

Dashboard ► my courses ► SAFE22S ► Midterm Test ► Mid-Term-Test

Started at Thursday, June 2, 2022 at 4:56 p.m

Status Completed

Finished at Thursday, June 2, 2022 at 5:27 p.m

Spent time 30 minutes 59 seconds

valuation 15,00 von 25,00 (60%)

question **1**

Not correct

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 redundant pattern. One of the requirements of the system is that it still has to function even if 2 of the redundant components have failed.

- ☐ a. 7
- ☐ b. 5
- ☐ c. 9
- ☒ d. 3



The answer is wrong.

The correct answer is:

5

question **2**

Completely

Earned points 0.00 out of 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

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

Kommentar:

(a) ASIL A-D

(b)

<severity> * <probability> * <controllability> = <ASIL-Level>

<severity> := S3 ; <explanation>

<probability> := E4 ; <explanation>

<controllability> := C3 ; <explanation>

<ASIL-Level> := ASIL-D ; <explanation>

Frage **3**

Richtig

Erreichte Punkte 1,00 von 1,00

Which standards do you have to apply for the development of the following software?*You are developing a software intended to be used in an airplane.*

- ☒ a. DO-178
- ☐ b. IEC 61511
- ☐ c. IEC 60601
- ☐ d. EN 50126



Die Antwort ist richtig.

Die richtige Antwort ist:
DO-178Frage **4**

Richtig

Erreichte Punkte 1,00 von 1,00

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

NOTE Multiple selections could be correct.

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



Die Antwort ist richtig.

Die richtigen Antworten sind:

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

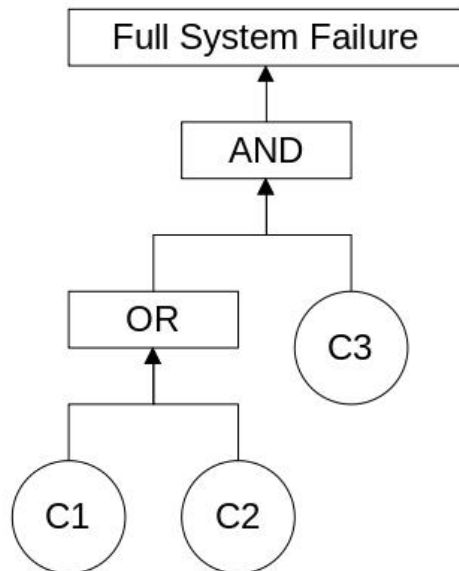
The provider guarantees that the conditions defined in the postcondition are satisfied.

Frage 5

Richtig

Erreichte Punkte 1,00 von 1,00

Select the minimal cut set for the following fault tree.



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



Die Antwort ist richtig.

Die richtige Antwort ist:

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

Frage 6

Richtig

Erreichte Punkte 4,00 von 4,00

Select the correct description for the given requirement specification properties.

Complete	All the things the system must/must not do.	✓
Valid	Expresses the real needs of the stakeholders.	✓
Verifiable	A process exists to test satisfaction of each requirement.	✓
Unambiguous	Every statement can be read in exactly one way.	✓

Die Antwort ist richtig.

Die richtige Antwort ist:

Complete → All the things the system must/must not do.,

Valid → Expresses the real needs of the stakeholders.,

Verifiable → A process exists to test satisfaction of each requirement.,

Unambiguous → Every statement can be read in exactly one way.

Frage 7

Richtig

Erreichte Punkte 1,00 von 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. Pessimistic Replication
- ☒ b. Optimistic Replication



Die Antwort ist richtig.

Die richtige Antwort ist:

Optimistic Replication

Frage 8

Falsch

Erreichte Punkte 0,00 von 1,00

Which standards 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. ISO 21448
- ☒ b. ISO 26262
- ☐ c. IEC 62016
- ☐ d. IEC 61508

✗

Die Antwort ist falsch.

Die richtige Antwort ist:
ISO 21448

Frage 9

Vollständig

Erreichte Punkte 2,00 von 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 whose faults will result in an overall system failure.

Answer Template:

<methodology_name>: <reason>

<Fault Tree Analysis> <A popular method which follows the top-down approach. Only components which are fail in top level hazard event are captured by this>

Kommentar:

Frage **10**

Teilweise richtig

Erreichte Punkte 0,50 von 1,00

Decide for the description whether the system is un/safe or un/reliable.

One of three redundant components computes a wrong command. A voter however selects the commands computed by the other two components by majority vote and sends it to the actuator.

- ☐ a. safe and reliable
- ☐ b. safe and unreliable
- ☒ c. unsafe and reliable
- ☐ d. unsafe and unreliable



Die Antwort ist teilweise richtig.

Die richtige Antwort ist:
safe and reliable

Frage **11**

Richtig

Erreichte Punkte 1,00 von 1,00

Which failure handling strategie is achieved?

The system performs a shutdown in case of a failure.

- ☐ a. Fail Tolerant
- ☒ b. Fail Safe



Die Antwort ist richtig.

Die richtige Antwort ist:
Fail Safe

Frage **12**

Falsch

Erreichte Punkte 0,00 von 1,00

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

- ☒ a. risk.
- ☐ b. hazard.

✗

Die Antwort ist falsch.

Die richtige Antwort ist:
hazard.Frage **13**

Richtig

Erreichte Punkte 1,00 von 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.

Die Antwort ist richtig.

Die richtige Antwort lautet:

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.

Frage 14

Falsch

Erreichte Punkte 0,00 von 1,00

Finish the following sentence.

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

- ☐ a. risk.
- ☒ b. hazard.



Die Antwort ist falsch.

Die richtige Antwort ist:
risk.

Frage 15

Teilweise richtig

Erreichte Punkte 0,50 von 1,00

Decide for the description whether the system is un/safe or un/reliable.

The ECU computes the wrong command and sends it to the actuator which breaks due to the wrong command.

- ☐ a. unsafe and unreliable
- ☐ b. safe and reliable
- ☒ c. unsafe and reliable
- ☐ d. safe and unreliable



Die Antwort ist teilweise richtig.

Die richtige Antwort ist:
unsafe and unreliable

Frage **16**

Richtig

Erreichte Punkte 1,00 von 1,00

Decide for the description whether the system is un/safe or un/reliable.*A monitoring component recognizes a wrong command computed by the ECU and shuts down the whole system.*

- ☐ a. unsafe and reliable
- ☐ b. unsafe and unreliable
- ☐ c. safe and reliable
- ☒ d. safe and unreliable



Die Antwort ist richtig.

Die richtige Antwort ist:
safe and unreliableFrage **17**

Richtig

Erreichte Punkte 1,00 von 1,00

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

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



Die Antwort ist richtig.

Die richtige Antwort ist:
Systematic Failure

Vorhergehende Aktivität

[◀ Assignment 3-02](#)

Direkt zu:

next activity

[Lecture 3.1: Verification & Validation \[DE\] ►](#)

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