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OMG-Certified Systems Modeling Professional - Model Builder – Advanced

OMG OMG-OCSMP-MBA400

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QUESTION NO: 1

Choose the correct answer

A system modeler exports requirements from a requirements management tool into a spreadsheet and then imports the requirements into a system modeling tool.

Which type of data exchange is this considered?

- A. manual exchange
- B. file-based exchange
- C. interaction-based exchange
- D. repository-based exchange

ANSWER: B**Explanation:**

This type of data exchange is considered file-based exchange because it involves transferring data between different tools using files as intermediaries. A file-based exchange is a common way of exchanging data between tools that do not have direct integration or compatibility. It requires the tools to support import and export functions for a common file format, such as CSV, XML, XMI, etc. A file-based exchange can be useful for transferring large amounts of data or for performing batch operations. However, it can also have some drawbacks, such as loss of information, lack of synchronization, or manual intervention. References: <https://www.omg.org/ocsm/ocsm/ocsm-adv-exam.htm>

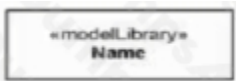
<https://www.ibm.com/docs/en/esdr/9.0.1?topic=tools-exchanging-model-data-by-using-xmi>

QUESTION NO: 2

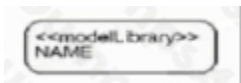
Choose the correct answer.

Which element would be used to depict a model library on a diagram?

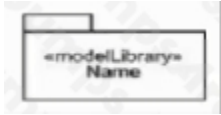
A)



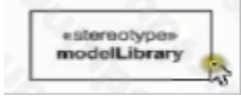
B)



C)



D)



- A. Option
- B. Option
- C. Option
- D. Option

ANSWER: C**Explanation:**

The element that would be used to depict a model library on a diagram is a package with the stereotype <> applied to it. This stereotype indicates that the package contains reusable model elements that can be imported into other models. Option C shows a package with this stereotype. References: <https://www.omg.org/ocsm/ocsm-adv-exam.htm>
<https://www.omg.org/spec/SysML/1.6/PDF>

QUESTION NO: 3

Choose the correct answer.

When defining a stereotype, a modeler may wish to put some constraints on the stereotype, its properties, or its relationships. What is the most suitable language to accomplish this?

- A. DSL
- B. OCL
- C. VSL
- D. XMI
- E. XML

ANSWER: B**Explanation:**

OCL stands for Object Constraint Language, which is a standard language for expressing constraints on UML and SysML models. Constraints are used to specify additional rules or conditions that are not directly captured by the modeling elements or their relationships. OCL can be used to define constraints on stereotypes, their properties, or their relationships in a profile. References: <https://www.omg.org/ocsm/ocsm-adv-exam.htm> <https://www.omg.org/spec/OCL/About-OCL/>

QUESTION NO: 4

Choose the correct answer

What is best practice to model a software application in a SysML model for a system?

- A. block stereotyped with «software» represents the software application and its interfaces
- B. A class stereotyped with «software» represents the software application and its interfaces
- C. A component stereotyped with «software» represents the software application and its interfaces.
- D. Software is typically not modeled in a system SysML model

ANSWER: A**Explanation:**

The best practice to model a software application in a SysML model for a system is to use a block stereotyped with «software» to represent the software application and its interfaces. A block is a modular unit that encapsulates its structure and behavior and can be connected to other blocks via ports and connectors. A stereotype is an extension of an existing metaclass that adds additional information or semantics to a model element. By using a block stereotyped with «software», the software application can be modeled as a system component with its own properties, operations, ports, flows, etc., and can be allocated to hardware blocks or other software blocks. References: <https://www.omg.org/ocsm/ocsm-adv-exam.htm> https://www.ibm.com/docs/SSB2MU_8.2.0/com.ibm.rhp.sysml.doc/topics/rhp_c_dm_sysml_profile_features.html

QUESTION NO: 5

Choose the correct answer

A senior engineer has been assigned to set up a SysML model for the development of a medical device. Many stakeholders are involved, ranging from the development team to management, quality assurance, and regulatory experts. All must use the model

Which choice defines a set of common tasks that will prepare the model for the stakeholders?

- A. 1) Define and apply appropriate profiles
- 2) Create a package structure that covers the relevant aspects
- 3) Set up a modeling center of excellence who builds the model for the stakeholders.

- B. Define and apply appropriate profiles
- 2) Define viewpoints for the different stakeholder concerns and set up conformant views
- 3) Create a package structure that covers the relevant aspects

- C. 1) Define one common set of SysML elements for all stakeholders.

- 2) Create a package structure that covers the relevant aspects
 - 3) Set up model access rights (read/write/delete) for the different stakeholder groups
- D. 1) Define viewpoints for the different stakeholder concerns and set up conformant views
- 2) Set up model access rights (read/write/delete) for the different stakeholder groups
 - 3) Nominate a model builder for each stakeholder group.

Answer: B

Explanation:

This choice defines a set of common tasks that will prepare the model for the stakeholders by using profiles, viewpoints, and packages. Profiles are used to extend SysML with domain-specific or methodology-specific concepts. Viewpoints are used to define different perspectives on the model that address different stakeholder concerns. Packages are used to organize the model elements into logical groups. These tasks will help to customize, structure, and communicate the model effectively.

References: <https://www.omg.org/ocsm/ocsm-adv-exam.htm>

https://www.ibm.com/docs/SSB2MU_8.2.0/com.ibm.rhp.sysml.doc/topics/rhp_c_dm_sysml_profile_features.html

- A.** Define and apply appropriate profiles
- 2) Define viewpoints for the different stakeholder concerns and set up conformant views
 - 3) Create a package structure that covers the relevant aspects
- B.** 1) Define one common set of SysML elements for all stakeholders.
- 2) Create a package structure that covers the relevant aspects
 - 3) Set up model access rights (read/write/delete) for the different stakeholder groups
- D. 1) Define viewpoints for the different stakeholder concerns and set up conformant views
- 2) Set up model access rights (read/write/delete) for the different stakeholder groups
 - 3) Nominate a model builder for each stakeholder group.

ANSWER: A

Explanation:

This choice defines a set of common tasks that will prepare the model for the stakeholders by using profiles, viewpoints, and packages. Profiles are used to extend SysML with domain-specific or methodology-specific concepts. Viewpoints are used to define different perspectives on the model that address different stakeholder concerns. Packages are used to organize the model elements into logical groups. These tasks will help to customize, structure, and communicate the model effectively.

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https://www.ibm.com/docs/SSB2MU_8.2.0/com.ibm.rhp.sysml.doc/topics/rhp_c_dm_sysml_profile_features.html

QUESTION NO: 6

Choose the correct answer

Which feature needs to be added to the systems development environment to conduct a performance simulation?

- A.** numerical solver

- B. object constraints
- C. parametric diagrams
- D. high-level architecture

ANSWER: A

Explanation:

This feature needs to be added to the systems development environment to conduct a performance simulation because it enables users to solve mathematical equations and models that represent system performance. A numerical solver is a software tool that can perform numerical analysis and computation on a given problem or model. A numerical solver can help users to evaluate system performance by solving equations that describe system behavior, properties, constraints, etc. A numerical solver can also help users to optimize system performance by finding optimal solutions or trade-offs for a given problem or model. References: <https://www.omg.org/ocsm/ocsm-adv-exam.htm> <https://sysml.org/tutorials/sysml-diagram-tutorial/>

QUESTION NO: 7

Choose the correct answer

Which kinds of model elements are used to populate the typical stakeholder views of a design?

- A. primarily behavior elements, such as activity, state and sequence diagrams
- B. primarily structural elements, such as block definition and internal block diagrams
- C. both behavioral and structural diagrams
- D. primarily use case and requirements diagrams

ANSWER: C

Explanation:

The typical stakeholder views of a design are composed of both behavioral and structural diagrams, depending on the purpose and perspective of the view. Behavioral diagrams show how the system or part behaves or interacts in different scenarios or states, such as activity, state and sequence diagrams. Structural diagrams show how the system or part is composed of parts, ports, connectors and properties, such as block definition and internal block diagrams. Both types of diagrams are important to convey the functionality and architecture of the system or part to different stakeholders. Use case and requirements diagrams are not sufficient to populate the stakeholder views of a design, as they only capture the functional and non-functional aspects of the system or part. References: OMG-Certified Systems Modeling Professional - Model Builder – Advanced (OCUP2-ADV) Examination Guide Version 1.0, Section 4.4

QUESTION NO: 8

Choose the correct answer

A large company uses SysML to design energy systems, and plans to use a specialized proprietary analysis tool (X) for evaluating and comparing the cost, performance, and reliability of energy system alternatives. The engineers at the company want to automatically create analysis models in X from design models in SysML.

To achieve this, they will use the following process:

- (1) Specify the appropriate module in X to be used for each block in the SysML design model.
- (2) Write scripts that use these mappings to automatically create analysis models in X

Which approach is most flexible when enabling this automation?

- A.** define a package that contains a note for each type of module in X. and anchor notes to the blocks in the design model
- B.** define a profile that contains a stereotype for each type of module in X. and assign the stereotype to the blocks in the design model
- C.** define a profile that contains a tag for each type of X in the tool, and assign the stereotype to the blocks in the design model
- D.** define a profile that contains a stereotype with a tag that can store the name of the module in X. apply the stereotype to the blocks in the design model, and populate the tag
- E.** define a package that contains a block for each type of module in X (e.g. module_1 block) and create a dependency relationship from the module block to the blocks in the design model

ANSWER: D

Explanation:

A profile is a mechanism for customizing SysML for a specific domain or purpose. A stereotype is a way of extending or modifying the semantics of a SysML element. A tag is an attribute of a stereotype that can store additional information. By defining a profile that contains a stereotype with a tag that can store the name of the module in X, the engineers can easily map the blocks in the design model to the corresponding modules in X, and use scripts to automate the creation of analysis models. [This approach is more flexible than using notes, dependencies, or predefined tags, because it allows for more control and consistency over the mapping process](#)

QUESTION NO: 9

Choose the correct answer.

An engineering team has been charged to design and build an embedded real-time control system using COTS (Commercial Off-The-Shelf) purchased components where possible. A technical risk for such a control system is that the system will miss (i.e. fail to respond to) critical inputs. The project has the additional risk that there may not be any components on the market that will meet both timing and cost constraints.

Given this, what information must be in the model before the engineering team can begin selecting and procuring COTS components?

- A.** timing constraints for all behaviors involved in responding to a critical input
- B.** (1) timing constraints for all behaviors involved in responding to a critical input (2) total system production cost provided by the customer
- C.** (1) minimum period of time between any two successive critical inputs (2) maximum acceptable time to produce all outputs for a critical input (3) allocation of (2) to all behaviors involved in responding to a critical input (4) total system production cost provided by the customer

D. (1) minimum period of time between any two successive critical inputs
(2) maximum acceptable time to produce all outputs for a critical input
(3) allocation of (2) to all behaviors involved in responding to a critical input
(4) total system production cost provided by the customer
(5) allocation of (4) to system components

E. (1) minimum period of time between any two successive critical inputs
(2) maximum number of critical inputs that will arrive in a given time interval
(3) maximum acceptable time to produce all outputs for a critical input
(4) allocation of (3) to all behaviors involved in responding to a critical input
(5) total system production cost provided by the customer
(6) allocation of (5) to system components

ANSWER: E

Explanation:

The information in option E is necessary and sufficient for the engineering team to begin selecting and procuring COTS components for the embedded real-time control system. This information defines the timing and cost requirements and constraints for the system and its components, which are essential for evaluating and comparing the available COTS components. The other options are either incomplete or irrelevant for this purpose. For example, option A does not include the minimum period of time between critical inputs, the maximum number of critical inputs, or the cost information. Option B does not include the minimum period of time between critical inputs or the maximum number of critical inputs. Option C does not include the maximum number of critical inputs or the allocation of cost to system components. Option D does not include the maximum number of critical inputs.

QUESTION NO: 10

Choose the correct answer.

A control unit aboard a ship sends commands to a remote-controlled submarine, which in turn sends messages to the ship after completing each major stage of its overall mission. For each distinct stage, the ship orders the submarine to perform a different set of operations. Completing any given stage takes a widely variable amount of time.

Why is it appropriate to use the MARTE profile to model this system with SysML?

- A.** The control unit is an embedded system, which the MARTE profile makes it possible to model in SysML
- B.** The stage transitions of the mission equate to a logical dock, a temporal construct that MARTE brings to SysML
- C.** The stage transitions of the mission equate to a chronometric clock, a temporal construct that MARTE brings to SysML
- D.** The control unit must order the submarine's operations in real time, which the MARTE profile makes it possible to model in SysML.

ANSWER: D

Explanation:

It is appropriate to use the MARTE profile to model this system with SysML because the control unit must order the submarine's operations in real time, which the MARTE profile makes it possible to model in SysML. MARTE is a UML profile that provides concepts and annotations for modeling and analyzing real-time and embedded systems. It supports modeling time-related properties and constraints, such as deadlines, periods, durations, clocks, etc., as well as resource-related

properties and constraints, such as memory, CPU, power, etc. By using MARTE, one can capture the real-time requirements and behavior of the system and perform schedulability and performance analysis. References:
<https://www.omg.org/ocsm/ocsm-adv-exam.htm> <https://www.omg.org/spec/MARTE/1.2/About-MARTE/>