaptation of content downloaded by mobiles can be executed on the server or on the client side. Compare the two solutions based on their requirements. Also, discuss the kind of resources each approach would consume on the server or the client side.

[10 marks]

c. Explain the summarization and filtering adaptation method.

[5 marks]

Question 2 [20 marks]

Let's consider a large organisation with several server sites networked. As the set of services on offer changes during the time, middleware for service discovery and remote execution is required. The deployment and use of discovery and remote execution services are based on a set of decisions. Assuming you will make these decisions, follow steps a, b and c below that should lead to a workable solution.

a. Adopt an architectural solution for the discovery service, either directory-based or Peer-2-Peer, and explain your decision in the context of a large organisation. Why do you choose one approach and not the other one?

[5 marks]

b. Devise in pseudo-code the protocols for service registration, service discovery and remote execution. Is there any other protocol or service that you will include in the system? For example, you may consider how the service provider and the client are getting in contact with the discovery service.

[10 marks]

c. Analyse your approach in regard to service provisioning and scalability. For example, what happens if a service suddenly stops? Or, what happens if the number of clients is increasing very much over a short period of time?

[5 marks]

Question 3 [15 marks]

Event notification is a very popular middleware service.

a. Explain the publisher-subscriber paradigm. What are the attributes of an event and how are they useful?

[5 marks]

b. Draw the model of the publisher-subscriber supporting architecture that provides for scalability of the service and explain the roles played by the new additions. How is scalability achieved?

[10 marks]

Question 4 [15 marks]

Mobile middleware for mobility management uses proxies and cache memory.

a. Explain the roles played by proxies and cache memories in mobility management.

[5 marks]

b. Describe how the move-out and move-in functions work by presenting their sequence of operations. Is the execution of these two functions error-free? If not, identify a possible error and propose a solution to reduce/eliminate it.

[10 marks]