quiz solution w4

Question 1

Which of these views show the functional design of the software, usually in the form of objects and the relationships between them?

☐ **physical view**

Incorrect

Incorrect. The physical view is more concerned with the physical deployment of the software.

☐ **process view**

Incorrect

Incorrect. The process view is typically focused on more non-functional requirements.

☑ ~~**logical view**~~

Correct

Correct! The logical view lays out the objects of the system, allowing you to see the key abstractions and the interactions among parts.

☐ **development view**

Incorrect

Incorrect. The development view is more about the development environment.

Question 2

Which of these UML diagrams are likely to be part of the process view? **Select two correct answers**.

1 point

☑ ~~**Activity diagram**~~

Correct

Correct! Activity diagrams can illustrate the processes in the system.

☑ ~~Sequence diagram~~

Correct

Correct! A sequence diagram illustrates a process in the software.

☐ **Class diagram**

This should not be selected

Incorrect. This belongs in the logical view.

☐ **State diagram**

This should not be selected

Incorrect. This belongs in the logical view.

Question 3

To which view would the Package Diagram belong? Remember that a package diagram shows the packages that make up a software and how they are related.

☐ **process view**

Incorrect

Incorrect. Process view is typically associated with how the software behaves dynamically.

☑ ~~development view~~

Correct

Correct! The internal makeup of the software is expressed in the development view. Another UML diagram you might find here is a Component diagram.

☐ **logical view**

Incorrect

Incorrect. The logical view is mostly concerned with the functionality that the end-users get.

☐ **physical view**

Incorrect

Incorrect. The physical view is mostly concerned with the hardware and development environments to which the software is deployed.

Question 4

Which of these statements about Component Diagrams is **true**?

☐ **They are useful for clarifying the artifacts that will be produced from development**

Incorrect

Incorrect. This is a job for deployment diagrams.

☐ **They do not show third-party libraries**

Incorrect

Incorrect. Third-party libraries are often included to see how they interact with the native components.

☐ **They give a dynamic view of the system**

Incorrect

Incorrect. Component views are static - they show a snapshot of the structure of the program

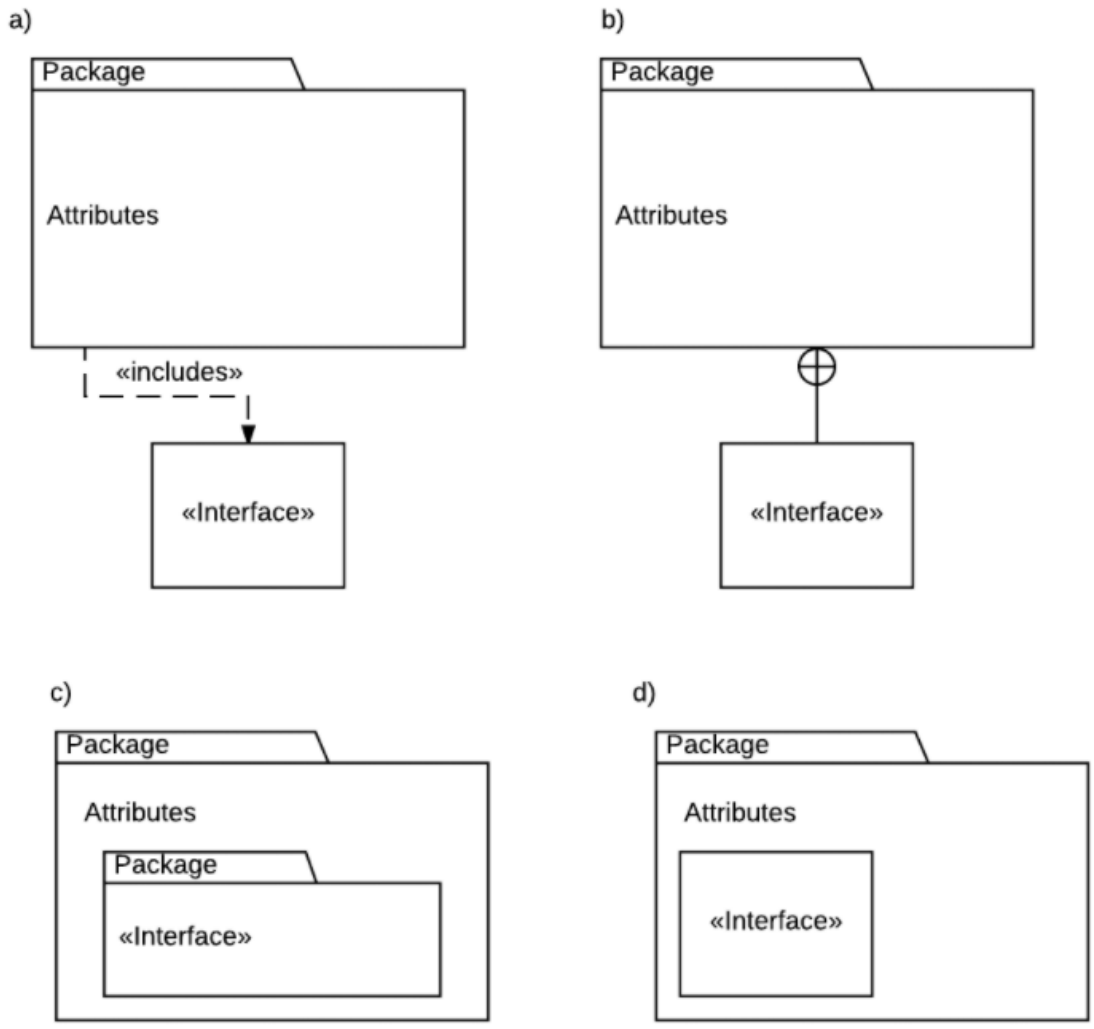
☑ ~~**They clarify dependency relationships**~~

Correct

Correct! Dependencies are shown with ball and socket and other connectors.

Question 5

Which of these Package Diagrams is **invalid**?



☐ **a)**

Incorrect

Incorrect. Everything depicted in this diagram is valid!

☐ **b)**

Incorrect

Incorrect. Everything depicted in this diagram is valid! The crossed box means that the interface is included in that package.

☑ ~~c)~~

Correct

Correct! Includes is not a keyword that is used in package diagrams. Use the crossed box instead.

☐ **d)**

Incorrect

Incorrect. Everything depicted in this diagram is valid!

Question 6

Which of these will you **NOT** find in a deployment diagram?

☐ **component**

Incorrect

Incorrect. Often, deployment diagrams will show how components are manifested in their nodes.

☐ **library**

Incorrect

Incorrect. Libraries are often shown in deployment diagrams.

☐ **device**

Incorrect

Incorrect. Devices are one of the types of nodes that can be depicted.

☐ **execution environment**

Incorrect

Incorrect! These are one of the types of nodes that can be depicted.

☑ ~~**class**~~

Correct

Correct! The lowest level usually depicted in a deployment diagram is a component. Individual classes are not shown.

☐ **artifact**

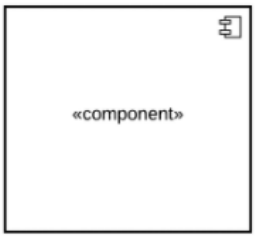
Incorrect

Incorrect. Artifacts manifest components and are usually a key part of deployment diagrams.

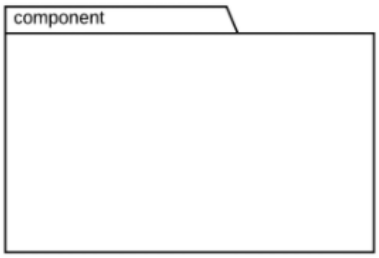
Question 7

Which of these diagrams correctly shows a component?

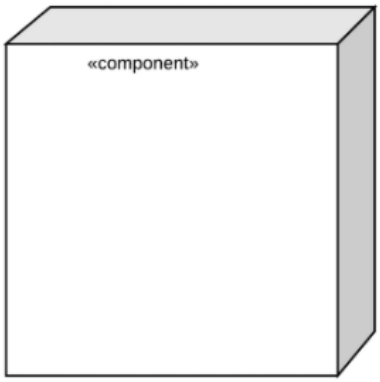
a)



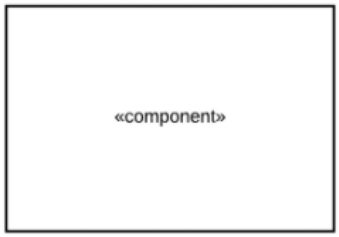
b)



c)



d)



1 point

☑ ~~a)~~

Correct

Correct! A component can also be shown with a large version of the icon in the top right

☐ **b)**

Incorrect

Incorrect. This is the shape used for a package.

☐ **c)**

Incorrect

Incorrect. This is the shape used for a node.

☐ **d)**

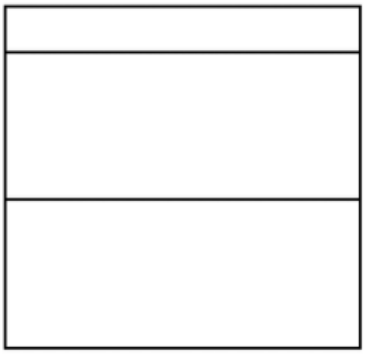
Incorrect

Incorrect. This is a general shape, often used for artifacts or libraries.

Question 8

Which of these does **NOT** belong on an activity diagram?

a) 

b) 

c) 

d) 

1 point

☐ **a)**

Incorrect.

This black bar either forks the process into concurrent ones or joins them at the end!

☑ ~~b)~~

Correct

Correct! Classes are too low-level to show in the higher-level activity diagram.

☐ **c)**

Incorrect

Incorrect. This is called a state box and is used on activity diagrams to show an activity.

☐ **d)**

Incorrect

Incorrect. This diamond depicts a decision fork.

Question 9

What is an **artifact**?

☐ **Part of the development process that is important to the developers, but not the end- users**

Incorrect

Incorrect. There are many details of development that are not important to end-users, but they're not called artifacts!

☑ ~~A physical realization of a software component~~

Correct

Correct! This could be an executable file or a config file, for example.

☐ **A part of a device that is nonetheless important to depict on the deployment diagram, like a hard-drive**

Incorrect

Incorrect. If it is important to note something like this, nodes can be nested.

☐ **An unintended effect that the software has on the device.**

Incorrect

Incorrect. This is a bug and should be eliminated!

Question 10

What is an abstract data type?

☐ **a data type that dynamically allows the storage of different primitives**

Incorrect

Incorrect! This is not an abstract data type.

☑ ~~**a data schema that is defined by the developer**~~

Correct

Correct! Abstract data types are defined by the developer to structure data in ways that are meaningful and show the key concepts of interactions.

☐ **a data type that is not actually storing data; instead it is used to define interfaces**

Incorrect

Incorrect. This is not a common way to use data types in our knowledge!

☐ **an interface that defines how to store data in a class**

Incorrect

Incorrect. At least in Java, interfaces cannot define variables, only methods and constants.

Question 11

Which of these are advantages of main program and subroutine architectural style? Select **two correct answers.**

☐ **abstract data types are easy to define and extend**

This should not be selected

Incorrect. Typically the procedural languages used for this style do not allow extending abstract data types.

☐ **easily mapped to all kinds of real-world problem spaces**

This should not be selected

Incorrect. This is typically considered an advantage of more object-oriented architectures.

☑ ~~**promotes function modularity and reuse**~~

Correct

Correct! Like reusing classes in object-oriented languages, developers try to write functions in a rewriteable way.

☑ ~~**efficient for computation focused problems**~~

Correct

Correct! Having objects for an algorithmic problem may be neither necessary nor useful.

Question 12

Which of these accurately represents basic Database Architecture?

a)

b)

c)

d)

☐ **a)**

Incorrect

Incorrect. The Data Accessors need the Central Data to work, not the other way around.

☐ **b)**

Incorrect

Incorrect! Though the dependency is shown correctly, basic database architecture does not require a middle layer.

☑ ~~c)~~

Correct

Correct! There are only two parts to basic database architecture, and the data accessors are clients of the central data.

☐ **d)**

Incorrect

Incorrect. The dependency is the wrong way around, and we are not looking for a layered database architecture.

Question 13

Select the **one accurate statement** about layered architecture:

☑ ~~Layered architecture is often based on layers of abstraction~~

Correct

Correct! This is especially true in communications protocols, but also for operating systems and in other usage.

☐ **Enforcing communication only between adjacent layers and within a layer is key to good, layered architecture**

Incorrect

Incorrect. This requirement is often relaxed in real-world software

☐ **Upper layers act as service providers to lower layers**

Incorrect

Incorrect. This relationship goes the other way!

☐ **Passthrough should be avoided at all costs**

Question 14

What is the correct term for a machine that hosts a server?

☐ **Called by type: e.g. print server or media server**

Incorrect

Incorrect, although people might speak this way informally.

☐ **server-machine**

Incorrect

Incorrect. This is not a term that is used.

☑ ~~**server-host**~~

Correct

Correct! A machine hosting a server process is called a server-host.

☐ **server-tier**

Incorrect

Incorrect. There may be more than one servers in a tier.

Question 15

Some programs allow users to record a sequence of inputs - for example keyboard and mouse inputs - to run later. What are these called?

☐ **user recorders**

Incorrect

Incorrect. This is not a term that is used.

☑ ~~**macros**~~

Correct

Correct! Macros allow users to record sequences of inputs to run later.

☐ **input listeners**

Incorrect

Incorrect. This term is not used for this application.

☐ **scripts**

Incorrect

Incorrect. Scripts are very similar, but are textual.

Question 16

Data Flow Architecture is also called...

- [x] ~~Pipe and Filter Architecture~~

Correct

Correct! This architecture consists of pipes (basically flows of data) and filters (which transform the data.

- [ ] **Cascade Architecture**

Incorrect

Incorrect. Cascade is not used for this architecture!

- [ ] **Black Box Architecture**

Incorrect

Incorrect, although some of the transformations are considered black boxes from outside.

- [ ] **Data Transformation Architecture**

Incorrect

Incorrect. Although this is essentially the nature of the architecture, it's not the name it goes by.

Question 17

Which of these is **NOT** a common component of event-driven architectures?

- [ ] **event bus**

Incorrect

Incorrect. The event bus is a key feature of event-driven architectures; it receives events and directs them to the correct place.

- [x] ~~event processor~~

Correct

Correct! The "processing" of events is split between the event bus, which directs them to the correct place, and the event consumers, which decide what to do with them.

☐ **event consumer**

Incorrect

Incorrect. Event consumers decide what to do with events that are directed to them.

☐ **event generator**

Incorrect

Incorrect. Event generators are a key feature of this architecture.

Question 18

Which type of process control that we discussed is typically needed for complex systems?

☐ **Machine Learning**

Incorrect

Incorrect. Machine learning is usually important for building models that are used in process control, but it is inadequate for process control on its own.

☐ **Feedforward Control + Feedback Control**

Incorrect

Incorrect. Even feedforward and feedback working in conjunction are fairly limited in the complexity of a system that they can control.

☑ ~~**MAPE-K**~~

Correct

Correct! MAPE-K control is good at dealing with more complex systems.

☐ **Feedforward Control**

Incorrect

Incorrect. Although feedforward gives better responsiveness than feedback loop, it cannot be used alone in a complex system.

Question 19

Which of these is a **drawback** of n-Tier architecture?

- [x] ~~Every tier demands extra resources to manage the client/server relationships~~

Correct

Correct! Typically a server in one tier has many clients; these relationships take resources (for example, IT support) to support.

- [ ] **Limited in scale**

Incorrect

Incorrect. N-Tier architectures are very scalable.

- [ ] **More hardware nodes are necessary**

Incorrect

Incorrect. n-Tier architecture does not even need more than one hardware node.

- [ ] **Only asynchronous messaging is possible, leading to challenging development decisions**

Incorrect

Incorrect. Both asynchronous and synchronous messaging can be implemented, each coming with tradeoffs.

Question 20

Which of these is **NOT** an example of Interpreter type architecture?

- [x] ~~The kernel of an operating system~~

Correct

Correct! This is better described as a layered architecture, wherein the lower layers provide services to the ones above.

☐ **Java Virtual Machine**

Incorrect

Incorrect. The JVM uses interpretation to make Java portable across all different execution environments.

☐ **Excel formulas**

Incorrect

Incorrect. Excel formulas are an example of using user-input to perform computation through the use of interpreters.

☐ **Scripting and Macros**

Incorrect

Incorrect. Scripting and macros are achieved by interpreting user-created scripts (scripting) or interpreting recorded user interactions (macros).

Question 21

Which of these terms matches this definition: “The amount of time the system is operational over a set period of time?”

☐ **interoperability**

Incorrect

Incorrect. This refers to how well the system interacts with different external systems.

☐ **usability**

Incorrect

Incorrect. Usability refers to the ease with which the user interacts with the system!

☐ **performance**

Incorrect

Incorrect. The performance is about the speed, usually including both latency and throughput.

☑ ~~availability~~

Correct

Correct! This is a description of the system's availability.

Question 22

Which of these quality attributes is most important from the developer's perspective?

☑ ~~flexibility~~

Correct

Correct! Flexibility is how well a system can adapt to requirements change; this is a concern for the developer not the customer.

☐ **availability**

Incorrect

Incorrect. The availability is a concern to the end user, although the developer will of course seek to make the system as available as possible.

☐ **usability**

Incorrect

Incorrect. Usability is a concern from the customer's perspective, although, of course, the developer will seek to provide high usability.

☐ **security**

Incorrect

Incorrect. The security is a concern to the end user, for example by protecting their personal data from third parties.

Question 23

[Q23] could be described as: "**how the artifact will behave as a result of receiving a stimulus**." What is this called?

☐ **response measure**

Incorrect

Incorrect, but you're getting close!

☐ **environment**

Incorrect

Incorrect. The environment is the mode of the system when it receives a stimulus.

☐ **output**

Incorrect

Incorrect. Developers don't think of this as an output, although the term you're looking for is similar!

☑ ~~**response**~~

Correct

Correct! The artifact responds to the stimulus with a response.

Question 24

[Q24] could be described as: **"the mode of the system when it receives a stimulus."** What is this called?

☐ **approach**

Incorrect

Incorrect. Approach is not a term that is used to build quality attribute scenarios.

☑ ~~**environment**~~

Correct

Correct! This is called the environment.

☐ **context**

Incorrect

Incorrect, although this could be considered a synonym!

☐ **scenario**

Incorrect

Incorrect. Remember that the whole diagram is considered a scenario!

Question 25

General quality attributes like performance and security have more specific components like throughput and latency for performance. What are these called?

☐ **architecture specifications**

Incorrect

Incorrect. This is not a term with a precise definition in Architecture Tradeoff Analysis Method!

☐ **architecturally significant requirements**

Incorrect

Incorrect. Architecturally significant requirements are the lowest branch of the tree; they are specific metrics!

☐ **sensitivity points**

Incorrect

Incorrect. Sensitivity points are processes in a system that could affect specific quality attributes.

☑ ~~**attribute refinement**~~

Correct

Correct! Attribute refinements are qualities that a system has, more specific than very general ones like security or availability.

Question 26

Which strategy is **NOT** part of delivering a high-quality system?

☐ **Set rules for design and implementation**

Incorrect

Incorrect. Setting rules helps your system achieve conceptual integrity.

☑ ~~**Treat all quality attributes as equally important**~~

Correct

Correct. In an ideal world you could deliver high quality software in every respect, but time and resources will force you to make tradeoffs in the quality attributes, so it is important to prioritize them.

☐ **Involve all stakeholders in design**

Incorrect

Incorrect. This is part of delivering a high-quality system! Involving all stakeholders ensures that you considered all perspectives.

☐ **Adopt good documentation practices**

Incorrect

Incorrect. Good documentation practices will ensure that the important details of your system are not lost over time.

Question 27

True or **False**: You should focus on situations that are outside the normal execution path when building a quality attribute scenario.

☑ ~~**True**~~

Correct

Correct! These cases will likely be the source of most errors.

☐ **False**

Incorrect

Incorrect. Most errors will likely stem from the system operating outside of normal conditions.

Question 28

"Maintenance Downtime" is an attribute refinement of what quality attribute?

☑ ~~**Availability**~~

Correct

Correct! Availability is the amount of time the system is operational. Maintenance downtime takes away from the availability.

☐ **Maintainability**

Incorrect

Incorrect. Maintainability is the ease with which your system can undergo change. It may affect the maintenance downtime, but is not the category it belongs in.

☐ **Performance**

Incorrect

Incorrect. Performance is typically broken down into throughput and latency.

☐ **Conceptual Integrity**

Incorrect

Incorrect. Conceptual integrity is more to do with consistency in the system.

Question 29

Eliza is planning a product line of media boxes. Some of these will connect to traditional television lines, whereas others will only have internet media like video-streaming services. What is this type of difference between products called?

☐ **Adaptation**

Incorrect

Incorrect. Adaptation is a term for a specific style of creating differences in your products!

☐ **Product-Specifics**

Incorrect

Incorrect. Product-specifics only apply to one product.

☐ **Extension**

Incorrect

Incorrect. Extension is a term for a specific style of creating differences in your product line!

☑ ~~**Variation**~~

Correct

Correct! Variations are parts of the product line that some products do and some products do not have.

Question 30

Mozilla Firefox and other browsers have ecosystems of add-ons for their browsers that add functionality, for example by blocking ads or providing tools for online shopping. What is this style of variation called?

☑ ~~**Extension**~~

Correct

Correct! Typically a common interface is presented to which many of these add-ons can be fitted.

☐ **Reference Architecture**

Incorrect

Incorrect. Reference architecture is not a style of variation but a tool that is used with any of these variation styles.

☐ **Replacement**

Incorrect

Incorrect. Add-ons do not replace part of the browser, but are an addition to the core functionality.

☐ **Adaptation**

Incorrect

Incorrect. In an adaptation-style variation, variations are realized by specific interfaces that can be changed, for example with config files. Add-ons are used with a general interface.