Roll No.													

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST 1

Sem & AY: Odd Sem.2019-20 | **Date**: 30.09.2019

Course Code: CSE 314 | **Time**: 9.30AM to 10.30AM

Course Name: SOFTWARE ARCHITECTURE | **Max Marks**: 40

Program & Sem: B Tech (CSE) & VII DE | **Weightage**: 20%

Instructions:

(i) Read the question properly and answer accordingly.

(ii) Question paper consists of three parts.

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries six marks. (3Qx6M=18M)

1. Define the term "Software Architecture". Explain any two process recommendations that make a good architecture. (C.O.NO.1) [Knowledge]

2. Explain the pipes and filters architectural style with suitable example.

(C.O.NO.2) [Comprehension]

3. Describe any four key influencers on the software architecture in detail.

(C.O.NO.1) [Knowledge]

Part B [Thought Provoking Questions]

Answer the Question. The Question carries ten marks. (1Qx10M=10M)

4. Which architectural style would you adopt for "Whatsapp" group-messaging? Provide the rationale for your decision. Discuss the components, connectors, advantages and invariants of your chosen approach.

(C.O.NO.2) [Comprehension]

Part C [Problem Solving Questions]

Answer both the Questions. Each question carries six marks. (2Qx6M=12M)

5. Describe Architecture Business Cycle with neat diagram.

(C.O.NO.1) [Knowledge]

6. Illustrate various activities which are involved in creating software architecture.

(C.O.NO.2) [Application]

SCHOOL OF ENGINEERING

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

Semester/ Branch: 7th CSE

Course Code: CSE 314

Course Name: Software Architecture

Date: 27th Sep 2019

Time: 1 hour

Max Marks: 40

Weightage: 20%

Extract of question distribution [outcome wise & level wise]

Q.NO.	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels			Thought provoking type [Marks allotted] Bloom's Levels			Problem Solving type [Marks allotted]			Total Marks
			K			C			A			
1	CO 1	Module 1		6								6
2	CO 2	Module 2					6					6
3	CO 1	Module 1		6								6
4	CO 2	Module 2					10					10
5	CO 1	Module 1		6								6
6	CO 2	Module 2								6		6
	Total Marks			18			16			6		40

K =Knowledge Level C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

[I hereby certify that All the questions are set as per the above guide lines. Mr. T Ramesh]

Reviewers' Comments

Annexure- II: Format of Answer Scheme

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

SCHOOL OF ENGINEERING

SOLUTION

Date: 27th Sep 2019

Time: 1 hour

Max Marks: 40

Weightage: 20%

Semester & Branch: 7th CSE

Course Code: CSE 314

Course Name: **Software Architecture**

Part A (3Q x 6M = 18 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1	Definition - The software architecture of a program or computing system is the structure or structures of the system, which comprise software elements, the externally visible properties of those elements, and the relationships among them. Any two of the following: The architecture should be the product of a single architect or a small group of architects with an identified leader. The architect (or architecture team) should have the functional requirements for the	Deft – 2 marks Two process recommendations – 2 marks	5 mins

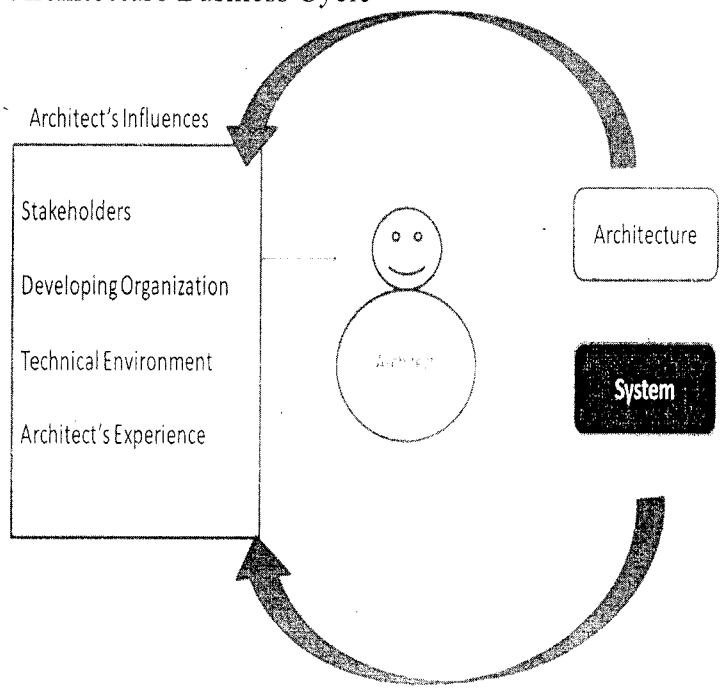
	system and an articulated, prioritized list of quality attributes that the architecture is expected to satisfy. The architecture should be well documented, with at least one static view and one dynamic view, using an agreed-on notation that all stakeholders can understand with a minimum of effort. The architecture should be circulated to the system's stakeholders, who should be actively involved in its review.		
2	Pipes are the connectors and Filters are the components in this style. A component reads streams of data on its input and produces streams of data on its output. Filters must be independent entities. They should not share state with other filters. Best known example of pipe-and-filter architecture are programs written in UNIX-SHELL. Unix supports this style by providing a notation for connecting components [Unix process] and by providing run-time mechanisms for implementing pipes.	Components & Connectors – 2 marks Example – 2 marks	5 mins
3	Four key influencers on software architecture are: - System Stakeholders - Developing Organizations - Background and experience of the Architect - Technical Environment	Mention of key influencers – 2 marks Brief explanation – 2 marks	5 mins

Part B (1Q x 10M = 10 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
4	**Blackboard architectural style** is most suitable. Each group member acts as a knowledge source or	2 marks for style and rationale +	25 mins

	component The Whatsapp platform acts as the connector Advantage – New group member can be added easily (evolvability); only one connector everyone uses (simplicity); concurrency control by the whatsapp blackboard platform. Invariant – All clients see all the transactions in the same order	2 marks each for component, connector, advantage and invariants	

Part C (2Q x 6M = 12Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
5	Architecture Business Cycle  	3 marks for diagram + 3 marks for explanation	10 mins
6	**The various activities involved in creating software architecture are:** 1) Creating the business case for the system 2) Understanding the requirements 3) Creating or selecting the architecture 4) Documenting and communicating the architecture 5) Analyzing or evaluating the architecture 6) Implementing the system based on the architecture 7) Ensuring that the implementation conforms to the architecture	1 mark for each activity	10 mins

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PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST – 2

Sem & AY: Odd Sem. 2019-20
Course Code: CSE 314
Course Name: SOFTWARE ARCHITECTURE
Program & Sem: B Tech (CSE) & VII

Date: 16.11.2019
Time: 9:30 AM to 10:30 AM
Max Marks: 40
Weightage: 20%

Instructions:
I. Read the question properly and answer accordingly.
II. Question paper consists of three parts.

Part A [Memory Recall Questions]

Answer All the Questions. Each Question carries six marks. (3Qx6M=18M)

1. Explain the general quality attribute scenario with a diagram. (C.O.NO.3) [Comprehension]
2. Distinguish between open-loop control system and feedback control system. (C.O.NO.2) [Comprehension]
3. Describe the Fault detection and recovery tactics (C.O.NO.3) [Knowledge]

Part B [Thought Provoking Questions]

Answer the Question. The Question carries ten marks. (1Qx10M=10M)

4. Demonstrate how Layered Architectural style can be applied over Mobile Robotics in providing solutions for various design considerations of Mobile Robotics. (C.O.NO.2) [Application]

Part C [Problem Solving Questions]

Answer both the Questions. Each Question carries six marks. (2Qx6M=12M)

5. Explain the Performance tactics with a diagram. (C.O.NO.3) [Comprehension]
6. Discuss Interpreters Architectural Style with neat diagram. (C.O.NO.2) [Comprehension]

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GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

Semester/ Branch: 7th CSE
Course Code: CSE 314
Course Name: Software Architecture

Date: 16/11/19
Time: 1 hour
Max Marks: 40
Weightage: 20%

Extract of question distribution [outcome wise & level wise]

Q.NO	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels			Thought provoking type [Marks allotted] Bloom's Levels			Problem Solving type [Marks allotted]			Total Marks
			K			C			A			
1	CO 3	Module 3					6					6
2	CO 3	Module 3					6					6
3	CO 3	Module 3		6								6
4	CO 2	Module 2								10		10
5	CO 3	Module 3					6					6
6	CO 2	Module 2					6					6
	Total Marks			6			24			10		40

K =Knowledge Level C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students

must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

Annexure- II: Format of Answer Scheme

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

SCHOOL OF ENGINEERING

SOLUTION

Date:

Time: 1 hour

Max Marks: 40

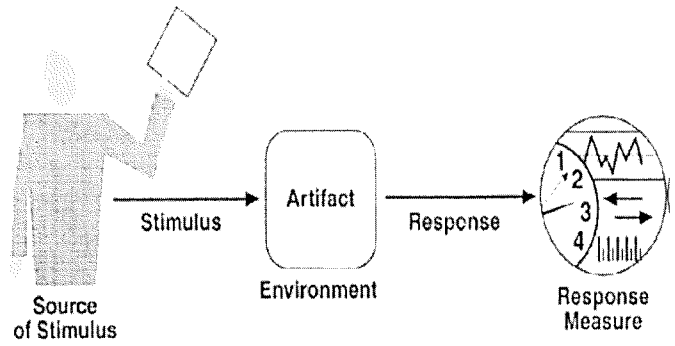
Weightage: 20%

Semester & Branch: 7th CSE

Course Code: CSE 314

Course Name: Software Architecture

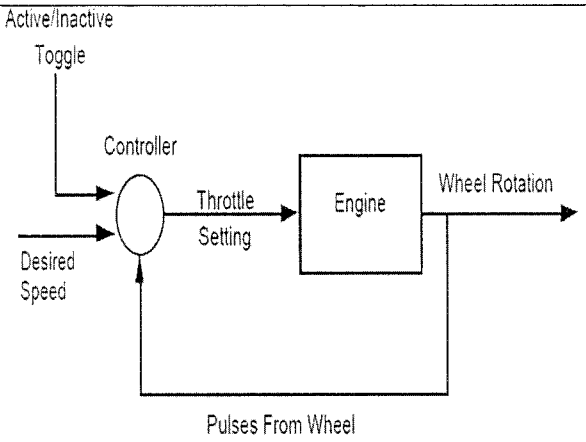
Part A (3Q x 6M = 18 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Questic
1	A quality attribute scenario is a quality-attribute-specific requirement. It consists of six parts. 1) ***Source of stimulus***. This is some entity (a human, a computer system, or any other actuator) that generated the stimulus. 2) ***Stimulus***. The stimulus is a condition that needs to be considered when it arrives at a system. 3) ***Environment.*** The stimulus occurs within certain conditions. The system may be in an overload condition or may be running when the stimulus occurs, or some other condition may be true. 4) ***Artifact***. Some artifact is stimulated. This may be the whole system or some pieces of it. 5) ***Response***. The response is the activity undertaken after the arrival of the stimulus. 6) ***Response measure.*** When the response occurs, it should be measurable in some fashion so that the requirement can be tested.  	Diagram carries 2 marks Listing of requirements – 1 mark Explanation carries 3 marks	5 mins

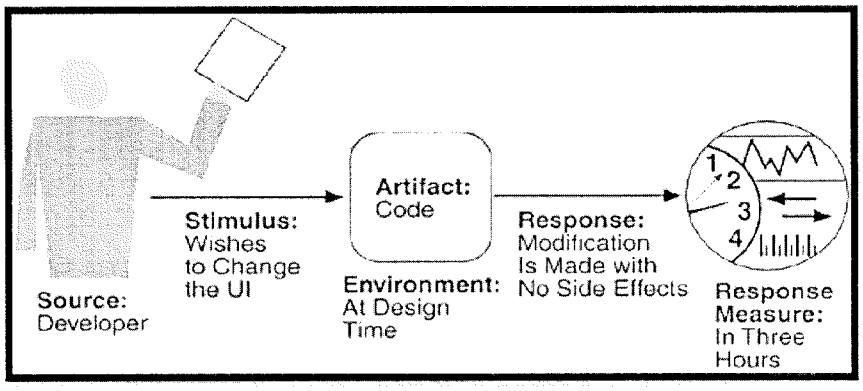
2	Non-repudiation is the property that a transaction (access to or modification of data or services) cannot be denied by any of the parties to it. This means you cannot deny that you ordered that item over the Internet if, in fact, you did. Ex: Bank amount withdrawal. Confidentiality is the property that data or services are protected from unauthorized access. Ex: This means that a hacker cannot access your income tax returns on a government computer.	3 marks for explanation + 3 marks for example	5 mins
3	Fault Detection tactics: - Ping / Echo - Hearbeat - Exception handling Fault Recovery tactics: Voting / Active redundancy / Passive redundancy / Spare / Shadow operation / State resynchronization / Checkpoint / Rollback	3 marks for fault detection tactics + 3 marks for recovery	5 mins

Part B (1Q x 10M = 10 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
4	**Computational Elements** ✓ *Process definition* - take throttle setting as I/P & control vehicle speed ✓ *Control algorithm* - current speed (wheel pulses) compared to desired speed o Change throttle setting accordingly presents the issue: o decide how much to change setting for a given discrepancy ❖ **Data Elements** ✓ *Controlled variable:* current speed of vehicle ✓ *Manipulated variable:* throttle setting ✓ *Set point:* set by accelerator and increase/decrease speed inputs ▪ system on/off, engine on/off, brake and resume inputs also have a bearing ✓ *Controlled variable sensor*: modelled on data from wheel pulses and clock	3 marks for diagram+ Explanation carries 7 marks	25 mins

	 Control Architecture for Cruise Control		

Part C (2Q x 6M = 12Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Quest'
5	Modifiability Scenario: 	1 mark each for source, stimulus, artifact, environment, response and 2 marks for response measure	10 mins
6	**INTERPRETERS** ✓ An interpreter includes pseudo program being interpreted and interpretation engine. ✓ Pseudo program includes the program and activation record. ✓ Interpretation engine includes both definition of interpreter and current state of its execution. Interpreter includes 4 components: **1** Interpretation engine: to do the work **2** Memory: that contains pseudo code to be interpreted. **3** Representation of control state of interpretation engine **4** Representation of control state of the program being simulated. Ex: JVM or "virtual Pascal machine"	2 marks for diagram + 4 marks for explanation	10 mins

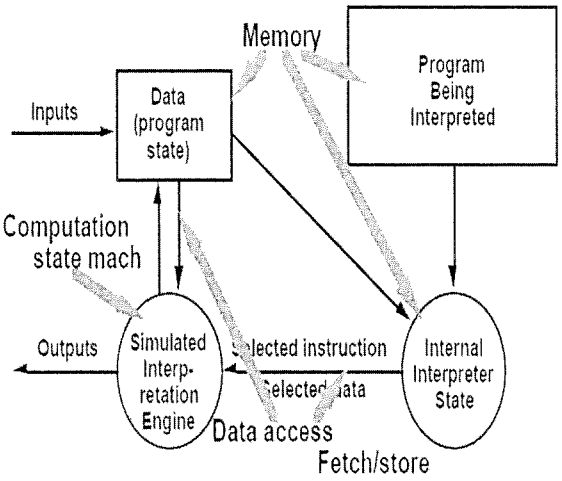


Figure 5: Interpreter

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GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Semester: Odd Semester: 2019 - 20
Course Code: CSE 314
Course Name: SOFTWARE ARCHITECTURE
Program & Sem: B Tech. (CSE) & VII (DE-II)

Date: 20 December 2019
Time: 9:30 AM to 12:30 PM
Max Marks: 80
Weightage: 40%

Instructions:
(i) Read the all questions carefully and answer accordingly.

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries 8 marks. (5Qx8M=40M)

1. Define the term "Software Architecture". Explain process recommendations that make a good architecture. (C.O.No.1) [Knowledge]
2. Describe Blackboard architectural pattern with a class diagram (C.O.No.2) [Knowledge]
3. Explain the Cloud Computing Architecture, with a graphical view (C.O.No.4) [Comprehension]
4. Discuss the object oriented model for Microkernel System? (C.O.No.2) [Comprehension]
5. Explain the modifiability quality scenario with a diagram. (C.O.No.3) [Comprehension]

Part B [Thought Provoking Questions]

Answer both the Questions. Each Question carries 10 marks. (2Qx10M=20M)

6. Demonstrate architectural style would you adopt for "FACEBOOK" notifications? Provide the rationale for your decision. Discuss the components, connectors, advantages and invariants of your chosen approach. (C.O.No.2) [Application]
7. Explain the sequence diagram for master-slave architectural pattern. Give two practical applications where master-slave pattern is useful and justify the answer. (C.O.No.4) [Comprehension]

Part C [Problem Solving Questions]

Answer both the Questions. Each Question carries 10 marks. (2Qx10M=20M)

8. Explain the tactics in security for resisting attacks and recovering from an attack. (C.O.No.3) [Comprehension]
9. Generalize a design of a layered architectural pattern for the OSI model? Discuss the key benefits of the layered architecture pattern. (C.O.No.4) [Comprehension]

SCHOOL OF ENGINEERING

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

END TERM FINAL EXAMINATION

Extract of question distribution [outcome wise & level wise]

Q.NO	C.O.NO (% age of CO)	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels	Thought provoking type [Marks allotted] Bloom's Levels	Problem Solving type [Marks allotted]	Total Marks
			K	C	A	
1	1	Module 1	8			8
2	1	Module 1	8			8
3	4	Module 4		8		8
4	2	Module 2		8		8
5	3	Module 3		8		8
6	2	Module 2			10	10
7	4	Module 4		10		10
8	3	Module 3		10		10
9	4	Module 4		10		
	Total Marks		16	54	10	80

K =Knowledge Level C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

I hereby certify that all the questions are set as per the above guidelines.

Faculty Signature:

Reviewer Commend:

Format of Answer Scheme

SCHOOL OF ENGINEERING

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

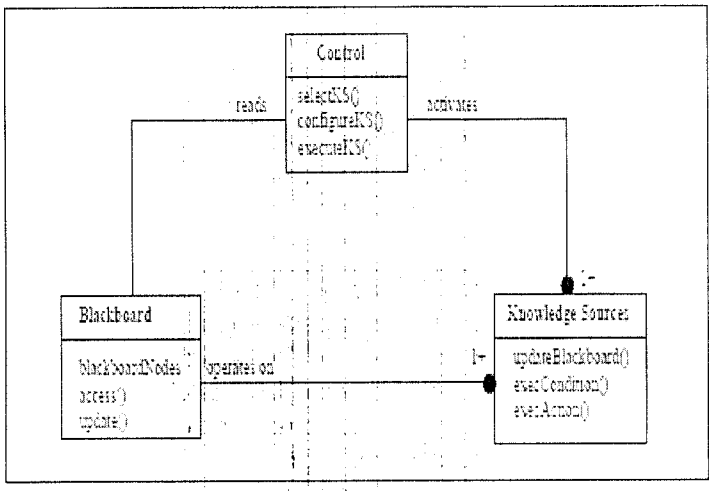
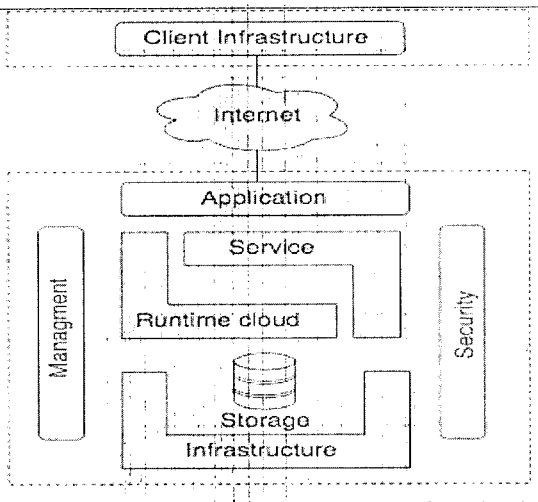
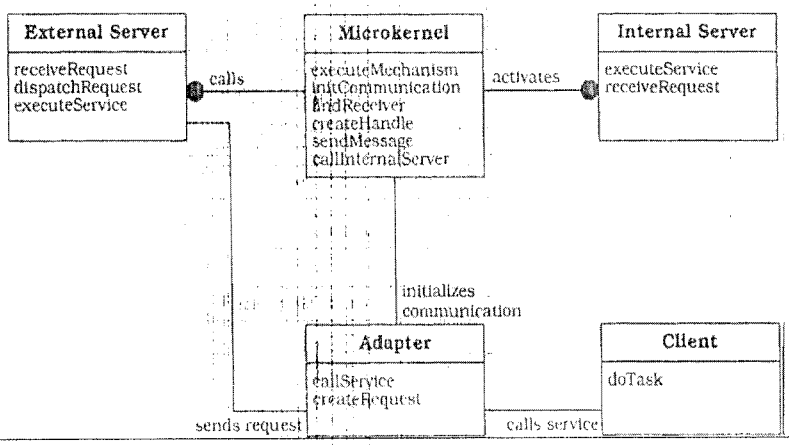
SOLUTION

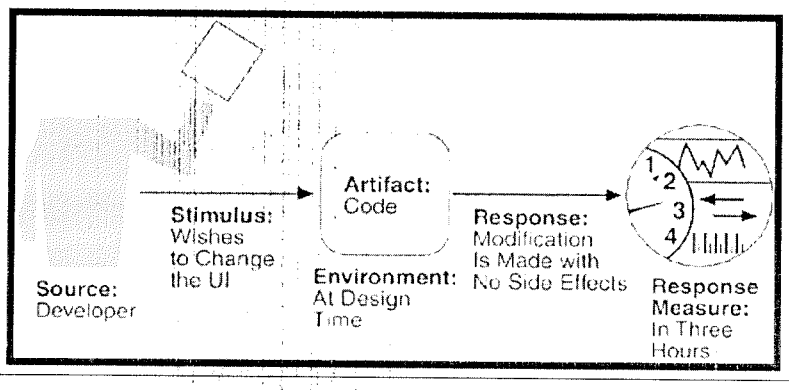
Semester: Odd Sem. 2019-20
Course Code: CSE 314
Course Name: SOFTWARE ARCHITECTURE
Program & Sem: B Tech 7th sem CSE

Date: 20.12.2019
Time: 3 HRS
Max Marks: 80
Weightage: 40%

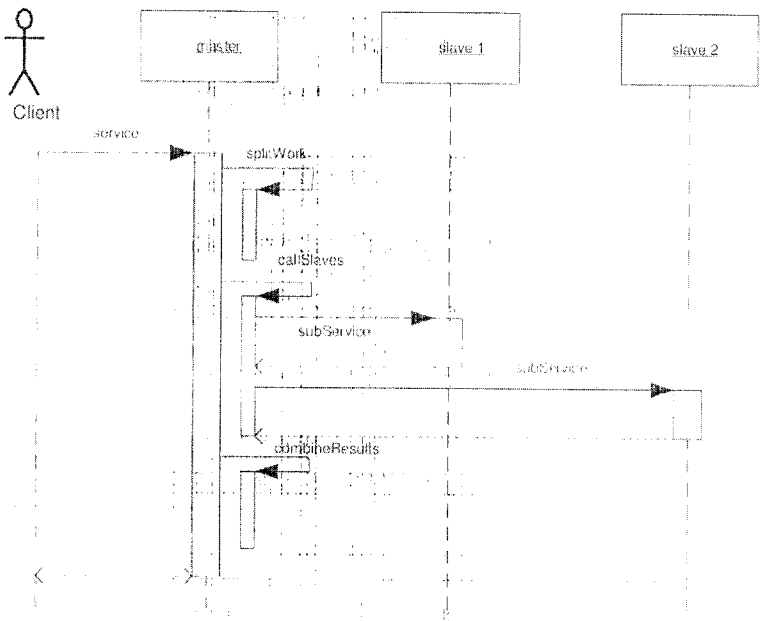
Part A (0Q x 0M = 0Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1	Definition - The software architecture of a program or computing system is the structure or structures of the system, which comprise software elements, the externally visible properties of those elements, and the relationships among them. **Process Recommendations :** The architecture should be the product of a single architect or a small group of architects with an identified leader. ▪ The architect (or architecture team) should have the functional requirements for the system and an articulated, prioritized list of quality attributes that the architecture is expected to satisfy. ▪ The architecture should be well documented, with at least one static view and one dynamic view, using an agreed-on notation that all stakeholders can understand with a minimum of effort. ▪ The architecture should be circulated to the system's stakeholders, who should be actively involved in its review. ▪ The architecture should be analyzed for applicable quantitative measures (such as maximum throughput) and formally evaluated for quality attributes before it is too late to make changes to it. ▪ The architecture should lend itself to incremental implementation via the creation of a "skeletal" system in which the communication paths are exercised but which at first has minimal functionality. This skeletal system can then be used to "grow" the system incrementally, easing the integration and testing efforts. ▪ The architecture should result in a specific (and small) set of resource contention areas, the resolution of which is clearly specified, circulated and maintained.	Deft – 2 marks process recommendations – 6 marks	20 mins

2	The Blackboard pattern is useful for problems for which no deterministic solution strategies are known. Several specialized subsystems assemble their knowledge to build a possibly partial or approximate solution. All components have access to a shared data store, the blackboard. Components may produce new data objects that are added to the blackboard. Components look for particular kinds of data on the blackboard, and may find these by pattern matching. **Class Diagram:** 	4 marks for explanation of the pattern 4 marks for class diagram	20 mins
3	 **Fig. - Graphical View of Cloud Computing Architecture**	2 marks for overall diagram 6 marks for client, application, service, runtime, management, security and storage	20 mins
4	Object oriented model for Microkernel system: 	6 marks for diagram 2 marks for explanation	20 mins

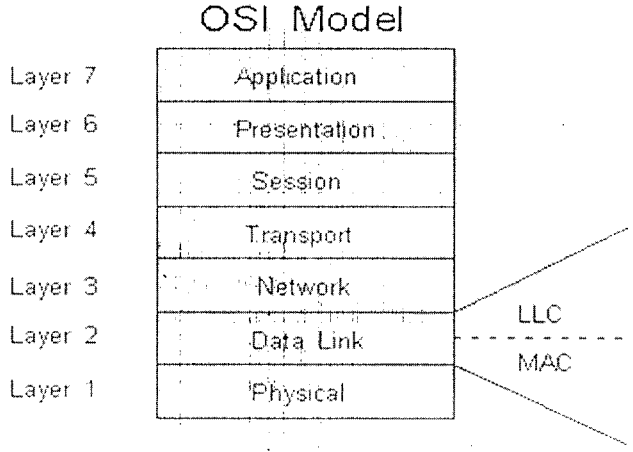
5	Modifiability Scenario  	1 mark each for source, stimulus, artifact, environment, response and 2 marks for response measure	20 mins

Part B (0Q x 0M = 0 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
6	**Event Based / Implicit Invocation Style** is most suitable. Components are the provider (Facebook) and subscriber (End Users) Connector is the push/pull model of the event. Advantages – Loose coupling between the components; notification can be asynchronous Invariant – Enforce integrity constraint on the data	2 marks for style and rationale + 2 marks each for component, connector, advantage and invariants	20 mins
7	Sequence Diagram  	6 marks for sequence diagram and explanation 2 marks each for two areas of application and justification	30 mins

Part C (0Q x 0M = 0Marks)

			Max. Time

Q No	Solution	Scheme of Marking	required for each Question
8	Resisting attacks: - Authenticate users - Authorize users - Maintain data confidentiality - Maintain integrity - Limit exposure - Limit attacks Recovering from attacks: - Restoration - Identification	6 marks for resisting attacks and 4 marks for recovering from attacks	20 mins
9	 Benefits: - A lower layer can be used by different higher layers. - Layers make standardization easier Dependencies are kept local	7 marks for the layers 3 marks for the benefits of the pattern	20 mins