Number: CPSA-F
Passing Score: 800
Time Limit: 120 min
File Version: 1.0

CPSA-F

Certified Professional for Software Architecture, Foundation Level

Version 1.0

Exam A

QUESTION 1

What are the four key terms in common definitions of software architecture? (Choose four.)

A. Source code
B. Building Blocks
C. Functionality
D. Relationships
E. Components
F. Requirements
G. Interfaces

Correct Answer: BDEF
Section: (none)
Explanation

Explanation/Reference:
Reference: http://www.michael-richardson.com/processes/rup_for_sqa/core.base_rup/guidances/concepts/software_architecture_4269A354.html

QUESTION 2 What role does understandability play for architecture documentation?
(Choose three.)

A. It is desirable, but not essential.
B. It is less important than completeness.
C. It is an important quality characteristic.
D. It is a quality characteristic together with correctness and efficiency.
E. It is a quality characteristic together with simplicity and brevity.
F. It is a quality characteristic together with scope and completeness.

Correct Answer: CDE
Section: (none)
Explanation

Explanation/Reference:
Reference: https://courses.cs.vt.edu/~csonline/SE/Lessons/Qualities/index.html

QUESTION 3
HOTSPOT

Which statements regarding top-down and bottom-up design are true? (Assign all answers.)

Hot Area:

Correct Answer:

Section: (none)
Explanation

Explanation/Reference:

QUESTION 4
HOTSPOT

Which statements with regard to project objectives and architectural objectives are true and which are false? (Assign all answers.)

Hot Area:

Correct Answer:

Section: (none)
Explanation

Explanation/Reference:

QUESTION 5
HOTSPOT

How does management and architects work together? Decide which statements are true and which are false. (Assign all answers.)

Hot Area:

Correct Answer:

Section: (none)
Explanation

Explanation/Reference:

QUESTION 6
HOTSPOT

How are written documentation and verbal communication of software architectures related? Please mark the following statements as true or false. (Assign all answers.) **Hot**

Area:

true	false	
○	○	A) Agile approaches make written documentation unnecessary. In such cases, verbal communication can substitute for documentation.
○	○	B) Written documentation makes verbal reiteration unnecessary.
○	○	C) Despite written documentation, verbal communication of architectural interrelationships is important.
○	○	D) Documentation and communication should use identical terms and rationale.
○	○	E) Documentation should be created primarily for project participants who either cannot or do not want to read the system's source code.
○	○	F) Communication and documentation complement each other: verbal communication helps architects determine what must be recorded in writing.

Correct Answer:

	true	false	
	O	**O**	A) Agile approaches make written documentation unnecessary. In such cases, verbal communication can substitute for documentation.
	O	**O**	B) Written documentation makes verbal reiteration unnecessary.
	O	O	C) Despite written documentation, verbal communication of architectural interrelationships is important.
	O	**O**	D) Documentation and communication should use identical terms and rationale.
	O	**O**	E) Documentation should be created primarily for project participants who either cannot or do not want to read the system's source code.
	O	**O**	F) Communication and documentation complement each other: verbal communication helps architects determine what must be recorded in writing.

Section: (none)
Explanation

Explanation/Reference:

QUESTION 7 Name the three most important fields of template-based architecture documentation.
(Choose three.)

A. To describe module structures (white boxes)
B. To describe individual architectural modules and their external interfaces (black boxes)
C. To use copyright templates for a consistent description of project/system meta information within documents and source codes
D. To use a standardized document structure
E. To reuse code and test case templates

Correct Answer: ABD
Section: (none)
Explanation

Explanation/Reference:
Reference: https://buildmedia.readthedocs.org/media/pdf/roboy-sw-documentation-template/latest/roboy-sw-documentation-template.pdf

QUESTION 8
HOTSPOT

Which characteristics of a black-box building block are you able to specify as an architect? (Assign all answers.)

Hot Area:

predefinable	not predefinable	
○	○	A) Compliance with functional requirements
○	○	B) Compliance with non-functional requirements (i.e. meeting required constraints)
○	○	C) Metrics for its coupling with other building blocks at the same level of abstraction or at the same level of refinement
○	○	D) Purpose and/or responsibility
○	○	E) Method signature of public interfaces
○	○	F) Data formats of public interfaces
○	○	G) Structure of the source code of this building block

Correct Answer:

predefinable	not predefinable	
●	○	A) Compliance with functional requirements
○	●	B) Compliance with non-functional requirements (i.e. meeting required constraints)
○	●	C) Metrics for its coupling with other building blocks at the same level of abstraction or at the same level of refinement
●	○	D) Purpose and/or responsibility
○	●	E) Method signature of public interfaces
○	●	F) Data formats of public interfaces
○	●	G) Structure of the source code of this building block

Section: (none)
Explanation

Explanation/Reference:

QUESTION 9
HOTSPOT

Which characteristics of a building block are only visible in the whitebox view, and for which characteristics does the blackbox view suffice? (Assign all answers.) **Hot**

 Area:

Correct Answer:

Section: (none)
Explanation

Explanation/Reference:

QUESTION 10
Which of the following techniques are best suited to illustrate the interaction of runtime building blocks? Select the four most suitable techniques.

A. Activity diagrams
B. Sequence diagrams
C. State diagram
D. Flowcharts
E. Class diagrams
F. Tabular description of interfaces
G. Depiction of screen flows (sequence of user interactions)
H. Numbered lists of sequential steps

Correct Answer: ABCE
Section: (none)
Explanation

Explanation/Reference:
Reference: https://www.smartdraw.com/uml-diagram/

QUESTION 11 Which two of the following statements about quality characteristics are most
accurate? (Choose two.)

A. Flexibility reduces testability
B. Increased flexibility improves robustness
C. Simplicity increases comprehensibility
D. Increased efficiency results in reduced performance

Correct Answer: BC
Section: (none)
Explanation

Explanation/Reference:

QUESTION 12
For which quality characteristics is the software architect responsible?
Please name the two characteristics that best match the role of the software architect. (Choose two.)

A. The performance of the software
B. The technical quality of the software implementation
C. The suitability of the software design for its purpose
D. The software is free of errors

Correct Answer: AB
Section: (none)
Explanation

Explanation/Reference:

QUESTION 13
Which of the following statements regarding iterative and incremental design are correct? Please name the three statements that fit the best. (Choose three.)

A. Iterations help to deal with uncertainties.
B. The iterative approach helps to detect design problems at an earlier stage.
C. If the incremental approach is used, risks are detected at a later stage.
D. Iterative design leads to project delays.
E. If iterative design is used; the customer will be less involved.
F. If incremental design is used; key functionality is considered as early as possible.
Correct Answer: ABF

Section: (none)
Explanation

Explanation/Reference:

QUESTION 14
HOTSPOT

Which of the following aspects are more of a domain-related nature, and which more of technical nature? (Assign all answers.)

Hot Area:

Correct Answer:

Section: (none)
Explanation

Explanation/Reference:

QUESTION 15 Which four of the following items can be building blocks of a software architecture?
(Choose four.)

A. an algorithm
B. a component
C. a test harness
D. a class
E. a processor
F. a method/procedure/function/operation
G. a local variable
H. a package

Correct Answer: ABDH
Section: (none)
Explanation

Explanation/Reference:

QUESTION 16
HOTSPOT

Which of the following statements regarding the design principle 'information hiding' are true and which are false? (Assign all answers.)

Hot Area:

true	false	
O	O	A) Adhering to the 'information hiding' principle increases flexibility for modifications.
O	O	B) Information hiding involves deliberately hiding information from callers or consumers of the building block.
O	O	C) Information hiding makes it harder to distinguish between interface and implementation.
O	O	D) Information hiding is a derivative of the approach of incremental refinement along the control flow.
O	O	E) In object-oriented development, information hiding is primarily relevant at class level.

Correct Answer:

true	false	
O	●	A) Adhering to the 'information hiding' principle increases flexibility for modifications.
O	●	B) Information hiding involves deliberately hiding information from callers or consumers of the building block.
●	O	C) Information hiding makes it harder to distinguish between interface and implementation.
O	●	D) Information hiding is a derivative of the approach of incremental refinement along the control flow.
O	●	E) In object-oriented development, information hiding is primarily relevant at class level.

Section: (none)
Explanation

Explanation/Reference:

QUESTION 17 Which two of the following requirements are examples of quality requirements?
(Choose two.)

A. Up to 40,000 requests per day B. User should be
able to select the sort order freely.
C. Spelling is corrected automatically.
D. Failure rate is less than 0.1%.

Correct Answer: BC
Section: (none)
Explanation

Explanation/Reference:

QUESTION 18
HOTSPOT
Conway's law sometimes is referred to as "If you have four teams working on the compiler, you'll get a 4-pass compiler."

Which interpretations of this law are true, which are false? (Assign all answers.)

Hot Area:

Correct Answer:

Section: (none)
Explanation

Explanation/Reference:

QUESTION 19
HOTSPOT

What is the main benefit of the layered architectural pattern? (Assign all answers.) **Hot**

Area:

true	false	
○	○	A) Increasing flexibility
○	○	B) Creating high-performance systems
○	○	C) Being able to use application servers

Correct Answer:

true	false	
●	○	A) Increasing flexibility
○	●	B) Creating high-performance systems
○	●	C) Being able to use application servers

Section: (none)
Explanation

Explanation/Reference:

QUESTION 20
In a customer project the architecture shall be based on components. The requirements have not been fully determined yet.
Taking this constraint into account, which three properties of the components developed by you will you pay particular attention to? (Choose three.)

A. meaningful component names

B. weak coupling
C. strong cohesion
D. open for extension
E. small component size

Correct Answer: CDE
Section: (none)
Explanation

Explanation/Reference:

QUESTION 21
HOTSPOT

Decide if the following statements are true or false. The performance of a system (response time or throughput) often competes with its… (Assign all answers.) **Hot**

Area:

Correct Answer:

Section: (none)
Explanation

Explanation/Reference:
Reference: http://www.cs.unb.ca/~wdu/cs3043/a1ans.htm

QUESTION 22 Which of the following principles apply to
testing? (Choose two.)

A. In general, exhaustive testing is not possible.
B. Where many errors exist, more errors are usually hidden.
C. Sufficient testing will show that a program is free of errors.
D. Error-free test runs also mean: the software is usable.

Correct Answer: AC
Section: (none)
Explanation

Explanation/Reference:

QUESTION 23 Which of the following statements apply to design
patterns? (Choose two.)

A. Design patterns are not invented but discovered.
B. Design patterns should always be described alongside the problem they are supposed to solve.
C. Design patterns are formally defined and can thus be proven to be correct.
D. The number of design patterns used is proportional to the software architecture's quality.

Correct Answer: AB
Section: (none)
Explanation

Explanation/Reference:

QUESTION 24

Which of the following statements are correct? (Choose two.)

A. The push operation usually places a new element onto a stack.
B. A stack acts exactly like a queue.
C. A stack is organized according to the FIFO principle.
D. A stack usually only provides access to one element at a time.

Correct Answer: AD
Section: (none)
Explanation

Explanation/Reference:

QUESTION 25 Which of the following statements are covered by the term
'coupling'? (Choose two.)

A. A building block uses an interface of another building block.
B. Two building blocks offer operations with the same name.
C. A building block only contains operations that belong together logically.
D. A building block uses internal data structures of another building block.

Correct Answer: AC
Section: (none)
Explanation

Explanation/Reference:

QUESTION 26
You want to demonstrate to colleagues that certain building blocks are suitable for the implementation of a use-case scenario. Which
of the following UML diagrams is best suited for this?

A. Use-case diagram
B. Sequence diagram
C. Activity diagramD. Class diagram

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Reference: https://www.lucidchart.com/pages/uml-use-case-diagram

QUESTION 27
HOTSPOT

What is the purpose of defining the system context? (Assign all answers.)

Hot Area:

Correct Answer:

Section: (none)
Explanation

Explanation/Reference:
QUESTION 28 Which views should software architects document? Select the three most
popular views.

A. Deployment view
B. Data view
C. Runtime view
D. Configuration view
E. Non-functional view
F. Link view
G. Stakeholder view
H. Building-block view
I. Interface view

Correct Answer: ABD
Section: (none)
Explanation

Explanation/Reference:
Reference: http://www.michael-richardson.com/processes/rup_for_sqa/core.base_rup/guidances/guidelines/software_architecture_document_F4C93435.html

QUESTION 29
Which elements should be defined in the white-box view of a software building block 'foo'? Select the three most important elements. (Choose three.).

A. The dependencies of the internal building blocks of 'foo'
B. The legal contracts with the suppliers of the internal building blocks of 'foo'
C. The algorithms of the internal building blocks of 'foo'
D. The internal building blocks of 'foo'
E. The rationale for the decomposition of the building block
F. The sizes (in lines of code) of the internal building blocks of 'foo'

Correct Answer: BCE
Section: (none)
Explanation

Explanation/Reference:

QUESTION 30 Which three artifacts does the assessment team create when conducting an ATAM evaluation?
(Choose three.)

A. Architecture-specific chapters of the quality management manual
B. The concrete quality tree
C. Description of quality scenarios
D. A quality model
E. Architecture documentation
F. Selection of the quality attributes of the architectural building blocks
G. List of the architectural risks

Correct Answer: CEG
Section: (none)
Explanation

Explanation/Reference:

QUESTION 31
HOTSPOT

You are supposed to choose a software-architecture modeling tool for a software-development project. You create a suitable criteria catalogue for the choice of appropriate tools.
Which of the following factors can play a role in this? (Assign all answers.)

Hot Area:

Correct Answer:

Section: (none)
Explanation

Explanation/Reference:
Reference: http://ceur-ws.org/Vol-1134/paper6.pdf

QUESTION 32
HOTSPOT

You are responsible for the documentation of the software architecture of a large development project. The project consists of three teams, each with its own architect, but with you as the person having overall responsibility of the entire project's software architecture.
Which of the following measures are beneficial? (Assign all answers.) **Hot**

Area:

beneficial	not beneficial	
○	○	A) As a first step, you divide the whole architecture documentation into sub-documents for each of the three sub-projects and then leave it up to each sub-project to define the internal structure of the respective architecture documentation.
○	○	B) You predefine the structure of the entire architecture documentation. The sub-teams must adhere to the predefined document structures.
○	○	C) You leave the decision regarding the documentation structure to the team that first begins the documentation of its sub-project.
○	○	D) You reject using word processing for the documentation because it is not connected with the source code.
○	○	E) The developers should document their parts of the architecture documentation using source code.

Correct Answer:

beneficial	not beneficial	
○	●	A) As a first step, you divide the whole architecture documentation into sub-documents for each of the three sub-projects and then leave it up to each sub-project to define the internal structure of the respective architecture documentation.
○	●	B) You predefine the structure of the entire architecture documentation. The sub-teams must adhere to the predefined document structures.
○	●	C) You leave the decision regarding the documentation structure to the team that first begins the documentation of its sub-project.
○	●	D) You reject using word processing for the documentation because it is not connected with the source code.
●	○	E) The developers should document their parts of the architecture documentation using source code.

Section: (none)
Explanation

Explanation/Reference:

QUESTION 33
HOTSPOT

You are the software architect on a large development project and are entrusted with the task of building a tool chain for continuous architecture evaluation and analysis.
Which of the following statements regarding this tool selection are correct/incorrect? (Assign all answers.) **Hot**

Area:

correct	incorrect	
○	○	A) Tools for static code analysis find all dependencies in the source code.
○	○	B) Several tools for static code analysis can be used to verify compliance with architectural rules.
○	○	C) Tools for static code analysis can reliably measure cohesion.
○	○	D) Tools for static code analysis can also be used to optimize runtime efficiency by highlighting dependencies.
○	○	E) Tools for dynamic analysis, such as profilers, cannot be used to optimize static structures.

Correct Answer:

correct	incorrect	
○	○ (selected)	A) Tools for static code analysis find all dependencies in the source code.
○ (selected)	○	B) Several tools for static code analysis can be used to verify compliance with architectural rules.
○	○ (selected)	C) Tools for static code analysis can reliably measure cohesion.
○	○ (selected)	D) Tools for static code analysis can also be used to optimize runtime efficiency by highlighting dependencies.
○ (selected)	○	E) Tools for dynamic analysis, such as profilers, cannot be used to optimize static structures.

Section: (none)
Explanation

Explanation/Reference:

QUESTION 34
HOTSPOT

Which information is presented in the building-block view? Rate the alternatives below as either true or false. (Assign all answers.)

Hot Area:

Correct Answer:
Section: (none)
Explanation

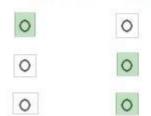**Explanation/Reference:**

QUESTION 35
HOTSPOT

In your project, three architects and seven developers are working on the documentation of the software architecture.
Which methods are appropriate in order to achieve a consistent and adequate documentation, and which are not? (Assign all answers.) **Hot**

Area:

appropriate	not appropriate	
○	○	A) The chief architect creates the documentation.
○	○	B) Identical templates are used for the documentation.
○	○	C) All parts of the architecture documentation are automatically extracted from the source code.

Correct Answer:

appropriate	not appropriate	
●	○	A) The chief architect creates the documentation.
○	●	B) Identical templates are used for the documentation.
○	●	C) All parts of the architecture documentation are automatically extracted from the source code.

Section: (none)
Explanation

Explanation/Reference:

QUESTION 36 What do you have to take into account when designing external interfaces?
(Choose three.)

A. Volatility of neighbouring systems
B. Adequate usage of the broker pattern
C. Protocols enforced by neighbouring systems
D. Expected amount of parallel calls
E. Ease of implementation
F. Effect on the coupling in the building block view

Correct Answer: CEF
Section: (none)
Explanation

Explanation/Reference:

QUESTION 37
HOTSPOT
Which of the following statements about the coupling between building blocks are correct? (Assign all answers.)

Hot Area:

Correct Answer:

Section: (none)
Explanation

Explanation/Reference:

QUESTION 38
HOTSPOT

You are the software architect of a system that has run for many years and been extended repeatedly. An analysis of the source code has revealed a multitude of dependencies between the classes.
Which of the following measures are possible solutions? (Assign all answers.)

Hot Area:

true	false	
O	O	A) The dependencies between classes are the responsibility of the developers. No measures are required within the architecture.
O	O	B) Loosening of direct dependencies between classes through the introduction of interfaces
O	O	C) Loosening of direct dependencies between classes through the introduction of factories

Correct Answer:

true	false	
O	●	A) The dependencies between classes are the responsibility of the developers. No measures are required within the architecture.
●	O	B) Loosening of direct dependencies between classes through the introduction of interfaces
O	●	C) Loosening of direct dependencies between classes through the introduction of factories

Section: (none)
Explanation

Explanation/Reference:

QUESTION 39 Select the two most appropriate methods for evaluating the reliability of a software system.
(Choose two.)

A. Determining the number of 'lines of code'
B. Measurement of 'Mean-Time-between-Failure'
C. Execution of performance tests
D. Determination of the cyclomatic complexity
E. Conducting an ATAM evaluation

Correct Answer: BC
Section: (none)
Explanation

Explanation/Reference:
QUESTION 40 What are known patterns for the adaptation of
interfaces? (Choose two.)

A. Bridge

B. Tower
C. Observer
D. Façade
E. Wall

Correct Answer: AC
Section: (none)
Explanation

Explanation/Reference:
Reference: http://www.cs.fsu.edu/~myers/cop3331/notes/patterns2.html

QUESTION 41 Which of the following statements about (crosscutting) concepts are most
appropriate? (Select four.)

A. The definition of appropriate concepts ensures the conceptual integrity of the architecture.
B. Concepts are a means to increase consistency.
C. For each quality goal there should be an explicitly documented concept.
D. Uniform exception handling is most easily achieved when architects agree with developers upon a suitable concept prior to implementation.
E. A concept might be implemented by a single building block.
F. Uniform usage of concepts reduces coupling between building blocks.
G. A concept can define constraints for the implementation of many building blocks.

Correct Answer: ABDG
Section: (none)
Explanation

Explanation/Reference:

QUESTION 42 Choose the most desirable characteristics of interfaces.
(Choose three.)

A. Easy to extend
B. Geared towards the capabilities of the provider
C. Clear descriptions of assertions and prerequisites
D. As few parameters as possible
E. Scalable to many consumers
F. Remotely callable
G. Hard to misuse

Correct Answer: BCF
Section: (none)
Explanation

Explanation/Reference:

QUESTION 43
HOTSPOT

Concerning external interfaces, Postel's law suggests: "Be conservative in what you do, be liberal in what you accept from others." Assume that Postel's law has been consistently applied in your system. (Assign all answers.) **Hot Area:**

Correct Answer:

Section: (none)
Explanation

Explanation/Reference: