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maxexam

ASE_FinalExamWS2020_21.final | 89 Minuten 57 Sekunden

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5. Programming
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Aufgabe 1

Is an ECU an embedded system? Explain your answer.

Aktuell geschriebene Wörter:

Frage 1/24

Test abschließen

Punkte: 2

Keine Antwort

Weiter

ONYX 9.8.0

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opal TUCexam

ASE_FinalExamWS2020_21_final | ⏳ 89 Minuten 53 Sekunden

Aufgabe 2

Is it necessary to test ECUs in the automotive domain? Explain your answer briefly.

Aktuell geschriebene Wörter: 0

Zurück Frage 2/24 Weiter

ONYX 9.8.0

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The screenshot shows a computer screen displaying an online examination system. The title bar reads "ASE_FinalExamWS2020_21_final | ⏳ 89 Minuten 53 Sekunden". The main content area is titled "Aufgabe 2" and contains the question: "Is it necessary to test ECUs in the automotive domain? Explain your answer briefly." Below the question is a large text input field. At the bottom of this section, it says "Aktuell geschriebene Wörter: 0". Above the input field, there is a small icon of a person writing. To the right of the input field are two buttons: "Zurück" and "Weiter". At the very top of the page, there is a navigation bar with icons for back, forward, search, and user profile. On the far right of the top bar, there are buttons for "Test abschließen", "Punkte: 2", and "Keine Antwort". The left side of the screen features a sidebar with a tree-like structure of exam sections: "1. Overview", "2. Communication", "3. AUTOSAR", "4. Test of ECUs", and "5. Programming", each with several sub-tasks. The "Aufgabe 2" section is currently active. At the bottom of the page, there are links for "data protection", "Terms of Use", "Imprint", "About TUCexam 13.9.1", and "Powered by BPS". The footer also includes the text "ONYX 9.8.0".

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Aufgabe 3

Put the given words to the correct position in the picture, representing the V-Model. Use Drag & Drop to put the words to the correct position.

Punkte: 1,5 | Keine Antwort | Test abschließen

Detail level

Time for development and test

Korrekte Element hier ablegen

Korrekte Element hier ablegen

Korrekte Element hier ablegen

Specification | Test | Implementation

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The screenshot shows a computer interface for a final exam. The top navigation bar includes links for back, forward, search, and user information. The main title is "ASE_FinalExamWS2020_21_final" with a timer of "89 Minuten 46 Sekunden". Below the title, "Aufgabe 3" is selected. The task description asks to put words to the correct position in a picture representing the V-Model. A "Drag & Drop" instruction is present. The central part of the screen features a V-Model diagram with a vertical "Detail level" axis on the left and a "Time for development and test" axis at the bottom. The diagram consists of several horizontal trapezoidal boxes of varying sizes. Three specific positions are highlighted with dashed boxes and the text "Korrekte Element hier ablegen". At the bottom, there are three buttons: "Specification", "Test", and "Implementation". The footer contains links for data protection, terms of use, imprint, about, and powered by BPO.

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Aufgabe 4

From the knowledge gained during Unit 1. Please match the below elements to their correct assignment. Use Drag & Drop to put the words to the correct position.

Variable	Korrekte Element hier ablegen	Control
CAN Bus	Korrekte Element hier ablegen	Input
Virtual Cockpit	Korrekte Element hier ablegen	Output
LED		
Interrupt		
Light sensor		
ECU		
CAN port		

[Zurück](#) | **Frage 4/24** | [Weiter](#)

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Aufgabe 5

Which of the following is true about Asynchronous communication ?
(Please select at most 4 answers, otherwise selecting more answers will result in 0 for this question)

- If communication clock is higher than bit rate, then clock division is required
- If communication clock is higher than bit rate, then clock division is not required due to master clock
- Re-synchronisation phase is not needed
- Absence of a centralised master clock
- Re-synchronisation phase is necessary
- Communication speed is managed through a master clock
- Communication bit rate is same for all nodes

Zurück | Frage 5/24 | Weiter

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Aufgabe 6

Through an automotive perspective, mark the following attributes as advantage/disadvantage of a bus system compared to point-to-point communication approach

	Advantage	Disadvantage
Cabling	<input type="checkbox"/>	<input type="checkbox"/>
Reliability	<input type="checkbox"/>	<input type="checkbox"/>
Message packet length	<input type="checkbox"/>	<input type="checkbox"/>
Weight	<input type="checkbox"/>	<input type="checkbox"/>
Real time properties	<input type="checkbox"/>	<input type="checkbox"/>
Cost effectiveness	<input type="checkbox"/>	<input type="checkbox"/>

Zurück | Frage 6/24 | Weiter

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TUCexam

ASE_FinalExamWS2020_21_final ⏱ 89 Minuten 21 Sekunden Test abschließen

Punkte: 3 Keine Antwort

Aufgabe 7

With your understanding of CAN arbitration process, determine the correct sending order from the following message-IDs. When multiple nodes in a CAN-Network are trying to send simultaneously, move them from the left list to correct position in the right list.

Message ID List:

- 0x 0AC
- 0x 0FF
- 0x 01E
- 0x 100
- 0x 009
- 0x 00C

0x00C	1
0x0FF	2
0x01E	3
0x0AC	4
0x100	5
0x009	6

⊕ 1. Overview
 [Aufgabe 1]
 [Aufgabe 2]
 [Aufgabe 3] **Aufgabe 7**
 [Aufgabe 4]
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Zurück Weiter

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Aufgabe 8

The following is a snapshot of a message register that represents an 8-digit message ID of a CAN-Message

ID bit 7	ID bit 6	ID bit 5	ID bit 4	ID bit 3	ID bit 2	ID bit 1	ID bit 0
MSB							LSB

Calculate the masking (MASK) and acceptance register (ACCEPT) values to approve only CAN messages with ID 229_{10} ($0E5_{16}$) and 197_{10} ($0C5_{16}$). (Numbers are given in decimal and numbers in brackets are given in Hexadecimal format)
(Please answer the question in Hexadecimal/Binary/Decimal formats only)

Mask: _____

Accept: _____

Zurück | Frage 8/24 | Weiter

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Aufgabe 9

Punkte: 4 Keine Antwort

Following is a function for sending a 16 bit long unsigned counter value encapsulated in a can message with id 0x10. The function is called at a time interval of every 500 ms and should send an incremented value of "counter" variable by 30 at every time interval. Upon reaching a value that equals 1000 or more, the counter should be reset to zero. The variable must be split in two parts of 8 bits each, in order to accommodate it in a can message. The first data byte of the can message should contain the first 8 least significant bits of the aforementioned variable "counter". And the second data byte should contain 8 most significant bits. Analyse the following piece of code to mark and select the correction option for the problems/errors against the above specified requirements in the below function:

```
void counterUpdateSend()
{
    static uint16 counter = 0; // variable declaration for counter
    counter = counter + 30; // counter increment
    if(counter == 1000) {
        counter = 0;
    }
    CAN_0.BUF[0].MSG_ID.B.STD.ID = 10; // CAN message id
    CAN_0.BUF[0].CS.B.LENGTH = 1; // CAN message data length
    CAN_0.BUF[0].DATA.B[0] = counter % 128; // obtaining first 8 least significant bits from the variable
    CAN_0.BUF[0].DATA.B[0] = counter / 256; // obtaining the 8 most significant bits
    CAN_0.BUF[0].CS.B.CODE = 0xC; // buffer code for transmitting a message
}
```

Zurück Frage 9/24 Weiter

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Aufgabe 10

Following is an 8-bit MASK and ACCEPT configuration. Please select which of the IDs can be accepted or not using this configuration on an ECU node connected to a CAN-Bus.

Mask: 0xF1
ACCEPT: 0x01

	Will be Rejected	Will be Accepted
0x10	<input type="radio"/>	<input checked="" type="radio"/>
0x01	<input checked="" type="radio"/>	<input type="radio"/>
0x03	<input type="radio"/>	<input checked="" type="radio"/>
0x13	<input type="radio"/>	<input checked="" type="radio"/>
0x0F	<input checked="" type="radio"/>	<input type="radio"/>
0xF3	<input type="radio"/>	<input checked="" type="radio"/>
0xFA	<input checked="" type="radio"/>	<input type="radio"/>
0x09	<input type="radio"/>	<input checked="" type="radio"/>

Zurück | Frage 10/24 | Weiter

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ASE_FinalExamWS2020_21_final | **⌚ 89 Minuten 15 Sekunden** | **Test abschließen**

Punkte: 3 | Keine Antwort

Aufgabe 11

Based on your knowledge learned in practical, determine the correct behavioral points of the following code snippet.
(Please select a maximum of 6 answers only)

```
void main(void) {  
    PIT_ConfigureTimer(1, 100); /* (channel, time in ms) */  
    SIU.GPDO[59].R = 1; /* LED6 – LED is active low(0=ON, 1=OFF) */  
  
    for(;;){  
        if (SIU.GPDI[44].R == 1) /* SWITCH1 */  
            PIT_StartTimer(1);  
        else  
            PIT_StopTimer(1);  
    }  
}  
  
void PIT_CHANNEL1(void) /* timer 1 interrupt function */ {  
    SIU.GPDO[59].R = 0;  
}
```

Timer is set to 100 ms
 Timer is never started
 LED 6 will turn ON only once, depending on switch input
 LED can remain permanently OFF
 LED can remain permanently ON
 Interrupt function will be only triggered when timer is started
 LED 6 will blink every 100 ms
 Interrupt function will be always triggered until program stops

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Aufgabe 10

Aufgabe 11 **89 Minuten 12 Sekunden**

Test abschließen

3. AUTOSAR

- Aufgabe 12**
- Aufgabe 13**
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- Aufgabe 15**
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- Aufgabe 17**

4. Test of ECUs

- Aufgabe 18**
- Aufgabe 19**
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- Aufgabe 21**
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- Aufgabe 23**

5. Programming

- Aufgabe 24**

Aufgabe 11

```
else  
{  
    PIT_StopTimer(1);  
  
}  
}  
  
void PIT_CHANNEL1(void) /* timer 1 interrupt function */  
{  
    SIUG.PPDO[59].R = 0;  
}
```

Timer is set to 100 ms

Timer is never started

LED 6 will turn ON only once, depending on switch input

LED can remain permanently OFF

LED can remain permanently ON

Interrupt function will be only triggered when timer is started

LED 6 will blink every 100 ms

Interrupt function will be always triggered until program stops

Timer is set to 1 sec

Timer can remain permanently started

LED 6 is turned on before timer starts

Timer is wrongly configured

Switch has no influence on LED

Zurück **Weiter**

Frage 11/24

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Aufgabe 12 | Punkte: 1 | Keine Antwort

What are the main ideas of the standard "AUTOSAR" (Automotive Open Systemarchitecture)?

- Function Orientated Approach
- Hardware independent Application which enables Reuseability
- Less wires in car
- Increasing Complexity of Software

Zurück | Frage 12/24 | Weiter

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Aufgabe 13

Explain the concept of "Complex Device Drivers" in AUTOSAR. What is it? Where is it located in the AUTOSAR architecture diagram? Why is it needed?

Some requirements can not be realized by AUTOSAR modules however Complex Device Driver provides them to the system.

Aktuell geschriebene Wörter: 0

Zurück Frage 13/24 Weiter

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Aufgabe 14

Punkte: 1 Keine Antwort

Which elements are used to create a software architecture (application) in AUTOSAR?

- Micro Services, Kubernetes, Cloud
- Webservice, FIBEX, SVN
- Software components, Database, Registers
- AI, Machine Learning, SVM
- Software components, Ports, Interfaces, Runnables
- Container, Constructor, Loops
- Function, Classes, Registers, Interrupts

Zurück Frage 14/24 Weiter

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Aufgabe 15

What does VFB mean in the context of AUTOSAR? State its benefit and the software development stage in which it is used.

Aktuell geschriebene Wörter: 0

Zurück | Frage 15/24 | Weiter

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88 Minuten 57 Sekunden

Aufgabe 16

Put the words to the correct position in the architecture picture of AUTOSAR.

The diagram shows the AUTOSAR architecture layers. At the bottom are six boxes: ECU Abstraction Layer, Microcontroller Abstraction Layer, Service Layer, Application Layer, Basic Software, and Runtime Environment (RTE). Above these is a large box labeled 'ECU'. Inside the ECU box, there is a vertical column labeled 'Complex Device Driver' on its right side. The ECU is divided into several horizontal sections. In each section, there is a dashed box containing the text 'Korrekt Element hier ablegen'. There are five such dashed boxes in total, one in each horizontal section of the ECU.

Aufgabe 16

Korrekt Element hier ablegen

ECU

Complex Device Driver

ECU Abstraction Layer Microcontroller Abstraction Layer Service Layer Application Layer Basic Software Runtime Environment (RTE)

Zurück Frage 16/24 Weiter

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88 Minuten 54 Sekunden

Aufgabe 17

Put the given words to the correct position in the picture of two ECUs with AUTOSAR architecture.

ECU 1 (AUTOSAR 3.2)

ECU 2 (AUTOSAR 3.2)

Bus system

Intra ECU Communication Inter ECU Communication Communication Stack ECU 2 Communication Stack ECU 1

Zurück Weiter

Frage 17/24

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Aufgabe 17

- 1. Overview
- 2. Communication
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- 4. Test of ECUs
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Punkte: 2 Keine Antwort

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Aufgabe 18

What is the main difference between static test and dynamic test?
Explain shortly, in which development phases static test and dynamic test are mostly used.

Aktuell geschriebene Wörter: 0

Zurück Frame 18/24 Weiter

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The screenshot shows a web-based exam system. On the left, a sidebar lists categories and sub-tasks: 1. Overview, 2. Communication, 3. AUTOSAR, 4. Test of ECUs, and 5. Programming. Task 4 contains 24 sub-tasks, with 'Aufgabe 18' highlighted in red. The main area displays 'Aufgabe 18' asking about the differences between static and dynamic testing, with a text input field below. A progress bar at the top indicates 88 minutes and 52 seconds remaining. The bottom navigation includes links for data protection, terms of use, imprint, and about information.

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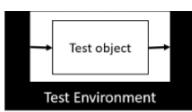
ASE_FinalExamWS2020_21_final | 88 Minuten 51 Sekunden | Test abschließen

Punkte: 2 | Keine Antwort

Aufgabe 19

The SuT (System under Test) represents the test object and test environment.

What does **PoC** and **PoO** in SuT stand for? What do they realize?



Aktuell geschriebene Wörter: 0

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Aufgabe 20

The V-Model contains different phases of test. In the given picture, the four abstract test phases are named. Explain briefly the major differences of the phases.

Where do the test cases come from?

The diagram illustrates the V-Model with four phases of testing:

- Acceptance Test (top)
- System Test (middle)
- Integration Test (bottom left)
- Component Test (bottom right)

Aktuell geschriebene Wörter: 0

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⌚ 88 Minuten 46 Sekunden

Aufgabe 21

Which sequence of the simulation types in the V-Model is correct (from top left to top right)?

MiL, HiL, SiL
 MiL, SiL, HiL
 HiL, SiL, MiL

Zurück

Frage 21/24

Weiter

Punkte: 1 Keine Antwort

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Aufgabe 22

Testing Park Pilot of a Car

The functionality of the Park Pilot System (PPS) of a car was developed and needs to be tested. The Park Pilot System supports the driver in parking. A button with two possible states (on, off) activates or deactivates the park pilot assist.

Features:

- The park pilot can be switched on by the driver. It can be switched on when the speed from the car is less than 10 km/h
- The park pilot will be deactivated when sensors are not working (sensor status)

Possible values of the sensors:

button for park pilot: 0 - OFF, 1 - ON
 current speed: < 10 km/h, >= 10 km/h
 sensor status: 0 - ERROR, 1 - WORKS

Possible States of Park Pilot System:

0 - OFF, 1 - ON

The test engineer has defined the following truth table based on the specification.

Button Park Pilot	Sensor Status	Current speed	Park Pilot Status
0	0		0
0	1	<10 km/h	0
1	0		0
1	1		1
0	0		0
0	1	>=10 km/h	0
1	0		0
1	1		0

Question a:
 Which test strategy is represented by the given truth table (for example random test strategy)?

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Aufgabe 23

Testing Seat Heating (Driver Seat) of a Car

The functionality of the Seat Heating of a car was developed and needs to be tested. The Seat Heating is used to heat the surface of the driver seat. Our Seat Heating has a button, which switches the heating on or off. Our Seat Heating has a very simple functionality: it switches off, when a temperature of 60 degrees is reached (time in ON state is not considered).

Features:

- Seat Heating can be switched on or off by a button
- If Seat Heating is switched ON, the heater increases the temperature up to 60°C. After that the Seat Heating is switched OFF

button for Seat Heating: 0 - OFF, 1 - ON
temperature sensor: <= 60°C, > 60°C

Question a:
Create a (complete) truth table for the Seat Heating .

Question b:
Create a manual test scenario for the Seat Heating. Consider in the manual test scenario input values in which the Seat Heating is in ON state.

Hints:

- You can realize the truth table like that:

a		b		c
0	0	0	1	1
1	1	1	1	1

- Use the test constructs from unit 5.

Construct	Parameters	Example
Loop	<Condition>	LOOP (true)
If Then	<Condition>	if (x > 1) then y = 1
Wait	<Time> (in ms)	Wait (1000) // ms
Calculator		x = a + b
Bus Read	<Message ID> (according to OCA file)	a = Can.read(engine_speed)
Bus Write	<Message ID>, <value>	Can.write(engine_speed, 100)
User Interaction	<Text>	Dialog ("Put your hand on the sensor")
Variable		int x = 1
Test Cancellation		END

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ASE_FinalExamWS2020_21_final | **88 Minuten 34 Sekunden** | **Aufgabe 24** | **Test abschließen** | **Punkte: 10** | **Keine Antwort**

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5. Programming

Aufgabe 24

Please write C-Code for the boards used in the practical to perform the following specified tasks:

- Configure the required hardware peripherals (pins, LEDs and switches)
- Send a CAN message with ID **3610** every 1000ms
- This message to be sent uses 3 data fields to send the following information:
Data-byte[0]: Button 5. Data-byte[1]: Button 6. Data-byte[2]: Light sensor value
For the light sensor value, 8 least significant bits should be sent. The light sensor is connected to Feature "ANA IN1" shown in the table on next page.
- The board should also receive a can message with ID **3716**
- The message to be received has 4 data fields. These data fields represent 4 LEDs. Please turn the LEDs "on" or "off" according to the data you get from the CAN message. The possible values for this representation are 0 and 1.
Data-byte[X] contains status for LED X, where X ranges from 0 to 3.
LED 5 blinks every second and LED 6 blinks at an interval of 200 ms.

Please use the provided information. It helps you to write the code.

Input/output

A button can be configured as digital input by writing "0x0100" to the corresponding PCR register. A pressed button or a switch on "action" results in a low signal ("0") on the pin. This signal can be checked by the input register of the corresponding pin ("SIU.GPDIN[R]", where X=corresponding PCR register number). Pins can be configured as output by writing a "0x200" to the corresponding PCR register. To set a digital output write "0" or "1" to the corresponding output register "SIU.GPDO[X].R". Analog inputs can be configured by writing a "0x2500" to the corresponding register. The converted values can be retrieved by reading the "ADC_0.CDR[2].B.CDATA" register. You can find the PCR register numbers in the following description in Table 1.

Timer

No software interrupts need to be configured. There is only one timer available. Please use the function "PIT_ConfigureTimer(int timerChannel, int period)" to configure this timer. To start the timer use the function "PIT_StartTimer(int timerChannel)".

Parameter	Value
timerChannel	Timer channel to be configured
period	Period in milliseconds

Upon successful configuration of the timer interrupt, function "PITCHANNEL00" will be automatically called. Implement this function for timer related tasks.

CAN

To reduce the complexity of the task you may configure the CAN driver just like this:

```
SIU.PCR[16].B.PA = 1; /* TX CAN pin configuration */
SIU.PCR[17].B.PA = 1; /* RX CAN pin configuration */
```

Furthermore for sending a CAN message you just need to set the register with the following constructs. It is possible to use some of them more than once. For example, the following code sends character "a" using the message ID 10.

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88 Minuten 33 Sekunden

Upon successful configuration of the timer interrupt, function "PITCHANNEL00" will be automatically called. Implement this function for timer related tasks.

CAN

To reduce the complexity of the task you may configure the CAN driver just like this:

```
SILPCR[16].B.PA = 1; /* TX CAN pin configuration */
SILPCR[17].B.PA = 1; /* RX CAN pin configuration */

Furthermore for sending a CAN message you just need to set the register with the following constructs. It is possible to use some of them more than once. For example, the following code sends character "a" using the message ID 10.

CAN_0.BUF[0].MSG_ID.B.STD_ID = 10; /* message identifier */
CAN_0.BUF[0].CS.B.LENGTH = 1; /* message length */
CAN_0.BUF[0].DATA.B[0] = 'a'; /* data byte 0 */
CAN_0.BUF[0].CS.B.CODE = 0xC; /* code for sending a message */

Implement the function "CANRCV()" to handle the received messages. This function is called automatically if a new CAN message is received. In this function you can read the following registers within the if-condition. "X" is replaceable.

CAN_0.BUF[0].ID.B.STD_ID /* received message identifier */
CAN_0.BUF[0].DATA.B[X] /* received data byte X */


```

Feature	CPU pin name	PCR register	Comments
LED7	PA11	11	Light when command is low
LED6	PD11	59	Light when command is low
LED5	PD13	61	Light when command is low
LED4	PD14	62	Light when command is low
LED3	PA12	12	Light when command is low
LED2	PA13	13	Light when command is low
LED1	PC10	42	Light when command is low
LEDO	PA9	9	Light when command is low
BT6	PA0	0	On = low
BT5	PA1	1	On = low
ANA IN1	PC1	33	External analog input
ANA IN2	PC2	34	External analog input
ANA OUT	PC9	41	Analog output
POT	PE1	65	Potentiometer
TEMP	PC2	66	Temperature Sensor

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Finish test

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1.1 ECUs in Automotive Domain

Which statements regarding ECUs in the automotive domain is correct?

ECUs communicate often by bus systems with each other.

An ECU is an Embedded System, because it has I/O connections to sensors.

An ECU is an Embedded System, because it realizes specific tasks and controls subsystems.

An ECU in a car cannot be defined as Embedded System.

Question 1/24

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1.2 Automotive and Test

Is it necessary to test ECUs in the automotive domain? Explain your answer briefly.

ECU should be tested mandatory. ECU integrate functionalities for calculations. Analysis of sensor data and controlling actuators.

White box testing should be performed in calculation and on a sense data. Provided by the directed sensors for the ECU.

Current word count: 51

Back Question 2/24 Forward

ECU-TEST aims at the specification, implementation, documentation, execution and assessment of test cases. Owing to various test automation methods, the tool ensures an efficient implementation of all necessary activities for the creation, execution and assessment of test cases. find errors as soon as possible save costs and resources

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1.3 V-Model

Put the given words to the correct position in the picture, representing the V-Model. Use Drag & Drop to put the words to the correct position.

Detail level

The diagram illustrates the V-Model structure. It features two parallel vertical columns of trapezoidal boxes representing levels of detail, labeled 'Detail level' on the left. A central vertical line connects the top and bottom of these columns. Two diagonal arrows point upwards from the bottom row towards the top row. A dashed box labeled 'Specification' is positioned at the bottom left, connected by a horizontal arrow to the first trapezoid in the left column. A dashed box labeled 'Test' is positioned at the bottom right, connected by a horizontal arrow to the first trapezoid in the right column.

Specification

Test

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1.4 ICO

From the knowledge gained during Unit 1, Please match the below elements to their correct assignment. Use Drag & Drop to put the words to the correct position.

CAN port	LED	Output
Variable	ECU	Control
	Light sensor	Input
	Virtual Cockpit	
	CAN Bus	
	Interrupt	

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2.1 Asynchronous communication

Which of the following is true about Asynchronous communication ?
(Please select at most 4 answers, otherwise selecting more answers will result in 0 for this question)

Baud rate needs to be fixed for all nodes
 Absence of a centralised master clock
 Re-synchronisation phase is not needed
 Communication speed is managed through a master clock
 Re-synchronisation phase is necessary
 If communication clock is higher than bit rate, then clock division is required
 If communication clock is higher than bit rate, then clock division is not required due to master clock

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2.2 Bus Systems

Through an automotive perspective, mark the following attributes as advantage/disadvantage of a bus system compared to point-to-point communication approach

	Disadvantage	Advantage
Cost effectiveness	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Reliability	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Real time properties	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Message packet length	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Weight	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cabling	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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2.3 CAN Arbitration

With your understanding of CAN arbitration process, determine the correct sending order from the following message-IDs, when multiple nodes in a CAN-Network are trying to send simultaneously. Move the from the left list to correct position in the right list.

Message ID List:

- 0xF00
- 0xCAB
- 0x00F
- 0x1FE
- 0x009
- 0x00C

Sequence List:

- 0x1FE
- 0x00C
- 0x00F
- 0xCAB
- 0xF00

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2.4 CAN Masking

The following is a snapshot of a message register that represents an 8-digit message ID of a CAN-Message

ID bit 7	ID bit 6	ID bit 5	ID bit 4	ID bit 3	ID bit 2	ID bit 1	ID bit 0
MSB							LSB

Calculate the masking (MASK) and acceptance register (ACCEPT) values to approve only CAN messages with ID 229_{10} ($E05_{16}$) and 197_{10} ($C05_{16}$). (Numbers are given in decimal and numbers in brackets are given in Hexadecimal format)
(Please answer the question in Hexadecimal/Binary formats without any spaces only)

Mask: 11011111(ODF)

Accept: 11100101(OE5) or 11

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2.5 Error Finding

Following is a function for sending a 16 bit long unsigned counter value encapsulated in a can message with id 0x10. The function is called at a time interval of every 500 ms and should send an incremented value of "counter" variable by 30 at every time interval. Upon reaching a value that equals 1000 or more, the counter should be reset to zero. The variable must be split in two parts of 8 bits each, in order to accommodate it in a can message. The first data byte of the can message should contain the first 8 least significant bits of the aforementioned variable "counter". And the second data byte should contain 8 most significant bits. Analyse the following piece of code to mark and select the correction option for the problems/errors against the above specified requirements in the below function:

```
void counterUpdateSend()
{
    static uint16 counter = 0; // variable declaration for counter
    counter = counter + 30; // counter increment
    if (counter = 1000) // B Incorrect condition
    {
        counter = 0;
        CAN_0.BUF[8].MSG_ID.B.STD_ID = 10; // CAN message id
        CAN_0.BUF[8].CS.B.LENGTH = 1; // CAN message data length
        CAN_0.BUF[8].DATA.B[0] = counter % 128; // obtaining first 8 least significant bits from the variable
        CAN_0.BUF[8].DATA.B[0] = counter / 256; // obtaining the 8 most significant bits
        CAN_0.BUF[8].CS.B.CODE = 0xC; // buffer code for transmitting a message
    }
}
```

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2.6 Masking

Following is an 4-bit MASK and ACCEPT configuration. Please select which of the IDs can be accepted or not, using this configuration on an ECU node connected to a CAN-Bus.

Mask : 1000
ACCEPT: 1XXX

	Will be Rejected	Will be Accepted
0x2	<input type="radio"/>	<input checked="" type="radio"/>
XXXX (any)	<input type="radio"/>	<input checked="" type="radio"/>
0110	<input checked="" type="radio"/>	<input type="radio"/>
1101	<input checked="" type="radio"/>	<input type="radio"/>
0xF	<input type="radio"/>	<input checked="" type="radio"/>

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2.7 Programming

Based on your knowledge learned in practical, determine the correct behavioral points of the following code snippet.
(Please select a maximum of 6 answers only)

```
void main(void) {  
    PIT_ConfigureTimer(1, 1000); /* (channel, time in ms) */  
    SIU.GPDI[59].R = 0; /* LED6 - LED is active low(0-ON, 1-OFF) */  
  
    for(;;){  
  
        if ( SIU.GPDI[44].R == 1 )/* SWITCH1 */  
        PIT_StartTimer(1);  
        else  
        PIT_StopTimer(1);  
  
    }  
}  
  
void PIT_CHANNEL1(void) /* timer 1 interrupt function */  
{  
    SIU.GPDO[59].R = 0;  
}
```

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3.1 Main Idea

What are the main ideas of the standard "AUTOSAR" (Automotive Open System Architecture)?

- Less wires in car
- ensuring Real time performance
- Increasing Complexity of Software
- Function Orientated Approach
- Hardware independent Application which enables Reuseability

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3.2 Complex Device Drivers

Explain the concept of "Complex Device Drivers" in AUTOSAR. What is it? Where is it located in the AUTOSAR architecture diagram? Why is it needed?

Complex Device Driver(CDD) enables the integration of special purpose functionality that is not specified in AUTOSAR. The interface to RTE must be AUTOSAR compliant. Direct Hardware Access.

In AUTOSAR architecture diagram, It is located in the basics software components. It

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3.3 Application

Which elements are used to create a software architecture (application) in AUTOSAR?

- AI, Machine Learning, SVM
- Software components, Database, Registers
- Micro Services, Kubernetes, Cloud
- Container, Constructor, Loops
- Software components, Ports, Interfaces, Runnables
- Webservice, FIBEX, SVN
- Function, Classes, Registers, Interrupts

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What does VFB mean in the context of AUTOSAR? State its benefit and the software development stage in which it used.

VFB :

Logical connection of software components from application with each other.
Before mapping of ports to concrete signal/bus system
Before mapping of SWCs to ECUs (application as non distributed)

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3.5 Architecture

Put the words to the correct position in the architecture picture of AUTOSAR.

The diagram illustrates the AUTOSAR architecture layers within an ECU (Electronic Control Unit). The layers are stacked vertically from top to bottom:

- Application Layer
- Runtime Environment (RTE)
- Service Layer
- ECU Abstraction Layer
- Microcontroller Abstraction Layer

A bracket on the right side of the diagram is labeled "Complex Device Driver", indicating its relationship to the lower layers.

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Complex Device Driver

ECU

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3.6 Communication

Put the given words to the correct position in the picture of two ECUs with AUTOSAR architecture.

The diagram illustrates the AUTOSAR architecture for two ECUs, ECU 1 and ECU 2. Both ECUs are based on the AUTOSAR 3.2 standard and contain a 'Basic Software' stack. ECU 1 contains SWC 1 and SWC 2, which communicate via 'Intra ECU Communication'. ECU 2 contains SWC 3. Both ECUs have a 'Communication Stack ECU' layer. ECU 1's stack includes 'Inter ECU Communication' leading to ECU 2's stack. The entire system is labeled 'Bus system' at the bottom.

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4.1 Static vs.Dynamic Test

Static and Dynamic Test are different test methodologies in the test domain. Define for each of the given scenarios the type of test methodology. Select between static test, dynamic test or both.

	Static Test	Dynamic Test
Functionality of Airbag Controller, flashed to the ECU, is checked against requirements	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Consistency between AUTOSAR SystemConfiguration of Climate Control is checked	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Syntax Errors are checked in the AUTOSAR application of Window Controller of a Car, followed by a test in a Virtual Validation Platform	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Check of AUTOSAR Compliance of an AUTOSAR Application for Seat Belt Manager (Communication by RTE)	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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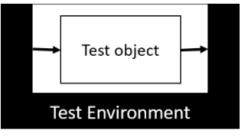
4. Test of ECUs

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4.2 System under Test

The SuT (System under Test) represents the test object and test environment.

What does PoC and PoO in SuT stand for? What do they realize?



In system under test (SuT), point of control (PoC) realizes simulation of an object with test data and point of observation (PoO) realizes the output reading test object.

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4.3 Test and V-Model

The V-Model contains different phases of test. In the given picture, the four abstract test phases are named. Explain briefly the major differences of the phases.

Where do the test cases come from?

```
graph TD; A[Acceptance Test] --- B[System Test]; B --- C[Integration Test]; C --- D[Component Test]
```

Component Test:
Directly after development, small units, classes or modules are tested, often white box test.

Integration Test:

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4.4 Simulation Types

Which sequence of the simulation types in the V-Model is correct (from top left to top right)?

MiL, SiL, HiL

MiL, HiL, SiL

HiL, SiL, MiL

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4.5 Test Parking Brake

Testing Parking Brake of a Car

The functionality of the Parking Brake System (PBS) of a car was developed and needs to be tested. The Parking Brake System realizes a mechanism to keep the vehicle securely motionless when parked. A button with two possible states (on, off) activates or deactivates the parking brake.

Features:

- The parking brake can be switched on by the driver. It can be switched on when the speed from the car is less than 5 km/h
- The parking brake can only be released (when active) when the driver does press the brake pedal

Possible values of the sensors:

button for parking brake: **0 - Not Active, 1 - Active**
current speed: < 5 km/h, ≥ 5 km/h
brake pedal (driver) **0 - Not Active, 1 - Active**

Possible States of Parking Brake System:

0 - Not Active, 1 - Active, KEEP STATE - the current status of the parking will not change

The test engineer has defined the following truth table based on the specification.

Button	Parking Brake	Brake Pedal (Driver)	Current Speed	Status	Parking Brake
	0	0			KEEP STATE
	0	1	<5 km/h		0
	1	0			1

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4.6 Test Seat Heating

Testing Seat Heating (Driver Seat) of a Car

The functionality of the Seat Heating of a car was developed and needs to be tested. The Seat Heating is used to heat the surface of the driver seat. Our Seat Heating has a button, which switches the heating on or off. Our Seat Heating has a very simple functionality, it switches off, when a temperature of 60 degrees is reached (time in ON state is not considered).

Features:

- Seat Heating can be switched on or off by a button
- If Seat Heating is switched ON, the heater increases the temperature up to 60°C. After that the Seat Heating is switched OFF

button for Seat Heating: 0 - OFF, 1 - ON
temperature sensor: $\leq 60^\circ\text{C}$, $> 60^\circ\text{C}$

Question a:
Create a (complete) truth table for the Seat Heating .

Question b:
Create a manual test scenario for the Seat Heating. Consider in the manual test scenario input values in which the Seat Heating is in ON state.

Hints:

- You can realize the truth table like that:

a	b	c
0	0	1
1	1	1

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Programming Task Points: 10

Please write C-Code for the boards used in the practical to perform the following specified tasks:

- Configure the required hardware peripherals (pins, LEDs and switches)
- Send a CAN message with ID **38₁₀** every 200ms
- This message to be sent uses 3 data fields to send the following information:
Data-byte[0]: Button 5 , Data-byte[1]: Button 6, Data-byte[2]: Light sensor value
For the light sensor value, 8 least significant bits should be sent. The light sensor is connected to Feature "ANA IN1" shown in the table on next page.
- The board should also receive a can message with ID **31₁₆**
- The message to be received has 4 data fields. These data fields represent 4 LEDs. Please turn the LEDs "on" or "off" according to the data you get from the CAN message. The possible values for this representation are 0 and 1.
Data-byte[X] contains status for LED X, where X ranges from 0 to 3.
- LED 5 blinks every second and LED 2 blinks at an interval of 500ms.

Please use the provided information. It helps you to write the code.

Input/output
A button can be configured as digital input by writing "0x0100" to the corresponding PCR register. A pressed button or a switch on "action" results in a low signal ("0") on the pin. This signal can be checked by the input register of the corresponding pin ("SIU.GPD1[X].R", where X=corresponding PCR register number). Pins can be configured as output by writing a "0x200" to the corresponding PCR register. To set a digital output write "0" or "1" to the corresponding output register "SIU.GDO[X].R". Analog inputs can be configured by writing a "0x2500" to the corresponding register. The converted values can be retrieved by reading the "ADC_0.CDR[2].B.CDATA" register.
You can find the PCR register numbers in the following description in Table 1.

Timer
No software interrupts need to be configured. There is only one timer available. Please use the function "*PIT_ConfigureTimer(int timerChannel, int period)*" to configure this timer. To start the timer use the function "*PIT_StartTimer(int timerChannel)*".

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2.5 Error Finding

Following is a function for sending a 16 bit long unsigned counter value encapsulated in a can message with id 0x10. The function is called at a time interval of every 500 ms and should send an incremented value of "counter" variable by 30 at every time interval. Upon reaching a value that equals 1000 or more, the counter should be reset to zero. The variable must be split in two parts of 8 bits each, in order to accommodate it in a can message. The first data byte of the can message should contain the first 8 least significant bits of the aforementioned variable "counter". And the second data byte should contain 8 most significant bits. Analyse the following piece of code to mark and select the correction option for the problems/errors against the above specified requirements in the below function:

```
void counterUpdateSend()
{
    static uint16 counter = 0; // variable declaration for counter A No error ▾
    counter = counter + 30; // counter increment
    if (counter = 1000) B Incorrect condition ▾
    { counter = 0; }

    CAN_0.BUF[8].MSG_ID.B.STD_ID = 10; // CAN message id A No error ▾
    CAN_0.BUF[8].CS.B.LENGTH = 1; // CAN message data length A No error ▾
    CAN_0.BUF[8].DATA.B[0] = counter % 128; // obtaining first 8 least significant bits from the variable A No error ▾
    CAN_0.BUF[8].DATA.B[0] = counter / 256; // obtaining the 8 most significant bits A No error ▾
    CAN_0.BUF[8].CS.B.CODE = 0xC; // buffer code for transmitting a message A No error ▾
}
```

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Aufgabe 18

What is the main difference between static test and dynamic test?

Explain shortly: in which development phases static test and dynamic test are mostly used.

Aktuell geschriebene Wörter: 0

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ASE_FinalExamWS2020_21_final | ④ 89 Minuten 17 Sekunden | Test abschließen

Punkte 4 | Keine Antwort

Aufgabe 9

Following is a function for sending a 16-bit long unsigned counter value encapsulated in a can message with id 0x10. The function is called at a time interval of every 500 ms and should send an incremented value of "counter" variable by 30 at every time interval. Upon reaching a value that equals 1000 or more, the counter should be reset to zero. The variable must be split in two parts of 8 bits each, in order to accommodate it in a can message. The first data byte of the can message should contain the first 8 least significant bits of the aforementioned variable "counter". And the second data byte should contain 8 most significant bits. Analyze the following piece of code to mark and select the correction option for the problems/errors against the above specified requirements in the below function:

```
void counterUpdateSend()
{
    static uint16 counter = 0; // variable declaration for counter
    counter = counter + 30; // counter increment
    if (counter > 1000) {
        counter = 0;
    }
    CAN_0_BUFI[0].MSG_ID.B.STD.ID = 10; // CAN message id
    CAN_0_BUFI[0].CS.B.LENGTH = 1; // CAN message data length
    CAN_0_BUFI[0].DATA.B[0] = counter % 128; // obtaining first 8 least significant bits from the variable
    CAN_0_BUFI[0].DATA.B[0] = counter / 256; // obtaining the 8 most significant bits
    CAN_0_BUFI[0].CS.B.CODE = 0xC; // buffer code for transmitting a message
}
```

④ Zurück | Frage 9/24 | ④ Weiter

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Aufgabe 24 (88 Minuten 34 Sekunden)

Please write C-Code for the boards used in the practical to perform the following specified tasks:

- Configure the required hardware peripherals (pins, LEDs and switches)
- Send a CAN message with ID **3610** every 1000ms
- This message to be sent uses 3 data fields to send the following information:
Data-byte[0]: Button 5. Data-byte[1]: Button 6. Data-byte[2]: Light sensor value
For the light sensor value, 8 least significant bits should be sent. The light sensor is connected to Feature "ANA INT1" shown in the table on next page.
- The board should also receive a can message with ID **3710**
- The message to be received has 4 data fields. These data fields represent 4 LEDs. Please turn the LEDs "on" or "off" according to the data you get from the CAN message. The possible values for this representation are 0 and 1. Data-byte[X] contains status for LED X, where X ranges from 0 to 3.
- LED 5 blinks every second and LED 6 blinks at an interval of 200 ms.

Please use the provided information. It helps you to write the code.

Input/output
A button can be configured as digital input by writing "0x0100" to the corresponding PCR register. A pressed button or a switch on "action" results in a low signal ("0") on the pin. This signal can be checked by the input register of the corresponding pin "SIU.GPD[K].R", where X=corresponding PCR register number. Pins can be configured as output by writing a "0x200" to the corresponding PCR register. To set a digital output write "0" or "1" to the corresponding output register "SIU.GPO[X].R". Analog inputs can be configured by writing a "0x200" to the corresponding register. The converted values can be retrieved by reading the "ADC_0.CDR[2].CDATA" register. You can find the PCR register numbers in the following description in Table 1.

Timer
No software interrupts need to be configured. There is only one timer available. Please use the function "PIT_ConfigureTimer(int timerChannel, int period)" to configure this timer. To start the timer use the function "PIT_StartTimer(int timeChannel)".

Parameter	Value
timeChannel	Timer channel to be configured
period	Period in milliseconds

Upon successful configuration of the timer interrupt, function "PITCHANVNL00" will be automatically called. Implement this function for timer related tasks.

CAN
To reduce the complexity of the task you may configure the CAN driver just like this:

```
SIUPCR[16].BPA = 1; // TX CAN pin configuration 1  
SIUPCR[17].BPA = 1; // RX CAN pin configuration 1
```

Furthermore for sending a CAN message you just need to set the register with the following constructs. It is possible to use some of them more than once. For example, the following code sends character "a" using the message ID 10.

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Aufgabe 22

Testing Park Pilot of a Car

The functionality of the Park Pilot System (PPS) of a car was developed and needs to be tested. The Park Pilot System supports the driver in parking. A button with two possible states (on/off) activates or deactivates the park pilot assist.

Features:

- The park pilot can be switched on by the driver. It can be switched on when the speed from the car is less than 10 km/h
- The park pilot will be deactivated when sensors are not working (sensor status)

Possible values of the sensors:

button for park pilot : 0 - OFF, 1 - ON
 current speed: < 10 km/h, >= 10 km/h
 sensor status: 0 - ERROR, 1 - WORKS

Possible States of Park Pilot System:

0 - OFF, 1 - ON

The test engineer has defined the following truth table based on the specification.

Button Park Pilot	Sensor Status	Current speed	Park Pilot Status
0	0		0
0	1	<10 km/h	0
1	0		0
1	1		1
0	0		0
0	1	>=10 km/h	0
1	0		0
1	1		0

Question a:
 Which test strategy is represented by the given truth table (for example random test strategy)?

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Aufgabe 2

Is it necessary to test ECUs in the automotive domain? Explain your answer briefly.

Aktuell geschriebene Wörter: 0

Zurück Frage 2/24 Weiter

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Opal Testcenter

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Aufgabe 14

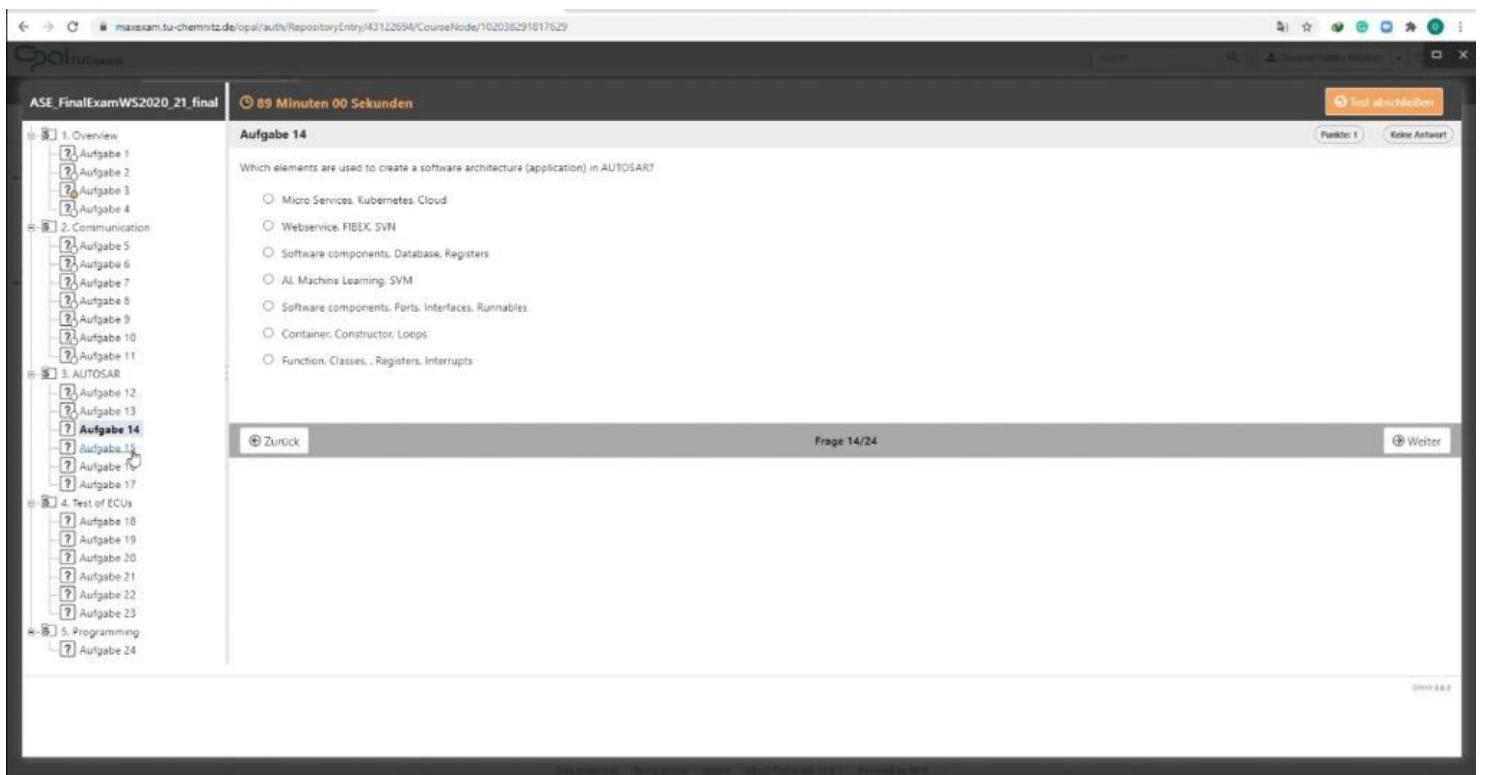
Punkte: 1 | Keine Antwort

Which elements are used to create a software architecture (application) in AUTOSAR?

- Micro Services, Kubernetes, Cloud
- Webservice, FIBEX, SVN
- Software components, Database, Registers
- AI, Machine Learning, SVM
- Software components, Ports, Interfaces, Runnables
- Container, Constructor, Loops
- Function, Classes, Registers, Interrupts

Zurück | Seite 14/24 | Weiter

DMVY4&8



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88 Minuten 57 Sekunden

Aufgabe 16

Put the words to the correct position in the architecture picture of AUTOSAR.

Korrektes Element hier ablegen

ECU

Complex Device Driver

ECU Abstraction Layer Microcontroller Abstraction Layer Service Layer Application Layer Basic Software Runtime Environment (RTE)

Zurück Frage 16/24 Weiter

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Punkte: 3

Korrekt Antwort?

Start abschließen

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⌚ 88 Minuten 46 Sekunden

Aufgabe 21

Punkte 1 Neuer Antwort

Which sequence of the simulation types in the V-Model is correct (from top left to top right)?

MIL, HIL, SIL
 MIL, SIL, HIL
 HIL, SIL, MIL

Zurück Frage 21/24 Weiter

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Schluesselwissen

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⌚ 89 Minuten 12 Sekunden

PIT_StopTimer(1);
};
};

void PIT_CHANNEL(void)/* timer 1 interrupt function */
{
SFU.GPDO[59].R = 0;
}

 Timer is set to 100 ms
 Timer is never started
 LED 6 will turn ON only once, depending on switch input
 LED can remain permanently OFF
 LED can remain permanently ON
 Interrupt function will be only triggered when timer is started
 LED 6 will blink every 100 ms
 Interrupt function will be always triggered until program stops
 Timer is set to 1 sec
 Timer can remain permanently started
 LED 6 is turned on before timer starts
 Timer is wrongly configured
 Switch has no influence on LED

⌚ Test abschließen

④ Zurück

Frage 11/24

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Aufgabe 23

Testing Seat Heating (Driver Seat) of a Car

The functionality of the Seat Heating of a car was developed and needs to be tested. The Seat Heating is used to heat the surface of the driver seat. Our Seat Heating has a button, which switches the heating on or off. Our Seat Heating has a very simple functionality: it switches off, when a temperature of 60 degrees is reached (time in ON state is not considered).

Features:

- Seat Heating can be switched on or off by a button
- If Seat Heating is switched ON, the heater increases the temperature up to 60°C. After that the Seat Heating is switched OFF.

button for seat Heating: 0 - OFF, 1 - ON
 temperature sensor: <= 60°C, > 60°C

Question a:
 Create a (complete) truth table for the Seat Heating.

Question b:
 Create a manual test scenario for the Seat Heating. Consider in the manual test scenario input values in which the Seat Heating is in ON state.

Hints:

- You can realize the truth table like that:

a	b	c
0	0	1
1	1	1

- Use the test constructs from unit 5.

Construct	Parameters	Example
Loop	<Condition>	LOOP (true)
If Then	<Condition>	If ($x = 12$) then $y = 1$
Wait	<Time> (in ms)	Wait (1000) // ms
Calc value		$a = a + b$
Bus Read	<Message ID> (assuming 1000 ms)	$a = Can.readEngineSpeed$
Bus Write	<Message ID>, <value>	Can.writeEngineSpeed, 100
User Interaction	<Text>	Do("Put your hand on the sensor")
Variable		int a = 1
Test Calculation		END

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Aufgabe 12

What are the main ideas of the standard "AUTOSAR" (Automotive Open Systemarchitecture)?

Function Orientated Approach
 Hardware independent Application which enables Reuseability
 Less wires in car
 Increasing Complexity of Software

Zurück | Frage 12/24 | Weiter

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Opal WebExam

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Aufgabe 10

Following is an 8-bit MASK and ACCEPT configuration. Please select which of the IDs can be accepted or not using this configuration on an ECU node connected to a CAN-Bus.

Mask: 0xF1
ACCEPT: 0x01

	Will be Rejected	Will be Accepted
0x10	<input type="radio"/>	<input checked="" type="radio"/>
0x01	<input checked="" type="radio"/>	<input type="radio"/>
0x03	<input type="radio"/>	<input checked="" type="radio"/>
0x13	<input checked="" type="radio"/>	<input type="radio"/>
0x0F	<input type="radio"/>	<input checked="" type="radio"/>
0xF3	<input checked="" type="radio"/>	<input type="radio"/>
0xFA	<input type="radio"/>	<input checked="" type="radio"/>
0x09	<input checked="" type="radio"/>	<input type="radio"/>

Zurück | Frage 10/24 | Weiter

Punkte: 4 | Keine Antwort | Test abschließen

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Aufgabe 1

Is an ECU an embedded system? Explain your answer.

Aktuell geschriebene Wörter: 0

Frage 1/24

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Punkte: 2 Keine Antwort

Test abschließen

DRK 4.0.0

A screenshot of a web-based examination system. On the left, a sidebar lists five main sections: '1. Overview', '2. Communication', '3. AUTOSAR', '4. Test of ECUs', and '5. Programming'. Each section contains a list of numbered assignments. The '1. Overview' section has four assignments, '2. Communication' has ten, '3. AUTOSAR' has six, '4. Test of ECUs' has six, and '5. Programming' has one. The main content area shows 'Aufgabe 1' with the question 'Is an ECU an embedded system? Explain your answer.' Below the question is a large empty text input field. At the bottom of this section, it says 'Aktuell geschriebene Wörter: 0'. Above the input field, there is a timer showing '89 Minuten 57 Sekunden'. At the top right of the main content area, there are buttons for 'Punkte: 2', 'Keine Antwort', and 'Test abschließen'. Below the main content area, a progress bar indicates 'Frage 1/24'. At the very bottom right, it says 'DRK 4.0.0'.

← → ⌂ maxeon.tu-chemnitz.de/opal/auth/repositoryEntry/431226/4/CourseNode/102036291817629

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Aufgabe 8

The following is a snapshot of a message register that represents an 8-digit message ID of a CAN-Message

<input type="radio"/> bit 7	<input type="radio"/> bit 6	<input type="radio"/> bit 5	<input checked="" type="radio"/> bit 4	<input type="radio"/> bit 3	<input type="radio"/> bit 2	<input type="radio"/> bit 1	<input type="radio"/> bit 0
MSB							LSB

Calculate the masking (MASK) and acceptance register (ACCEPT) values to approve only CAN messages with ID 229₁₀ (0E5₁₆) and 197₁₀ (0C5₁₆). (Numbers are given in decimal and numbers in brackets are given in Hexadecimal format)
(Please answer the question in Hexadecimal/Binary/Decimal formats only)

Mask: _____

Accept: _____

Zurück Frage 8/24 Weiter

Punkte: 2 Keine Antwort

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Q1 | Gained: 2 of 2 point(s) (evaluated by: Norbert Englisch)

A modern car contains more than 50 Electronic Control Units (ECUs). The development of these ECUs in the automotive domains requires a process model.

Question a:
Which process modell is mostly used in the automotive domain for software projects of embedded system?

Question b:
Exlpain briefly the structure of this process model.

a) V model
b)
Majorly consist of Specification, Implementation and Test phases

Word count: 12

To overview

Q2

⊗ | Gained: 0 of 1 point(s) (Max. points: 1)

Select the correct option:
Which of the following are topics/goals in AUTOSAR ?

Architecture, Mehtodology, Standardisation

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Sol TUCexam Search Muhammad Asjad

Select the correct option:
Which of the following are topics/goals in AUTOSAR ?

Architecture, Mehtodology, Standardisation
 Interfaces, Ports, Components
 Reusability, Standardisation, Reliability
 Architecture, Components, Availability

To overview

Q3 Max. points: 1
Gained: 1 of 1 point(s)

What is the purpose of VFB in AUTOSAR?

Abstraction of communication between Software components
 VFB is the same as RTE
 Abstraction of communication between Basic Software modules
 Realisation of Intra/Inter ECU communication

To overview

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⌚ | Gained: 1 of 1 point(s)

What is the purpose of VFB in AUTOSAR?

Abstraction of communication between Software components
 VFB is the same as RTE
 Abstraction of communication between Basic Software modules
 Realisation of Intra/Inter ECU communication

⌚ To overview

Q4 Max. points: 1

⌚ | Gained: 1 of 1 point(s)

Which elements are used to create a software architecture (application) in AUTOSAR?

Function, Classes, , Registers, Interrupts
 Webservice, FIBEX, SVN
 Micro Services, Kubernetes, Cloud
 Software components, Database, Registers
 Container, Constructor, Loops

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Q5 | Gained: 1 of 1 point(s)

Which elements are used to create a software architecture (application) in AUTOSAR?

- Function, Classes, Registers, Interrupts
- Webservice, FIBEX, SVN
- Micro Services, Kubernetes, Cloud
- Software components, Database, Registers
- Container, Constructor, Loops
- AI, Machine Learning, SVM
- Software components, Ports, Interfaces, Runnables

To overview

Q5 Max. points: 1

Q5 | Gained: 1 of 1 point(s)

What is the name of the AUTOSAR architecture module that is marked by a circle in the below picture :

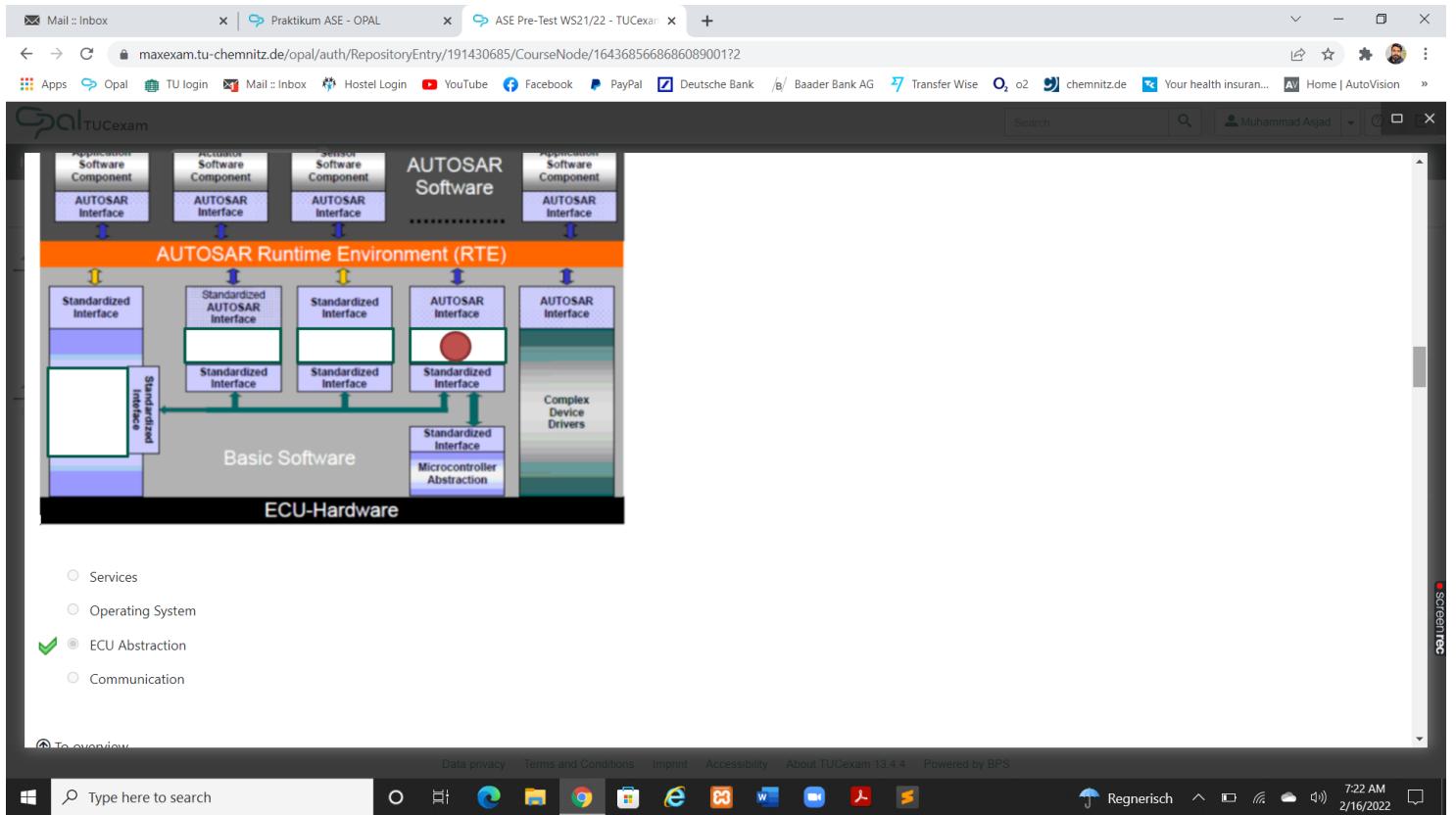
The diagram shows four rectangular boxes arranged horizontally. From left to right: 'Application Software Component' (white background), 'Actuator Software Component' (light blue background), 'Sensor Software Component' (light green background), and 'AUTOSAR Software' (dark grey background). Below the diagram is a navigation bar with links: Data privacy, Terms and Conditions, Imprint, Accessibility, About TUCexam 13.4.4, Powered by BPS.

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Gained: 1 of 1 point(s)

Please choose a correct option :

Which AUTOSAR Architecture layer are marked by the grey circles in the following picture?

Microcontroller

- ECU Abstraction Layer and Operating System
- Micro-controller Abstraction Layer and Complex Device Drivers
- Operating System and Micro-controller Abstraction Layer
- Complex Device Drivers and ECU Abstraction Layer

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⊗ | Gained: 0 of 1 point(s)

Determine the order of transmission in CAN Bus for the following Message IDs:

ID 1 : 0xA9
ID 2 : 0xFE1
ID 3 : 0x109

1 --- 2 --- 3
 Random order
 2 --- 1 --- 3
 2 --- 3 --- 1
 3 --- 2 --- 1
 1 --- 3 --- 2

To overview

Q8 Max. points: 1

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Q8 | Gained: 1 of 1 point(s) Max. points: 1

There are two ECUs connected to the same CAN Bus. ECU1 sends with a baud rate of 125kBit/s and ECU2 with 250kBit/s. Is a communication between ECU1 and ECU2 possible?

No, communication is not possible.
 Yes, communication is possible. Each second bit will be lost.
 Yes, communication is possible.
 Yes, communication is possible. But the bus load will be very high.

To overview

Q9 | Gained: 0 of 1 point(s) Max. points: 1

Consider only 4 bits for masking filtering an ID in a CAN Bus ECU
Which of the ID provided in options below can be accepted(received) based on the following acceptance and masking ?

Acceptance : 0x6
Masking : 0x6

0x9
 0xF

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To overview

Q9

Max. points: 1

⊗ | Gained: 0 of 1 point(s)

Consider only 4 bits for masking filtering an ID in a CAN Bus ECU
Which of the ID provided in options below can be accepted(received) based on the following acceptance and masking ?

Acceptance : 0x6
Masking : 0x6

0x9
 0xE
 0x2
 0xF

To overview

Q10

Max. points: 2

⊗ | Gained: 0 of 2 point(s), no response

Consider only 4 bits of CAN ID instead of 11 and answer the following question:
Which of the following values are correct for masking and acceptance of the given IDs ?

ID 1: 0x6

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Gained: 0 of 2 point(s), no response

Consider only 4 bits of CAN ID instead of 11 and answer the following question:
Which of the following values are correct for masking and acceptance of the given IDs ?

ID 1: 0x6
ID 2: 0x7

NOTE : Select the correct value for masking and acceptance from the following choices

Masking : 0xE
 Acceptance : 0x10
 Acceptance : 0xE
 Acceptance : 0x7
 Masking : 0x5
 Masking : 0xF

To overview

Q11 Max. points: 1

Gained: 0 of 1 point(s)

Which network topology is mostly used in a car for realizing the communication of ECUs?

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Search Muhammad Asjad

Q11 Max. points: 1

④ | Gained: 0 of 1 point(s)

Which network topology is mostly used in a car for realizing the communication of ECUs?

Star Topology
 Ring Topology and Line Topology
 Wireless Communication
 ECUs do not need to communicate with each other

④ To overview

Q12 Max. points: 1

④ | Gained: 1 of 1 point(s)

Which sequence of the simulation types in the V Model is correct (from top left to top right)?

MiL, HiL, SiL
 HiL, SiL, MiL
 MiL, SiL, HiL

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To overview

Q12 Max. points: 1

⊗ | Gained: 1 of 1 point(s)

Which sequence of the simulation types in the V Model is correct (from top left to top right)?

Mil, HiL, SiL
 HiL, SiL, MiL
 Mil, SiL, HiL

To overview

Q13 Max. points: 1

⊗ | Gained: 0 of 1 point(s), no response

Which names belong to the System under Test (SuT)?

Test, Error, Code
 Input, Output, Algorithm
 Test Object, Test Environment

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To overview

Q13

Max. points: 1

ⓘ | Gained: 0 of 1 point(s), no response

Which names belong to the System under Test (SuT)?

Test, Error, Code

Input, Output, Algorithm

Test Object, Test Environment

To overview

Q14

Max. points: 3

ⓘ | Gained: 0 of 3 point(s), no response

The given picture represent and abstract overview about the test methodologies in the software area.

```
graph TD; Test[Test] --> Review[Review]; Test --> StaticAnalysis[Static Analysis]; Test --> BlackBox[Black Box]; Test --> GreyBox[Grey Box]; Test --> WhiteBox[White Box]
```

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Gained: 0 of 3 point(s), no response

The given picture represent and abstract overview about the test methodologies in the software area.

```
graph TD; Test[Test] --> Review[Review]; Test --> StaticAnalysis[Static Analysis]; Test --> BlackBox[Black Box]; Test --> GreyBox[Grey Box]; Test --> WhiteBox[White Box]
```

Question a:
Which two test methodologies are missing in the given pictures?

Question b:
Explain shortly the main difference between the two test methodologies from Question a.

Word count: 0

To overview

Q15

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Sol TUCexam Search Muhammad Asjad

Testing Automatic Light of a Car

The Functionality of the Light Assistant System (LAS) of a car was developed and need to be tested. The Light Assistant System switches the head light of the car on or off, based on the brightness of the environment, measured by a light sensor. A button with two possible states (on, off) activates or deactivates the light assist.

Possible Values of the sensors:

Button for LAS : **0 - OFF, 1 - ON**
Light sensor: **0 - DARK, 1 - BRIGHT**

Possible States of Light Assistant System:

0 - OFF, 1 - ON

The test engineer has defined the following truth table based on the specification.

Input	Output	
Button LAS	Light sensor	Status LAS
0	0	0
0	1	0
1	0	0
1	1	1

Question a:
Which test strategy is represented by the given truth table (for example Random test strategy)?

Question b:

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Sol TUCexam Search Muhammad Asjad

The test engineer has defined the following truth table based on the specification.

Input		Output
Button LAS	Light sensor	Status LAS
0	0	0
0	1	0
1	0	0
1	1	1

Question a:
Which test strategy is represented by the given truth table (for example Random text strategy)?

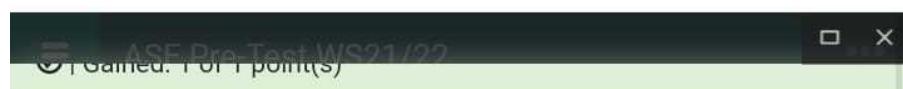
Question b:
How many test cases are defined in the truth table?

Word count: 0

To overview

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Which names belong to the System under Test (SuT)?

- Test Object, Test Environment
- Test, Error, Code
- Input, Output, Algorithm

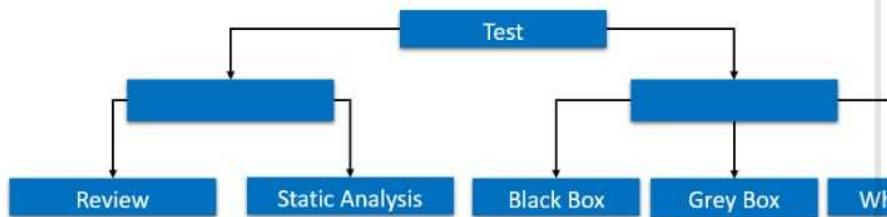
[To overview](#)

Q14

Max. points: 3

i | Gained: 3 of 3 point(s) (evaluated by: Norbert Englisch)

The given picture represent and abstract overview about the test methodologies in the software area.



Question a:

Which two test methodologies are missing in the given pictures?

Question b:

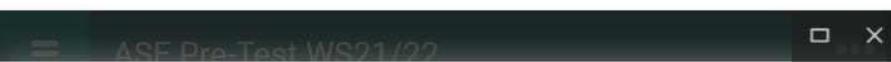
Explain shortly the main difference between the two test methodologies from Question a.

- a) static, dynamic
- b) Static- the test object is not executed, but analysed
dynamic-Test object is executed.

Word count: 14



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To overview

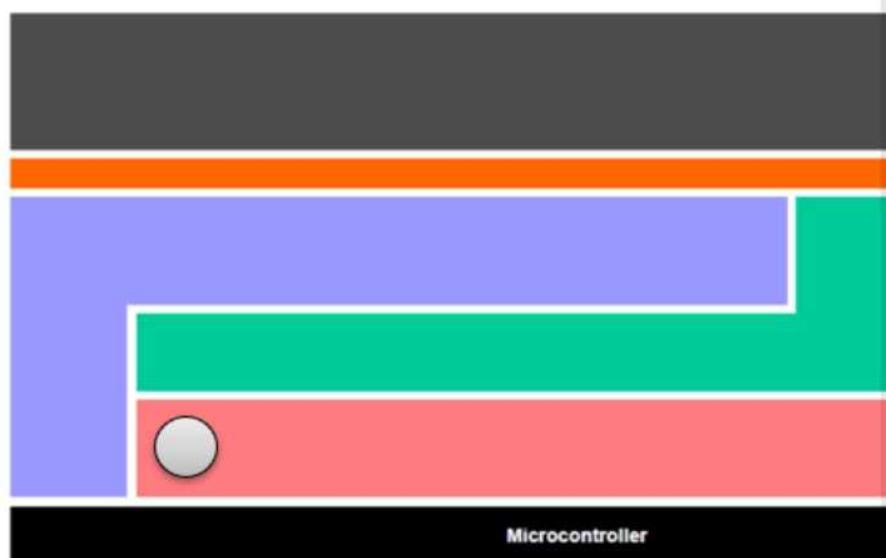
Q6

Max. points: 1

| Gained: 1 of 1 point(s)

Please choose a correct option :

Which AUTOSAR Architecture layer are marked by the grey circles in the following picture?



- Micro-controller Abstraction Layer and Complex Device Drivers
 Operating System and Micro-controller Abstraction Layer
 ECU Abstraction Layer and Operating System
 Complex Device Drivers and ECU Abstraction Layer

To overview

Q7

Max. points: 1

| Gained: 1 of 1 point(s)

Determine the order of transmission in CAN Bus for the following Message



i | Gained: 1 of 2 point(s) (evaluated by: Norbert Englisch)

Testing Automatic Light of a Car

The Functionality of the Light Assistant System (LAS) of a car was developed and need to be tested. The Light Assistant System switches the head light of the car on or off, based on the brightness of the environment, measured by a light sensor. A button with two possible states (on, off) activates or deactivates the light assist.

Possible Values of the sensors:

Button for LAS : 0 - OFF, 1 - ON

Light sensor: 0 - DARK, 1 - BRIGHT

Possible States of Light Assistant System:

0 - OFF, 1 - ON

The test engineer has defined the following truth table based on the specification.

Input		Output
Button LAS	Light sensor	Status LAS
0	0	0
0	1	0
1	0	0
1	1	1

Question a:

Which test strategy is represented by the given truth table (for example Random test strategy)?

Question b:

How many test cases are defined in the truth table?

- a) Functional Test
- b) 4



Answer

The correct transmission order is : 2 --- 1 --- 3

To overview

Q8

| Gained: 0 of 1 point(s)

There are two ECUs connected to the same CAN Bus. ECU1 has a baud rate of 125kBit/s and ECU2 with 250kBit/s. Is a communication between ECU1 and ECU2 possible?



No, communication is not possible.

Yes, communication is possible. But the bus load is too high.

Yes, communication is possible. Each second I can send 10 messages.



Yes, communication is possible.

To overview

Q9

| Gained: 1 of 1 point(s)

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ASE Pre-Test WS21/22

Q1

Max. points: 2

i | Gained: 2 of 2 point(s) (evaluated by: Norbert Englisch)

A modern car contains more than 50 Electronic Control Units (ECUs). The development of these ECUs in the automotive domains requires a process model.

Question a:

Which process modell is mostly used in the automotive domain for software projects of embedded system?

Question b:

Explain briefly the structure of this process model.

- a) V model.
- b) In the V model left side is specification , bottom part is implementation and right side is testing.

Word count: 22

[To overview](#)**Q2**

Max. points: 1

x | Gained: 0 of 1 point(s)

Select the correct option:

Which of the following are topics/goals in AUTOSAR ?

- Architecture, Mehtodology, Standardisation
- Reusability, Standardisation, Reliability
- Interfaces, Ports, Components
- Architecture, Components, Availability



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⊗ | Gained: 0 of 1 point(s)

What is the purpose of VFB in AUTOSAR?

- Abstraction of communication between Software components
- Realisation of Intra/Inter ECU communication
- Abstraction of communication between Basic Software modules
- VFB is the same as RTE

⊕ To overview

Q4

Max. points: 1

⊗ | Gained: 1 of 1 point(s)

Which elements are used to create a software architecture (application) in AUTOSAR?

- Function, Classes, , Registers, Interrupts
- Software components, Database, Registers
- Container, Constructor, Loops
- Webservice, FIBEX, SVN
- Micro Services, Kubernetes, Cloud
- AI, Machine Learning, SVM
- Software components, Ports, Interfaces, Runnables

⊕ To overview

Q5

Max. points: 1

⊗ | Gained: 1 of 1 point(s)

What is the name of the AUTOSAR architecture module that is marked by a



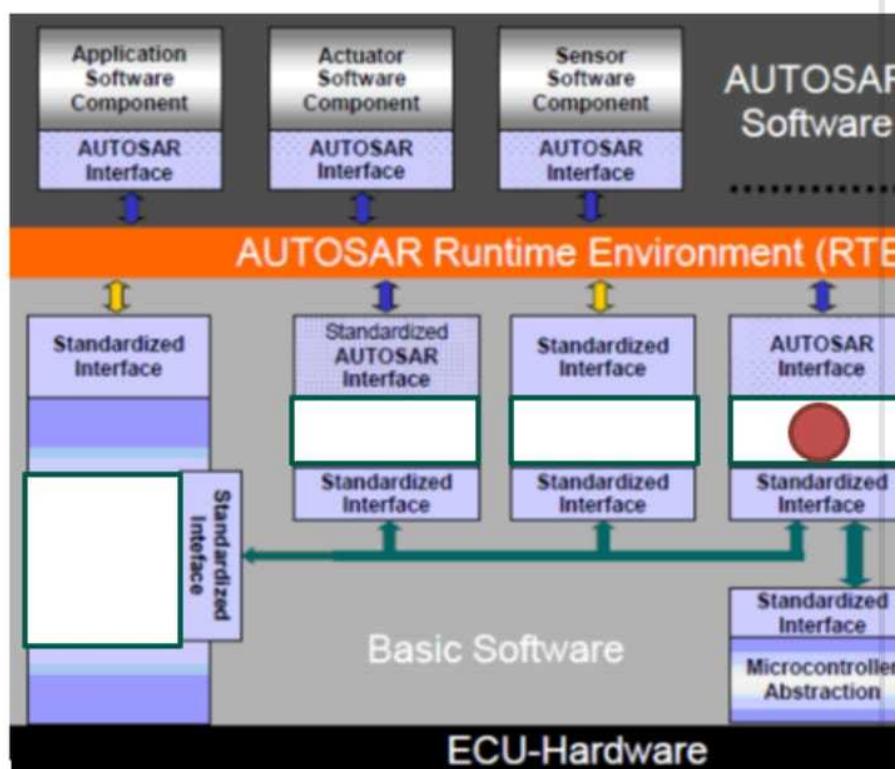
To overview

Q5

Max. points: 1

 | Gained: 1 of 1 point(s)

What is the name of the AUTOSAR architecture module that is marked by a circle in the below picture :



- ECU Abstraction
 Communication
 Operating System
 Services

To overview

Q6

Max. points: 1



- Reusability, Standardisation, Reliability
- Interfaces, Ports, Components
- Architecture, Components, Availability

 To overview

Q3

 | Gained: 0 of 1 point(s)

What is the purpose of VFB in AUTOSAR?

-  Abstraction of communication between Software Components
- Realisation of Intra/Inter ECU communication
- Abstraction of communication between Basic Software Components
-  VFB is the same as RTE

 To overview

Q4

 | Gained: 1 of 1 point(s)

Which elements are used to create a software architect



Word count: 22

① To overview

Q2

⊗ | Gained: 0 of 1 point(s)

Select the correct option:

Which of the following are topics/goals in AUTOSAR ?

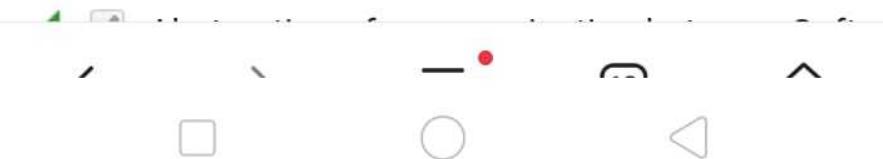
- Architecture, Methodology, Standardisation
- Reusability, Standardisation, Reliability
- Interfaces, Ports, Components
- Architecture, Components, Availability

① To overview

Q3

⊗ | Gained: 0 of 1 point(s)

What is the purpose of VFB in AUTOSAR?



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[To overview](#)**Q7**

Max. points: 1

 | Gained: 1 of 1 point(s)

Determine the order of transmission in CAN Bus for the following Message IDs:

ID 1 : 0x0A9

ID 2 : 0xFE1

ID 3 : 0x109

- Random order
- 3 --- 2 --- 1
- 1 --- 3 --- 2

 1 --- 2 --- 3 2 --- 1 --- 3 2 --- 3 --- 1**Answer**

The correct transmission order is : 2 --- 1 --- 3

[To overview](#)**Q8**

Max. points: 1

 | Gained: 0 of 1 point(s)

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To overview

Q8

Max. points: 1

⊗ | Gained: 0 of 1 point(s)

There are two ECUs connected to the same CAN Bus. ECU1 sends with a baud rate of 125kBit/s and ECU2 with 250kBit/s. Is a communication between ECU1 and ECU2 possible?

No, communication is not possible.

Yes, communication is possible. But the bus load will be very high.

Yes, communication is possible. Each second bit will be lost.

Yes, communication is possible.

To overview

Q9

Max. points: 1

⊗ | Gained: 1 of 1 point(s)

Consider only 4 bits for masking filtering an ID in a CAN Bus ECU
Which of the ID provided in options below can be accepted(received)
based on the following acceptance and masking ?

Acceptance : 0x6

Masking : 0x6

- 0xF
- 0x2
- 0x9
- 0xE

Answer

The correct value 0x2



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 0x2 0x9 0xE**Answer**

The correct value 0x2

[To overview](#)**Q10**

Max. points: 2

 | Gained: 2 of 2 point(s)

Consider only 4 bits of CAN ID instead of 11 and answer the following question:

Which of the following values are correct for masking and acceptance of the given IDs ?

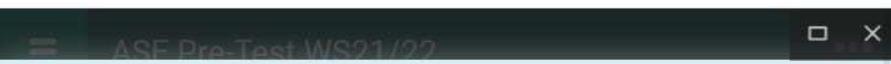
ID 1: 0x6

ID 2: 0x7

NOTE : Select the correct value for masking and acceptance from the following choices

 Masking : 0xE Acceptance : 0xE Acceptance : 0x7 Acceptance : 0x10 Masking : 0x5 Masking : 0xF

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[To overview](#)**Q11**

Max. points: 1

 | Gained: 1 of 1 point(s)

Which network topology is mostly used in a car for realizing the communication of ECUs?

- Ring Topology and Line Topology
- ECUs do not need to communicate with each other
- Wireless Communication
- Star Topology

[To overview](#)**Q12**

Max. points: 1

 | Gained: 1 of 1 point(s)

Which sequence of the simulation types in the V Model is correct (from top left to top right)?

- MiL, HiL, SiL
- MiL, SiL, HiL
- HiL, SiL, MiL

[To overview](#)**Q13**

Max. points: 1

 | Gained: 1 of 1 point(s)

Which names belong to the System under Test (SuT)?

- Test Object, Test Environment



```

-- signal s1,s2 : STD_LOGIC;
43
44
45
46
47 begin
48
49 t : process (a,b,s1,s2)
50     variable v1,v2 : STD_LOGIC;
51     begin
52
53         if(a ='1') then s1 <= '1'; v2 := '1'; else s1 <= '0'; v2 := '0'; end if;
54         if(b ='1') then s2 <= '1'; v1 := '1'; else s2 <= '0'; v1 := '0'; end if;
55         y1 <= '0'; y2 <= '0';
56         y3 <= '0'; y4 <= '1';
57         if(s1 = '1') then y1 <= '1'; end if;
58         if(v1 = '1') then y3 <= '1'; end if;
59         |if(s2 = '1') then y2 <= '1'; end if;
60         if(v2 = '1') then y4 <= '0'; end if;
61
62     end process;
63
64 end Behavioral;

```

At Line 59, when $a = 0, b = 1$,
should the signal value of $s2$ still be
0 for evaluation?

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Question 3
Question 4
Question 5
Question 6
Question 7
Question 8
Question 9
Question 10
Question 11
Question 12
Question 13
Question 14
Question 15

Question 6

Please choose a correct option :

Which AUTOSAR Architecture layer are marked by the grey circles in the following picture?



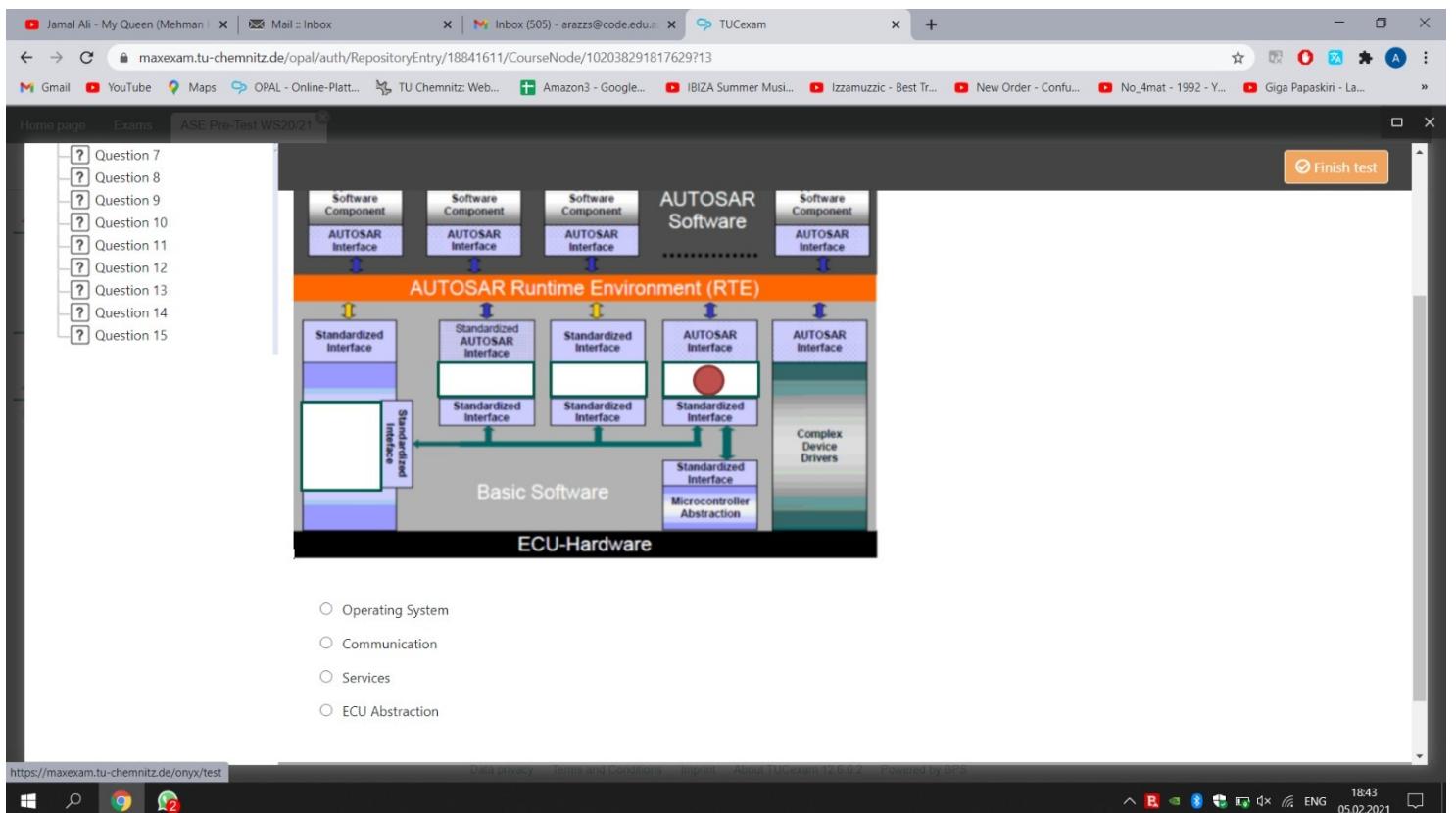
Microcontroller

Complex Device Drivers and ECU Abstraction Layer
 Operating System and Micro-controller Abstraction Layer
 Micro-controller Abstraction Layer and Complex Device Drivers
 ECU Abstraction Layer and Operating System

Finish test Points: 1

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18:44 05.02.2021



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Test Questions

Question 1 Question 2 Question 3 Question 4 Question 5 Question 6 Question 7 Question 8 Question 9 Question 10 Question 11 Question 12 Question 13 Question 14 Question 15

Test Questions

Section time limit: 16 minutes 43 seconds

Question 12

Points: 1

Which sequence of the simulation types in the V Model is correct (from top left to top right)?

HIL, SIL, MIL
 MiL, SIL, HiL
 MiL, HiL, SIL

Back Question 12/15 Forward

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Farida ASE
3cu vbf same as rte
WhatsApp Desktop

https://maxexam.tu-chemnitz.de/onyx/test

Windows taskbar: Search, Google, WhatsApp, Battery, Network, Volume, ENG, 18:45, 05.02.2021, Task View

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Test Questions

Test Questions

Section time limit: 16 minutes 39 seconds

Question 13

Points: 1

Which names belong to the System under Test (SuT)?

Input, Output, Algorithm
 Test, Error, Code
 Test Object, Test Environment

Back Question 13/15 Forward

ONYX 9.7.1

https://maxexam.tu-chemnitz.de/onyx/test

Windows taskbar icons: Search, Google Chrome, WhatsApp, Battery, Network, Volume, ENG, 18:45, 05.02.2021

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Test Questions

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Test Questions

Section time limit: 18 minutes 49 seconds

Question 3

What is the purpose of VFB in AUTOSAR?

Points: 1

Abstraction of communication between Software components
 VFB is the same as RTE
 Realisation of Intra/Inter ECU communication
 Abstraction of communication between Basic Software modules

Back Question 3/15 Forward

ONYX 9.7.1

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Finish test

```
void Pit_Channel_10{           //interrupt function for channel 1
    SIU.GPDO[6].R = ~SIU.GPDO[6].R;
    PIT.CHANNEL[1].TFLG.R = 1;
}

void Pit_Channel_20{           //interrupt function for channel 2
    SIU.GPDO[7].R = 1;
    PIT.CHANNEL[1].TFLG.R = 1;
}

 Timer Channel 2 not started and LED 2 ON all the time
 Timer Channel 1 configured and started and LED 1 is off all the time
 Timer Channel 1 started and LED 1 blinking every 1 second
 LED 1 blinking inside the timer channel 2 function call
 LED 1 blinking every 1 second
 LED 2 blinking
 LED 2 not blinking
```

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Test Questions

Section time limit: 18 minutes 55 seconds

Question 2

Points: 1

Select the correct option:
Which of the following are topics/goals in AUTOSAR ?

Architecture, Mehtodology, Standardisation

Interfaces, Ports, Components

Reusability, Standardisation, Reliability

Architecture, Components, Availability

Back Question 2/15 Forward

ONYX 9.7.1

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Windows 10 Taskbar: Back, Home, Search, Google, Notifications (1), Network, Battery, Volume, ENG, 18:43, 05.02.2021

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compose a message with id 0x0A1, appropriate length and data so that a can message is configured and sent with the text characters.
Note: Each character is 8 bits in length.

```
void sendMessage()
{
    CAN_0.BUF[9].MSG_ID.B.STD_ID =  ;
    CAN_0.BUF[9].CS.B.LENGTH =  ;
    CAN_0.BUF[9].DATA.B[0] =  ;
    CAN_0.BUF[9].DATA.B[1] =  ;
    CAN_0.BUF[9].DATA.B[2] =  ;
    CAN_0.BUF[9].DATA.B[3] =  ;
    CAN_0.BUF[9].DATA.B[4] =  ;
    CAN_0.BUF[9].DATA.B[5] =  ;
    CAN_0.BUF[9].DATA.B[6] =  ;
    CAN_0.BUF[9].DATA.B[7] =  ;
}
```

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3cu vbf same as rte
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Question 14 Question 15

Finish test

0 - OFF, 1 - ON

The test engineer has defined the following truth table based on the specification.

Input		Output
Button LAS	Light sensor	Status LAS
0	0	0
0	1	0
1	0	0
1	1	1

Question a:
Which test strategy is represented by the given truth table (for example Random text strategy)?

Question b:
How many test cases are defined in the truth table?

Current word count: 0

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Test Questions

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Test Questions

Section time limit: 16 minutes 55 seconds

Question 10

Consider only 4 bits of CAN ID instead of 11 and answer the following question:
Which of the following values are correct for masking and acceptance of the given IDs ?

ID 1: 0x6
ID 2: 0x7

NOTE : Select the correct value for masking and acceptance from the following choices

Masking : 0xF
 Masking : 0xE
 Acceptance : 0xE
 Acceptance : 0x10
 Masking : 0x5
 Acceptance : 0x7

Back Question 10/15

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Test Questions

⌚ Section time limit: 18 minutes 46 seconds

Question 4

Points: 1

What is the name of the AUTOSAR architecture module that is marked by a circle in the below picture?

The diagram illustrates the AUTOSAR architecture layers:

- Software Layer:** Contains Application Software Components (with AUTOSAR Interfaces), Actuator Software Components (with AUTOSAR Interfaces), and Sensor Software Components (with AUTOSAR Interfaces).
- AUTOSAR Runtime Environment (RTE):** Manages communication between the Software Layer and the Basic Software.
- Basic Software:** Provides standardized interfaces to the RTE.
- Hardware Abstraction Layer:** Includes Standardized Interfaces, Microcontroller Abstraction, and Complex Device Drivers.

A red circle highlights the 'Standardized Interface' layer between the Application Software Component and the Basic Software.

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Question 7

Points: 1

Determine the order of transmission in CAN Bus for the following Message IDs:

ID 1 : 0xA9
ID 2 : 0xE1
ID 3 : 0x109

3 --- 2 --- 1
 2 --- 3 --- 1
 1 --- 3 --- 2
 1 --- 2 --- 3
 2 --- 1 --- 3
 Random order

Back Question 7/15 Forward

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Test Questions

Finish test

Test Questions

Section time limit: 17 minutes 00 seconds

Question 9

Points: 1

Consider only 4 bits for masking filtering an ID in a CAN Bus ECU
Which of the ID provided in options below can be accepted(received) based on the following acceptance and masking ?

Acceptance : 0x6
Masking : 0x6

0x9
 0x2
 0xF
 0xE

Back Question 9/15 Forward

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Finish test Points: 3

Question 14

The given picture represent and abstract overview about the test methodologies in the software area.

```
graph TD; Test[Test] --> Review[Review]; Test --> StaticAnalysis[Static Analysis]; Test --> BlackBox[Black Box]; Test --> GreyBox[Grey Box]; Test --> WhiteBox[White Box]
```

Question a:
Which two test methodologies are missing in the given pictures?

Question b:
Explain shortly the main difference between the two test methodologies from Question a.

Current word count: 0

Back Question 14/15 Forward

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