Software Architecture: Principles and Practices (SAPP) Examination

Question 1
The term 'enterprise architecture' describes ...

A.) software elements of a system.
B.) hardware elements and how they are interconnected.
X C.) business structures and how they are interconnected.
D.) both the hardware and software elements of a system.

Question 2
Enterprise and system architecture...

A.) provide an environment in which software operates.
B.) provide requirements and constraints to which software architecture must adhere.
C.) are likely to be associated with one or more software architectures.
X D.) all of the above
E.) none of the above

Question 3
Which of the following is a concern of software architecture?

A.) Software elements of the system
B.) Human elements of the system
X C.) Hardware elements of the system
D.) All of the above
E.) None of the above
Question 4

Software architecture is an abstraction of a system that...

× A.) suppresses details of what software elements do internally.

B.) shows how software elements will be implemented.

C.) describes the algorithms and data structures used by software elements.

D.) identifies the public and private interfaces of software elements.

Question 5

The 'externally visible properties' of a software architecture's elements refers to all of the following except...

A.) quality attributes of those elements.

× B.) "as is" design of those elements.

C.) functions and services provided by those elements.

D.) resources provided and used by those elements.

Question 6

Which of the following is not true concerning software architecture?

A.) An architecture comprises many different structures.

× B.) An architecture is best described by a single, coherent structure.

C.) An architectural structure might show runtime elements and relationships.

D.) An architectural structure might show non-runtime elements and relationships.
Question 7

Which of the following is true concerning software architecture?

A.) Architecture is concerned primarily with the private details of element interfaces.

B.) An architecture is composed of a fixed set of candidate structures.

C.) Every system has an architecture, explicit or implicit.

D.) A software architecture is the planned implementation of a system.

Question 8

Which of the following cannot be inferred from the description of a software architecture’s elements?

A.) How many elements a system has

B.) The design of individual elements

C.) Commonalities between system elements

D.) Relationships between system elements

Question 9

Which of the following is not true of architectural patterns?

A.) They are often selected to promote various quality attribute properties.

B.) They are well-known solutions to recurring design problems.

C.) They are industry-defined standards for software design.

D.) They are often selected in the early stages of architectural design.
Question 10
Which of the following would not be part of a reference model?

A.) What major functions a system is expected to perform

B.) How system functions are allocated to software elements

C.) What data flows to, from, and between system functions

D.) Which functions are mandatory and which are optional

Question 11
Which of the following would not be part of a reference architecture?

A.) Elements of the architecture and their externally visible properties

B.) Relationships between elements and the properties of those elements

C.) Which elements, relationships, and properties are optional in any given implementation of the architecture

D.) How to instantiate the architecture for a particular application

Question 12
There are three primary reasons why a software architecture is important. Which of the following is not one of them?

A.) It reveals early design decisions about a system.

B.) It enables communication among stakeholders regarding the system.

C.) It ensures implementation conformance to a defined specification.

D.) It is a transferable, reusable abstraction of a system.
Question 13

Software architecture provides a common frame of reference for all of the following except...

A.) negotiating requirements with stakeholders.
B.) keeping the customer informed of progress and cost.
C.) minimizing the amount of time spent in component design.
D.) deciding how to structure the development organization and allocate resources.

Question 14

Which of the following is least likely to be imposed on the implementation by software architecture?

A.) Test procedures
B.) Process-scheduling priorities
C.) Elements and interactions
D.) Data sharing

Question 15

Which of the following processes within a development organization is not affected by software architecture?

A.) Budgeting and scheduling
B.) Partitioning and assigning work
C.) Performing user testing
D.) Planning testing and deployment
Question 16
Software architecture allows us to predict...

A.) how much the system will impact the technological environment.

B.) how well quality attributes will be achieved.

C.) how satisfied customers will be with the product.

D.) how often requirements will change.

Question 17
Architecture helps us to reason about and manage change, because it partitions all changes into these three classes of change:

A.) requirements, design, and implementation changes.

B.) local, nonlocal, and architectural changes.

C.) high-level design, detailed design, and coding changes.

D.) life-cycle, process, and practice changes.

Question 18
Once an architecture has been defined, it can be analyzed and prototyped as a skeletal system. Which of the following is not a benefit of this approach?

A.) Elements can be plugged into a skeletal framework of the architecture.

B.) Risky elements can be identified and prototyped.

C.) The system is executable early in the product's life cycle.

D.) Development can proceed before the architectural mismatches have been identified.
Question 19

Which of the following is false regarding software architecture?

A.) Software architecture enables more accurate cost and schedule estimates.
B.) Software architecture enables more accurate project planning and tracking.
× C.) Software architecture enables more accurate process conformance estimates.
D.) Software architecture enables more accurate predictions of resource usage.

Question 20

Software architecture can serve as the basis of a strategic reuse agenda that includes reuse of all of the following except...

× A.) product-specific functionality and qualities.
B.) work breakdown structures and requirements.
C.) project personnel and experience.
D.) components and standards.

Question 21

Architecture-based development...

× A.) focuses on composing elements rather than programming them.
B.) relaxes constraints on which third-party products can be incorporated into the system.
C.) avoids implementation standards to promote flexibility.
D.) inhibits component interchangeability.
Question 22

Architecture enables template-based development. Which of the following is not true of this type of development?

A.) Templates can be used to localize how elements interact.
B.) Templates can be used to code element interaction frameworks.
C.) Templates speed up development and increase reliability.
D.) Templates promote standardization but reduce performance.

Question 24

Which of the following structures is most likely to be of interest in determining how modifiable software is in terms of supporting a new hardware platform?

A.) Uses structure
B.) Shared-data repository structure
C.) Implementation structure
D.) Work assignment structure

x

Question 25

Which of the following structures is most likely to be of interest in determining how secure a system is from unauthorized external access?

A.) Implementation structure
B.) Deployment structure
C.) Class/generalization structure
D.) Decomposition structure

x
Question 26
Which of the following structures is most likely to be of interest in determining how well a system will perform when faced by simultaneous access by 1,000 users?

A.) Layered structure

B.) Process structure
C.) Work assignment structure
D.) Implementation structure

Question 27
Architects primarily focus on designing whatever structures will provide them with the most leverage in achieving...

A.) the functional requirements of the system.

B.) the operational requirements of the system.

C.) the quality attributes requirements of the system.

D.) all of the above
E.) none of the above

Question 28
The Architecture Business Cycle best refers to...

A.) the business, social, and technical influences on an architecture.

B.) the influence of architecture on cost, schedule, and resource allocation.

C.) the cyclic nature of architecture-centric development.

D.) the ideal lifecycle model for architecture-based development.
E.) none of the above
Question 29
Which of these factors is least likely to influence the design of a software architecture?

A.) The architect's background and experience
B.) The technical environment in which the system is developed
C.) The way in which the architecture is represented
D.) The structure of the development organization

Question 30
Why should software architects involve stakeholders early in the life cycle of a system?

A.) To inform stakeholders of the system's priorities
B.) To limit the real constraints of a system
C.) To manage stakeholder expectations
D.) To discuss design alternatives

Question 31
Which of the following might be an organizational influence on software architectures?

A.) Available expertise
B.) Organizational structure
C.) Investment in existing assets
D.) All of the above
E.) None of the above
Question 32

The existing technical environment will...

A.) be the most influential cost driver of the system.
B.) be a key factor in minimizing the constraints imposed on a system.
C.) likely influence the design of an architecture.
D.) have the least impact on the cost of the system.

Question 33

The design choices made by a software architect might be influenced by his or her...

A.) past experience in designing service-oriented architectures.
B.) personal goals and objectives.
C.) education and training.
D.) all of the above
E.) none of the above

Question 34

The design of an architecture is least likely to influence...

A.) the formation of development teams.
B.) development, test, and integration activities.
C.) conformance to project tracking and reporting practices.
D.) resource allocation in schedules and budgets.
Question 35

Software architecture does not offer which of the following benefits?

A.) Allowing the company to enter a specific market segment

x  B.) Guaranteeing that implementations will conform to the architecture specification

C.) Providing a basis for resource allocation and budgeting

D.) Enabling efficient production and deployment of similar systems

Question 36

Occasionally, a system or architecture will introduce itself into the technical environment in a way that will impact the architectural design of many systems for the foreseeable future. All of the following are examples of this except for:

A.) The World Wide Web

x  B.) C++

C.) Service-oriented architecture

D.) Windows operating system

Question 37

Understanding the influences described by the Architecture Business Cycle helps the architect to do many things. Which of the following is not one of them?

A.) Realize that system requirements are not the only influence on architectural design

x  B.) Determine when and how these influences will occur during the life cycle

C.) Actively look for and assess the impact of such influences on the architecture

D.) Prepare for and manage these influences throughout the life cycle
Question 38
Which of the following architectural influences can affect customer requirements?

A.) Customers perceive the benefit of existing architectures and want similar kinds of architectures for their systems.

B.) Customers will alter their requirements based on the availability of existing systems and components.

C.) Customers ask for features that are available on existing systems.

D.) All of the above

E.) None of the above

Question 39
Which of the following offers the best example of a non-operational description of a quality attribute requirement?

A.) Modifiability: "Developers must be able to port the software to a Mac within six months."

B.) Performance: "The software must outperform competing software by a factor of 20."

C.) Usability: "The system shall be easy for operations personnel to learn and use."

D.) Security: "The system shall prevent all unauthorized access to top-secret records."
**Question 40**

Which of the following best describes "quality attributes?"

- A.) Properties of work products or goods by which their quality will be judged by stakeholders
- B.) Properties of software systems that drive how systems will be partitioned to achieve the desired functionality
- C.) Properties of work products or goods that determine their marketability
- D.) Properties of software systems that are well defined by industry standards and used as a basis for determining whether a system is "fit for purpose"

**Question 41**

Quality attributes requirements are derived from...

- A.) stakeholder concerns.
- B.) industry standards.
- C.) functional requirements.
- D.) architectural structure.

**Question 42**

Which of the following is not true concerning quality attributes?

- A.) Quality attributes have a significant influence on the architecture of a system.
- B.) Architectural decisions are often made to promote various quality attributes.
- C.) Architecture provides the foundation for achieving quality attributes and guarantees that those qualities will be met in the final implementation of the system.
- D.) Changes in an architecture to promote one quality attribute may have a negative impact on other quality attributes.
Question 43

Which of the following is not true concerning the functional requirements of a system?

A.) We can achieve functional requirements using any architecture.
B.) Functional requirements often have associated quality attribute requirements.
C.) We can achieve functional requirements yet fail to meet quality attribute requirements.
D.) Functional requirements have a significant influence on the architecture of a system.

× D.) Functional requirements have a significant influence on the architecture of a system.

Question 44

Failing to understand the quality attribute requirements for a system is often the result of...

A.) ignoring industry-standard definitions for those requirements.
× B.) wide variation in the vocabulary used to describe those requirements.
C.) a lack of tool support for recording and tracking those requirements.
D.) following a life-cycle model that does not accommodate those requirements.

Question 45

A "quality attribute scenario" is...

A.) the relationship between different qualities of a system.
B.) a list of all quality attributes relevant to some part of a system.
C.) a short description of how a user will interact with some part of a system.
× D.) a short description of how a system should respond to some stimulus.
Question 46

Which of the following is not part of a quality attribute scenario?

A.) Environment
B.) Response measure
C.) Evaluation
D.) Stimulus source

Question 47

The main purpose of developing quality attribute scenarios is to...

A.) better understand quality attributes requirements.
B.) select architectural patterns.
C.) unveil conflicting stakeholder requirements.
D.) select architectural tactics.

Question 48

Which of the following statements is true?

A.) A general scenario is an instantiation of a concrete scenario.
B.) A concrete scenario is an instantiation of a general scenario.
C.) Concrete scenarios are system independent.
D.) General scenarios are formed by combining concrete scenarios.
Question 49

Which of the following statements is not true?

A.) General scenarios can help stakeholders communicate more effectively about quality attribute requirements.

× B.) General scenarios are system-specific but domain-independent scenarios.

C.) General scenarios can help stakeholders develop concrete scenarios.

D.) General scenarios can be developed for any quality attribute.

Question 50

The Quality Attribute Workshop (QAW) engages stakeholders to...

A.) evaluate the design of a system.

× B.) discover the quality attribute requirements for a system.

C.) determine whether a system is “fit for purpose”.

D.) propose and select system design alternatives.

Question 51

The Quality Attribute Workshop (QAW) is best used...

× A.) before architectural design.

B.) during architectural design.

C.) after architectural design but before non-architectural design.

D.) during non-architectural design.
Question 52
Which of the following results from the Quality Attribute Workshop (QAW)?

A.) Improved allocation of project resources
B.) Consensus on the non-architectural design for a system
C.) Reduced and better control over stakeholder communication
D.) Increased stakeholder communication

Question 53
Which of the following best describes the relationship between architectural patterns and architectural tactics?

A.) Any tactic implements different patterns.
B.) Patterns and tactics are equivalent.
C.) A pattern may employ one or more tactics.
D.) Tactics and patterns are unrelated.

Question 54
Which of the following is not part of describing or determining an architectural pattern?

A.) Implementation details
B.) Interaction mechanisms or connectors
C.) Semantic constraints
D.) Element types
Question 55
The purpose of applying patterns in software architecture is to...

A.) build multiple related systems.

B.) address one or more architectural tactics.

C.) isolate one or more quality attributes.

X D.) promote one or more quality attributes.

Question 56
The purpose of identifying patterns in a software architecture is to...

A.) improve stakeholder communication.

X B.) help predict specific qualities in an architecture.

C.) enable reuse of legacy systems.

D.) help build multiple products in a product line.

Question 57
A software architecture view is...

A.) an opinion regarding software architecture.

X B.) a representation of a structure found in a software system.

C.) a collection of UML diagrams.

D.) a list of elements in a software system.
Question 58

Documenting a software architecture is *best* described as a process of...

A.) documenting the structures, elements, and relationships that will best support non-architectural design.

× B.) documenting relevant views and then adding information that applies to more than one view.

C.) documenting runtime interactions and behaviors and their impact on quality attributes requirements.

D.) documenting the module structures that will best support the development and management teams.

Question 59

Which type of architectural view shows sets of code units?

A.) Allocation views

× B.) Module views

C.) Component-and-connector views

D.) User action/feedback views

Question 60

Which type of architectural view shows the runtime interactions of sets of elements?

A.) Allocation views

B.) Module views

× C.) Component-and-connector views

D.) User action/feedback views
Question 61
Which type of architectural view shows how software and non-software elements are related within a system?

A.) Allocation views
B.) Module views
C.) Component-and-connector views
D.) User action/feedback views

Question 62
A process view of a system's software architecture would most likely be used to reason about which of the following quality attribute properties of that system?

A.) Maintainability and buildability
B.) Performance and reliability
C.) Security and modifiability
D.) Reusability and availability

Question 63
An allocation view of a software architecture shows...

A.) runtime behavior and interactions of elements.
B.) code units that implement functionality.
C.) user interactions with system elements.
D.) relationships between software elements to environment elements.
Question 64

A deployment view of a system's software architecture would most likely be used to reason about which of the following quality attribute properties of that system?

A.) Modifiability and security

x B.) Availability and affordability

C.) Reusability and reliability

D.) Interoperability and subsetability

Question 65

One of the most important factors to consider when deciding which views to develop for an architecture is...

A.) what life-cycle model will be followed during the course of development.

B.) what notation and process will be used for creating and verifying the correctness of views.

C.) what tools are available for view creation, dissemination, and maintenance.

x D.) which views will best serve stakeholder needs.

Question 66

Views often include information about all of the following except for...

A.) a primary presentation, element catalog, and context diagram.

B.) driving architectural requirements and design rationale.

C.) results of design-related analysis, prototyping, and experimentation.

x D.) pseudo descriptions for key algorithms and database schemata.
Question 67

Beyond views, it is useful to describe all of the following when documenting an architecture except for...

A.) a system overview and documentation roadmap.

B.) the major architectural approaches taken and their relationship to key requirements.

C.) the relationship between implementation constructs and architectural elements.

D.) a mapping between architectural elements and key requirements.

Question 68

One should not proceed with architectural design until...

A.) architectural drivers are known with some confidence.

B.) functional requirements have been documented and validated.

C.) quality attribute requirements have been documented and validated.

D.) design constraints have been documented and validated.

Question 69

Which of the following is true?

A.) Non-architectural design should begin only after the completion of architectural design.

B.) Architectural design should not begin before the completion of requirements analysis.

C.) Non-architectural design may begin before the completion of architectural design.

D.) Architectural design should begin before requirements analysis.
Question 70

Attribute-Driven Design (ADD) is an approach to defining software architecture where decomposition is based on...

A.) minimizing interactions between architecturally significant elements.

B.) recursive decomposition of functional partitions to maximize architectural cohesion.

× C.) applying architectural patterns and tactics to satisfy quality attribute requirements.

D.) compartmentalizing functions and behaviors to maximize architectural coherence.

Question 71

Which of the following is not an input of the ADD method?

A.) Quality attribute requirements

× B.) Module decomposition requirements

C.) Functional requirements

D.) Design constraints

Question 72

Which of the following is least likely to be a benefit of architecture evaluations?

A.) They provide input into where an architecture can be improved.

B.) They provide a forum for identifying and discussing unclear, missing, or invalid requirements.

× C.) They allow immediate stakeholder input about how to redesign an architecture to correct problems.

D.) They result in improved communications between stakeholders.
Question 73

Which of the following is the least desirable point in the software life cycle to perform an architecture evaluation?

A.) When acquiring a system
B.) When building a system
x C.) When the system is first released
D.) When substantial changes are proposed for a system

Question 74

Which of the following is unlikely to be a cost associated with architecture evaluations?

A.) Managing an organization’s architecture evaluation capability
B.) Training the evaluation team
x C.) Excessive communication among stakeholders
D.) Loss of productivity for senior designers

Question 75

Architecture evaluation methods generally fall into what two categories?

A.) Scenario verification and prototyping techniques
x B.) Questioning and measuring techniques
C.) Simulation-based and questionnaire-based techniques
D.) Checklist and quantitative techniques
Question 76

In questionnaire-based evaluation techniques...

× A.) the architect answers a prepared list of questions.
B.) detailed sets of yes/no questions focus on particular qualities.
C.) the quality of the design process is measured.
D.) specific interactions between a system and stakeholder are described.

Question 77

In scenario-based evaluation techniques...

A.) the architect answers a prepared list of questions.
B.) detailed sets of yes/no questions focus on particular qualities.
C.) the quality of the design process is measured.

× D.) specific interactions between a system and stakeholder are described.

Question 78

In checklist-based evaluation techniques...

× A.) the architect answers a prepared list of questions.
B.) detailed sets of yes/no questions focus on particular qualities.
C.) the quality of the design process is measured.
D.) specific interactions between a system and stakeholder are described.
Question 79

In an architectural evaluation, the term "metrics" means...

× A.) quantitative and observable measures of an architecture.
B.) numeric measures of the quality of the design process.
C.) numeric measures of the quality of the evaluation process.
D.) standardized but qualitative measures of an architecture.

Question 80

Which of the following is not a focus of metric-based architecture evaluations?

A.) Results of applying metrics.
B.) Choosing a set of metrics
× C.) Comparing different sets of metrics
D.) Assumptions underlying the metrics

Question 81

Which of the following is not a typical output from an architectural evaluation?

× A.) Detailed implementation plans
B.) Enhanced system documentation
C.) Sets of scenarios for future use
D.) Sets of ranked risks or issues
Question 82

The purpose of the ATAM is to...

A.) discover the right architecture for a system.

x B.) assess the consequences of architectural decisions.

C.) provide precise analyses.

D.) compare competing architectural designs for a system.

Question 83

A quality attribute utility tree...

A.) facilitates the derivation of quality attribute scenarios from architectural tradeoffs.

B.) measures the utility of proposed design alternatives.

C.) maps architectural patterns to quality attributes.

x D.) prioritizes a list of quality attribute scenarios.

Question 84

In the context of software architecture evaluations, which of the following best describes "a risk?"

x A.) A potentially problematic architectural decision

B.) An architectural decision that affects one or more quality attribute responses positively while negatively affecting others

C.) An architectural decision that is positively correlated to at least one quality attribute response measure

D.) A good architectural decision implicit in the architecture
Question 85

In the context of software architecture evaluations, which of the following best describes "a tradeoff?"

A.) A potentially problematic architectural decision

x B.) An architectural decision that affects one or more quality attribute responses positively while negatively affecting others

C.) An architectural decision that is positively correlated to at least one quality attribute response measure

D.) A good architectural decision implicit in the architecture

Question 86

In the context of software architecture evaluations, which of the following best describes "a sensitivity point?"

A.) A potentially problematic architectural decision

B.) An architectural decision that affects one or more quality attribute responses positively while negatively affecting others

x C.) An architectural decision that is positively correlated to at least one quality attribute response measure

D.) A good architectural decision implicit in the architecture
Question 87

In the context of software architecture evaluations, which of the following best describes "a nonrisk?"

A.) A potentially problematic architectural decision

B.) An architectural decision that affects one or more quality attribute responses positively while negatively affecting others

C.) An architectural decision that is positively correlated to at least one quality attribute response measure

D.) A good architectural decision implicit in the architecture

Question 88

Which of the following is not characteristic of a software product line?

A.) A software product line comprises a set of similar software systems.

B.) Products in a software product line share a common, managed set of features.

C.) A software product line minimizes constraints on product variation.

D.) Products in a software product line are developed from a common set of core assets.

Question 89

Software product line architectures epitomize strategic, planned reuse that might very well include reuse of all of the following except for...

A.) architectural designs, code, and test plans.

B.) requirements, performance models, and network load analyses.

C.) work breakdown structures, project plans, and project schedules.

D.) user documentation, product-specific features, and development tools.
Question 90

The "scope" of a product line architecture refers to...

A.) what stakeholders will be involved in defining the product line.

X B.) which products are included in the product line and which are not.

C.) what markets and users will be targeted by the product line.

D.) how product variations will impact the development schedule.

E.) none of the above

Question 91

The scope of a product line should be...

A.) as narrow as possible to maximize the benefit we get from developing the product line.

X B.) not too narrow and not too broad to justify the investment in development and to minimize maintenance efforts.

C.) as broad as possible to maximize the number of stakeholder needs we are able to satisfy.

D.) defined broadly until the first product is released.

E.) none of the above

Question 92

Variation between two or more products in a software product line might include differences in...

A.) functional and quality attribute requirements.

B.) target platforms and product configurations.

C.) target markets and user interfaces.

X D.) all of the above

E.) none of the above
Question 93

Which of the following answers is false? It is particularly important to evaluate a product line architecture because...

A.) a good architecture may be critical to the success of the organization.

x B.) products that deviate from the core asset base can be identified and developed separately.

C.) many software systems will depend on the architecture.

D.) the investment is greater than the investment in creating the architecture for a single product.

Question 94

Which of the following is not true for product lines?

A.) Tools and processes must be robust.

x B.) Architecture must support variation between skills of development team members.

C.) Software components must be designed to be general.

D.) Architecture must support variation between products.
Question 95

The World Wide Web case study illustrates all of the following except...

A.) the Architecture Business Cycle in action.

× B.) how technological advances tend to stabilize attribute requirements.

C.) the influence an architecture can have on the technical, business, and social environment.

D.) how architectural decisions lead to the achievement of quality attribute requirements.

Question 96

Which of the following factors contributed the least to the success of Celsius Tech’s software product line architecture?

A.) Domain knowledge and experience with similar systems

B.) Building similar systems in parallel

× C.) Coding expertise in command and control systems

D.) Emphasis on information hiding and encapsulation