

End Semester Examination, Autumn-2021
Department of CSE

Date: **04.12.2021**

Subject: **Software Architecture**

Total marks: **100**

Subject code: **CS6403**

A. Answer any 18 (eighteen) questions. (Each question carries ‘4’ marks). Please be precise.

1. What are the fundamental steps considered in the context of software architecture? Explain Twin peaks model with respect to software architecture.
2. How descriptive architecture is different from the prescriptive architecture? Explain it with a neat diagram.
3. What is the objective of Model-View-Controller? Explain Sense-Compute-Control with respect to Lunar Lander case study.
4. Define architectural style. Write the benefits of using styles. Explain publish-subscribe architectural style with a neat diagram.
5. Explain CORBA concepts and implementation with respect to Lunar Lander.
6. What are the different roles of a connector? Explain the role of a connector as communicator.
7. What do you understand by implemented and conceptual connectors? Explain data access connector with the terms such as service, type, dimension, sub-dimension and value.
8. What is architectural modeling? Explain views and viewpoints of a 3-tier application and Lunar Lander system.
9. Briefly explain Rapide ADL with a suitable example? Write all of its evaluation parameters.
10. Explain Acme by considering the pseudocodes of *UserInterface*, *calculation* and *DataStore* components in Lunar Lander. Write all of its evaluation parameters.
11. Write all the concerns relevant to architectural analysis. What are the four ‘C’s associated with architectural analysis goals.
12. What is the mapping problem in architectural implementation? Explain one-way and round trip mapping. How architecture implementation framework works as a bridge between architectural style and implementation?
13. Explain lightweight C2 and flexible C2 with all of its evaluation parameters.
14. What are the fallacies of distributed system viewpoints according to Deutsch & Gosling. Explain REST principles and constraints in the distributed system.
15. Define NFP with respect to software architecture. Explain six non-functional properties.
16. Explain PACE with various functional units in different layers.
17. What are the three key factors in DSSE? Explain reference architecture with an example.
18. Explain TOGAF with different key areas for achieving the business goals.

19. What are the eleven desired skill sets of a software architect? Explain on each skill in the desired set.
 20. How the human need is expressed through psychological conflicts between ego and super ego? Explain it with diagram on the basis of theory of psyche.
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B. MCQs: Answer all questions. (Each correct answer carries '1' mark and -1/3 mark for the wrong answer).

1. Which of following describes the entities and data in the domain?

- a) Use case diagram
- b) Entity relationship diagram
- c) Data flow diagram
- d) Control flow diagram

2. Which is not a deployment analysis strategy?

- a) Mixed Integer Non-linear Programming (MINLP)
- b) Mixed Integer Linear Programming (MIP)
- c) Greedy
- d) Dynamic

3. Which is a type of trust management system?

- a) Credential and policy-based
- b) Fraud based
- c) Authority based
- d) Manipulation based

4. Which is not a component of PACE?

- a) Communication layer
- b) Trust layer
- c) Information layer
- d) Data layer

5. Which is not an early architecture description language?

- a) Darwin
- b) Rapide
- c) Wright
- d) XADL

6. Acme is a part of which of the following languages:
- a) Early architecture description languages
 - b) Domain- and style-specific languages
 - c) Extensible architecture description languages
 - d) None
7. Which is not a kind of visualization?
- a) Effect Visualization
 - b) Evaluating Visualizations
 - c) Textual visualization
 - d) Behavioral visualization
8. Which is not a mechanism for text visualization?
- a) Syntax highlighting
 - b) Autocomplete
 - c) Structural folding
 - d) Typecasting
9. Which is not a dimension of architectural consistency?
- a) Refinement Consistency
 - b) Interaction Consistency
 - c) Interchange Consistency
 - d) Interface consistency
10. Which statement is not true?
- a) Names and interfaces of interacting components may match, but behaviors need not
 - b) Consistency is an internal property of an architectural model
 - c) Completeness is an external goal
 - d) Architectural models are refined during the design process
11. Which is not an advantage of layered style?
- a) Standardized layer interfaces for libraries and frameworks
 - b) Changes in a layer affect at most the adjacent two layers
 - c) Evolvment
 - d) Layers may have to be skipped

12. Which is not a benefit of first-class connector?
- a) Separate computation from interaction
 - b) Minimize component interdependencies
 - c) Become points of distribution
 - d) Cannot deal with high frequency
13. Which is not a dimension of adaptor connector?
- a) Invocation conversion
 - b) Protocol conversion
 - c) Presentation conversion
 - d) Wrapper conversion
14. Which is not a dimension of distributor connector?
- a) Naming
 - b) Delivery
 - c) Routing
 - d) Packaging
15. Which is true about connection dimension inter relationship?
- a) Requires –Two dimensions can never be composed into a single connector
 - b) Prohibits –Choice of one dimension mandates the choice of another
 - c) Restricts –Combinations may result in unstable or unreliable connectors
 - d) Restricts – Dimensions are not always required to be used together
16. Peer-to-peer connector does not contain:
- a) Arbitrator connector
 - b) Data access connector
 - c) Stream connector
 - d) Procedure call connector
17. Grid connector does not contain:
- a) Arbitrator connector
 - b) Data access connector
 - c) Stream connector
 - d) Procedure call connector

18. Which is not an important characteristic of the model?
- a) Ambiguity
 - b) Precision
 - c) Accuracy
 - d) Persistency
19. Which is an extensible architectural description language?
- a) ADML
 - b) AADL
 - c) Weaves
 - d) Koala
20. Which is not a pitfall of software architects' teams?
- a) Lack of authority
 - b) Life in ivory tower
 - c) Procrastination
 - d) Full of self confidence
21. Which is not an example of de jure standard?
- a) UML (managed by OMG)
 - b) CORBA (also managed by OMG)
 - c) HTTP protocol (managed by IETF)
 - d) Windows (managed by Microsoft)
22. Which is a drawback of early adoption of a standard?
- a) Early to market
 - b) Early experience
 - c) Improved ability to influence the standard
 - d) Lack of support
23. Which is not the key area addressed by TOGAF?
- a) Business concern
 - b) Data concern
 - c) System concern
 - d) Technology concern

24. Which is not an example of UML tools?
- a) Star UML
 - b) Rational rose
 - c) Arch studio
 - d) ArgoUml
25. Which is not a part of six shearing layers?
- a) Site
 - b) Service
 - c) Structure
 - d) Surround
26. Which of following defines how entities and data combine to provide features?
- a) Context information diagram
 - b) Control flow diagram
 - c) Entity relationship diagram
 - d) Use case diagram
27. Which is not an example of nonfunctional property?
- a) Scalability
 - b) Heterogeneity
 - c) Efficiency
 - d) Persistency
28. Which is a limitation of distributed system viewpoint?
- a) Latency is infinite
 - b) Bandwidth is zero
 - c) Transport cost is zero
 - d) The network is unreliable
