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Started at Thursday, June 1, 2023 at 4:55 p.m

status Completed

Finished at Thursday, June 1, 2023 at 5:26 p.m

Spent time 30 minutes 59 seconds

Evaluation Not rated yet

question **1**

Correct

Score 1.00 out of 1.00

Which kind of failure is described?

The system fails due to a bit flip in memory.

- ☒ a. Random Failure
- ☐ b. Systematic failure



The answer is correct.

The correct answer is:
Random Failure

question **2**

Correct

Score 1.00 out of 1.00

Which of the replication types do you need to choose for the given description?

You are developing a safety-critical system which needs high reliability.

- ☒ a. Pessimistic Replication
- ☐ b. Optimistic Replication



The answer is correct.

The correct answer is:
Pessimistic Replication

question **3**

Incorrect

Earned points 0.00 out of 1.00

How many redundant components do you need at least to satisfy the following requirement?

You are developing a safety critical system and want to apply the MooN redundancy pattern. One of the requirements of the system is that it still has to function even if 1 of the redundant components have failed.

- ☐ a. 9
- ☐ b. 7
- ☒ c. 5
- ☐ i.e. 3



The answer is wrong.

The correct answer is:

3

question **4**

Complete

Achievable points: 5.00

ISO 26262 defines ASIL level to classify the criticality of functions.

(a) **Name the defined ASIL levels and state which has the highest criticality. (1 point)**

Answer Template:

The ASIL levels are ..., with ... being the highest criticality.

(b) **Assume that you develop the function of an airbag. Show exemplarily how you would determine the respective ASIL level and give a brief explanation for your choices. (4 points)**

Answer Template:

The criticality assessment is based on <property_1>, ..., <property_n>.

I evaluate <property_1> as ..., because

I evaluate <property_n> as ..., because

Hence the final ASIL level would be

(a) ASIL A is the lowest whereas B,C,D (is the highest).

severity> * <probability> * <controllability> = <ASIL level>

<severity> := S3 ; <it causes life threatening, fatal injuries that's why s3,>

<probability> := E4 ; <highly probable as the accidents might happen quite often>

<controllability> := C3 ; <extremely low controllability>

<ASIL-Level> := ASIL-D ; <highest level of integrity>

question **5**

Correct

Score 1.00 out of 1.00

Which standard do you have to apply for the development of the following software?

You are developing a software intended to be used in a series road vehicle. The software leverages complex sensors as inputs.

- ☐ a. DO-178
- ☐ b. ISO 26262
- ☒ c. ISO 21448
- ☐ i.e. none



The answer is correct.

The correct answer is:

ISO 21448

question 6

Correct

Score 1.00 out of 1.00

Which of the following statement/s is/are true for contract-based programming?

- ☒ a. The provider guarantees that the conditions defined in the postcondition are satisfied. ✓
- ☐ b. The provider guarantees that the execution will never fail.
- ☐ c. The consumer that at certain intervals guarantees a defined invariant condition is satisfied.
- ☒ i.e. The consumer guarantees that the conditions defined in the precondition are satisfied. ✓

The answer is correct.

The correct answers are:

The consumer guarantees that the conditions defined in the precondition are satisfied.,

The provider guarantees that the conditions defined in the postcondition are satisfied.

question 7

Correct

Score 1.00 out of 1.00

Fill in the gaps of the following text.

The result was a system ✓, this was caused by a/an ✓ in the implementation, more specifically in the way the interface was called. This happened since the programmer did not know how to use the interface, which was a/an ✓ in her/his education.

The answer is correct.

The correct answer is:

Fill in the gaps of the following text.

The result was a system [failure], this was caused by a/an [error] in the implementation, more specifically in the way the interface was called. This happened since the programmer did not know how to use the interface, which was a/an [fault] in her/his education.

question 8

Incorrect

Earned points 0.00 out of 1.00

Which standard do you have to apply for the development of the following software?*You are developing a software for a defibrillators device to be installed in a series road vehicle for emergency doctors.*

- ☐ a. ISO 21448
- ☐ b. IEC 62304
- ☒ c. ISO 26262
- ☐ i.e. none



The answer is wrong.

The correct answer is:

IEC 62304

question 9

Complete

Achievable points: 2.00

Which of the safety analysis methods introduced in the lecture would you choose and why?*Assume you are performing a hazard and risk analysis for a vehicle's lighting control system. You have already developed a general component structure for the system. Now your goal is to identify the components or groups of components whose faults will result in an overall system failure.*

Answer Template:

<methodology_name>: <reason>

<Fault Tree Analysis> :

reason:

The structural analysis identifies which component failures will lead to the top level event

question **10**

Correct

Score 1.00 out of 1.00

Which of the replication types do you need to choose for the given description?*You are developing a safety-critical system which needs high availability.*

- ☒ a. Optimistic Replication
- ☐ b. Pessimistic Replication



The answer is correct.

The correct answer is:

Optimistic Replication

question **11**

Incorrect

Earned points 0.00 out of 1.00

Select the respective requirement specification property for the given description .*The origin of each requirement is clear.*

- ☐ a. Traceable
- ☐ b. Ranked
- ☒ c. consistent
- ☐ i.e. valid



The answer is wrong.

The correct answer is:

Traceable

question **12**

Correct

Score 1.00 out of 1.00

Complete the following sentence.*During the hazard and risk analysis you identified an overflow of a variable as a potential...*

- ☐ a. risk.
- ☒ b. danger.



The answer is correct.

The correct answer is:
danger.question **13**

Correct

Score 1.00 out of 1.00

Which kind of failure is described?*The system fails due to an error in the implementation.*

- ☒ a. Systematic failure
- ☐ b. Random Failure



The answer is correct.

The correct answer is:
Systematic failure

question **14**

Not answered

Achievable points: 1.00

Select the respective requirement specification property for the given description .*The requirements do not contradict each other.*

- ☐ a. valid
- ☐ b. consistent
- ☐ c. unambiguous
- ☐ i.e. Ranked

The answer is wrong.

The correct answer is:
consistent

question **15**

Correct

Score 1.00 out of 1.00

Complete the following sentence.*During the hazard and risk analysis you identified the possibility that the cars braking system could fail and as a result the driver would lose control over the car as a...*

- ☒ a. risk.
- ☐ b. danger.



The answer is correct.

The correct answer is:
risk.

question **16**

Correct

Score 1.00 out of 1.00

Which failure handling strategy is achieved?*The system switches to a backup channel in case of a failure in the main channel.*

- ☐ a. fail-safe
- ☒ b. Fail Tolerant



The answer is correct.

The correct answer is:

Fail Tolerant

question **17**

Correct

Score 1.00 out of 1.00

Select the respective requirement specification property for the given description .*The requirement specification can be changed without difficulty.*

- ☐ a. consistent
- ☐ b. Traceable
- ☐ c. Ranked
- ☒ i.e. modifiable



The answer is correct.

The correct answer is:

modifiable

question **18**

Not answered

Achievable points: 1.00

Select the respective requirement specification property for the given description .

The requirements indicate a relative importance.

- ☐ a. valid
- ☐ b. Ranked
- ☐ c. Complete
- ☐ i.e. unambiguous

The answer is wrong.

The correct answer is:

Ranked

question **19**

Correct

Score 1.00 out of 1.00

Which failure handling strategy is achieved?

The system performs a shutdown in case of a failure.

- ☐ a. Fail Tolerant
- ☒ b. fail-safe



The answer is correct.

The correct answer is:

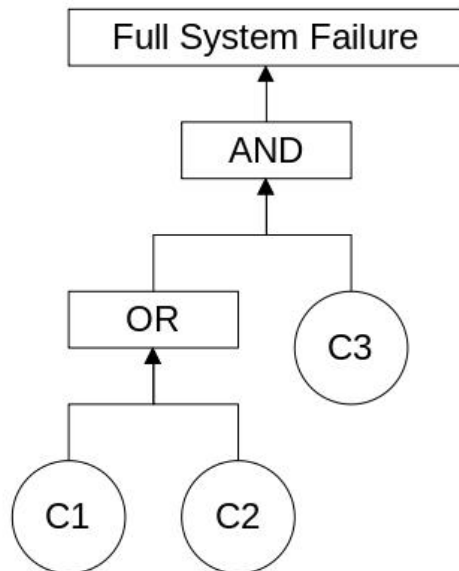
fail-safe

question 20

Correct

Score 1.00 out of 1.00

Select the minimal cut set for the following fault tree.



- ☐ a. $C = \{ \{ C1, C3 \}, \{ C2, C3 \}, \{ C1, C2, C3 \} \}$
☒ b. $C = \{ \{ C1, C3 \}, \{ C2, C3 \} \}$
☐ c. $C = \{ \{ C1, C2 \}, \{ C3 \} \}$
☐ i.e. $C = \{ \{ C1, C2, C3 \} \}$



The answer is correct.

The correct answer is:

 $C = \{ \{ C1, C3 \}, \{ C2, C3 \} \}$

previous activity

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