UNIVERSITY OF COLOMBO, SRI LANKA



UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

BACHELOR OF SCIENCE IN COMPUTER SCIENCE
BACHELOR OF SCIENCE IN INFORMATION SYSTEMS
BACHELOR OF SCIENCE HONOURS IN COMPUTER SCIENCE
BACHELOR OF SCIENCE HONOURS IN SOFTWARE ENGINEERING
BACHELOR OF SCIENCE HONOURS IN INFORMATION SYSTEMS

Academic Year 2021/2022 - Third Year Examination - Semester I - 2021

SCS3203/IS3108 Middleware Architecture

TWO (2) HOURS for both Part A and Part B



Part A

To be completed by t	the candidate
Examination Index No:	

Important Instructions to candidates:

The medium of instruction and question is **English**.

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Note that questions appear on both sides of the paper. If a page is not printed, please inform the supervisor immediately.

Write your index number on each and every page of the Question paper.

This paper has **02** questions and **09** pages.

Answer **ALL** questions. All questions carry equal marks (25 marks).

This paper consists of two parts, Part A (Question No 1 and Question No 2) and Part B (Question No 3 and Question No 4) and submit separately.

Any electronic device capable of storing and retrieving text including electronic dictionaries and mobile phones are **not allowed**.

Calculators are not allowed.

For Examiner's use only Question Marks	
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Total	

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(i)	State the importance of the communications link and the protocol, elements in a middlew	are. [2 Mark
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	and and and and and the same and	
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ii)	State two (2) elements out of four (4) elements of middleware, which ensure the require	d degree
	performance, reliability etc.	[2 Mar
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<u></u>		
i)	State and briefly explain the two types of scalabilities in a distributed system using suitable	e diaorai
· <i>)</i> 	State and offerty explain the two types of seatabilities in a distributed system using saltabilities.	[6 Mar
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	Index No:	
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(ii)	Mention two (2) system failures in middleware and briefly explain each of them.	[4 Marks]
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~	tate the difference between <i>Open group</i> and <i>Close group</i> . [4
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í	Total Order Multicast (TOM) is a property which needs to be applied in multicasting. Briefly
t	he TOM using a suitable diagram.
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Questi	on 2
a) (i)	State the importance of <i>stub</i> and <i>skeleton</i> generated by the Interface Definition Language in Remote Procedure Calls.
	[4 Marks

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L	
(ii)	"It is a good practice to avoid using pointers in remote procedure calls", justify this statement.
	[4 Marks
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		THE REPORT OF THE PARTY OF THE
(b)	SQL Parsing and Calling Stored Procedures are two methods used in Remote Database A Define and compare those two methods considering their advantages and disadvantages.	ccess.
Γ	Define and compare mose two methods considering their advantages and disadvantages.	[5 Marks
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	In order to ensure ACID properties, we use the <i>two-phase commit protocol</i> . Briefly explain phase commit protocol and how it works using a suitable diagram.	
_		[6 Marks
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	Index No:
d)	Briefly explain the significant failure of message queuing middlev

Briefly explain the significant failure of message queuing middleware using	a suitable example. [6 Marks]
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Question No	Marks
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Total	

i)	Describe Monolithic architecture and Micro-services architecture in yo	
	Monolithic Architecture:	[4 Mark
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	Micro-services Architecture:	
(ii)	Write down two (2) advantages and disadvantages of serverless compu	ting.
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(ii)	Write down two (2) advantages and disadvantages of serverless computed Advantages:	
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(ii)	Advantages:	
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(ii)	Advantages: Disadvantages:	iting. [4 Mar
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List down j	our (4) main cloud deploymen	t models.	
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List down J	Cour (4) main cloud deploymen	t models.	[4

eads.]

Questi	<u>on 4</u>
(a)	For the years JavaEE has evolved to a greater extent and been well recognized & adopted by the industry. One of the key highlights is that <i>JEE</i> getting its new name 'Jakarta EE' under the Eclipse Foundation.
(i)	JEE Server is considered to be one of the main components of JakartaEE specification. JEE Servers differ from the Java Web Servers (i.e. Servlet Containers). Name at least two (2) products available for each "JEE Server" and "Java Web Server" in the market.
	[4 Marks]
	JEE Server:
	Java Web Server:
(ii)	Name two (2) open-source Microprofile.io runtimes currently available in the market.
	[2 Marks]

i. ii. iii. iv. v.	Java Servlets EJBs Micro Services Architecture GraalVM Grafana Dashboards				
					$[2 \times 5 = 10 \text{ Mark}]$
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(b)

	which will be consumed by the front-end developers for developing the Fuel Filling Station Locato e application.
The f	unctionalities are listed but not limited to;
•	Add/View/Update/Delete fuel filling stations Self-register and login users
•	Rate/Comment real-time on fuel filling station stocks availability Search for fuel filling stations with stocks and shorter queues, etc.
Answ	rer questions (i) to (iv) based on the above scenario.
(i)	Pick a MicroProfile.io runtime of your choice and justify the selection. [2 Marks
	E IVIGIA
(ii)	Name and justify the "Content-type" you suggest for the communication between API and UI. [2 Mark

(c) Assume that you have been appointed as the lead engineer for implementing a Fuel Filling Station Locator

)	Name and justify the "Webservice type" you choose among SOAP, RI implement the API.		
			[2 M

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