



Test 5

Graded Quiz • 44 min

Due May 11, 12:29 PM IST

Test 5

TOTAL POINTS 22

1. What properties does a robot have according to ISO definition?

1 point

- ☒ A specified range of tasks
- ☐ Anthroponathy
- ☒ AI
- ☐ Two-plane operations
- ☒ Operations carried out in any environment
- ☐ Single-axis operations
- ☒ Mobility
- ☒ Independence
- ☐ Single-plane operations

2. What signals are best to use with L293D to control the speed and the direction of one motor?

1 point

- ☒ One PWM signal and two digital signals
- ☐ One PWM signal and one digital signal
- ☐ Two PWM signals and one digital signal
- ☐ Three PWM signals

3. What combination of data levels should we apply at motor driver inputs to make the motor turn if the LOW level has been applied to ENABLE?

1 point

- ☒ If there is 0 value at ENABLE, the motor won't start
- ☐ 0.0
- ☐ 0.1
- ☐ 1.1
- ☐ 1.0

4. What does the usage of the Motor Shield allow us?

1 point

- ☒ Up to 2A on each channel
- ☒ To combine or separate the power of the motors and the controller by using the power join jumper

☒ To control the direction of motor rotation with one pin

5. What are the permissible ways to power your motors and controller in a mobile robot?

1 point

☒ 4.5 V sent to the Motor Shield with combined power for the motors and the controller

☐ 9V sent to the motors, 4.5V sent to the controller, and the power is separated

☒ 3V applied to the motors and then sent to the controller through a voltage up-converter

☒ 9V sent to the Motor Shield with combined power of the controller and the motors

☐ 9V sent to the controller, 4.5V sent to the motors, and the power is separated

6. How can we resolve the problem, when our motor turns in the opposite direction from the desired one?

1 point

☒ We need to change the polarity of the connection of the motors to the driver or the expansion board

☒ If there was a function created to control the robot's movement, where the sign of the parameter of the direction control was taken into consideration, we can change the sign of the comparison of the transmitted speed with 0

☒ We need to invert the signal responsible for the direction of the rotation

☐ We need to set the pin connected to ENABLE as an input

7. How can the movement control (speed and direction of both motors) function come in useful?

1 point

- ☒ It will allow to count out only two values to control 4 robot's parameters
- ☐ It allows to increase the maximum speed of the motors and make it higher than the speed the motors used to have when there was no such function
- ☒ It will teach the robot to follow the black line
- ☒ It will allow to process incorrect speed values counted out in the program
- ☒ It will delete some lines of the code and make the code more readable
- ☒ It will enable the robot to avoid obstacles

8. Imagine that we have a distance meter installed in the robot, just as in the Hitch experiment. The sketch contains the whole code on the configuring of the pins, and the main loop consists of the line `drive(measure())`, where both functions are defined as in the above-mentioned experiment. What statements will be true concerning such robot, when we start it in an empty room? Try to solve this problem without realizing it in practice by basing yourself on the information you already possess.

1 point

- ☐ The robot will be moving forward and backward hither and thither
- ☒ The robot will never move backwards
- ☐ The robot will start moving and gradually gain speed

☐ If the distance to the wall is more than 255cm, the robot will not move

☐ The robot will stop at the distance of 255cm from the wall

☒ The robot starts moving fast, but will gradually slow down and stop

9. When do we get the "black under both sensors" value?

1 point

☐ When the robot stops on the borderline

☒ When the robot reaches a crossroads

☒ When the robot has reached the edge of the table

10. Which statements are true concerning the analog line sensor?

1 point

☒ External light sources don't pose a problem for it

☐ The sensor emits ultra sound, and with its reflection, it determines the color

☐ Empty spaces under the sensor are equivalent to a white background under the sensor

☒ The voltage at its signal output is proportional to the intensity of grey under the sensor

☒ With its help, we are able to tell a red line from a green one

11. Which improvement option of the robot and the relay algorithm could ensure that the robot works more smoothly?

1 point

- ☐ Increase the robot's gauge width
- ☐ Install more powerful power source units
- ☒ Increase the number of sensors and provide for a larger number of different states (speed combinations of both wheels) depending on how the sensors and the line are located relative to each other

12. Which robot motion parameter is measured in proportion to the sensor value deviation to the left or to the right from the standard position above the line in the regulator that we've shown you?

1 point

- ☐ Getting up speed at acceleration
- ☐ Target speed
- ☐ The speed of the left wheel
- ☒ The difference in the speed of the wheels
- ☐ Acceleration of the right wheel at the slowdown

13. How will the reduction of the coefficient used in a proportional regulator affect the robot's behavior?

1 point

- ☐ The robot will slow down
- ☐ The desired location of the sensor above the line will change

- ☐ The reaction to the deviation of the sensor from standard value will be more pronounced
- ☐ The robot will accelerate
- ☒ The reaction to the deviation of the sensor from standard value will be less pronounced

14. How does sensor location affect the robot's behavior?

1 point

- ☐ Having the sensor on the left side is more effective than having it on the right side
- ☐ The more external light gets into the area under the sensor, the more precise its readings will be
- ☒ The range of the values received by the sensor changes depending on the height at which the sensor is installed
- ☐ The sensor located too high sees only a small part of the track and briskly reacts to its change of position above the line
- ☒ The sensor located too low sees only a small part of the track and briskly reacts to its change of position above the line

15. What can be achieved if we add new components to the regulator?

1 point

- ☐ The data from the sensor is specified
- ☐ Acceleration time for the motors is reduced

- ☐ Battery discharge is taken into consideration
- ☒ The dynamics of data received from the external environment is considered
- ☐ The choice of the coefficients is simplified

16. How to identify that the robot has reached the crossroads when we use a regulator, which monitors the difference between the values received from two sensors?

1 point

- ☒ We need to monitor the absolute value received by the sensors, and when it's identified as a black background under both sensors, we need to signal that the robot has reached the crossroads
- ☐ We need to monitor the error sign, and as soon as it changes from + to -, we need to signal that the robot has reached the crossroads
- ☐ When we use this regulator, this is an impossible task

17. What do you need to check when you find out that the device has stopped working?

1 point

- ☒ That the pin numbers in the code correspond to the pins, to which the devices are connected
- ☒ The version of the program uploaded in the device
- ☒ That the power supply units are charged
- ☒ Absence of disruptions in the circuit of the device

- ☒ That there is voltage in all available nodes
- ☒ The values received from the sensors and calculated parameters
- ☒ All the components in turn

18. What will we read in the Port Monitor when we run the following sketch

1 point

```
#define EINZ
#define ZWEI

void setup()
{
    #ifdef EINZ
        Serial.begin(9600);
    #endif
    #ifdef DREI
        Serial.println("Hello, world!");
    #endif
}

void loop()
{
    #ifdef EINZ
        Serial.println("Don't panic!");
    #endif
    #ifdef DREI
        Serial.println("42");
    #endif
}
```

```
    // Don't panic! Don't panic! ... Don't panic!  
#endif  
#ifdef ZWEI  
    while(true) { }  
#endif  
}
```

- ☐ Don't panic! Don't panic! ... Don't panic!
- ☒ Don't panic!
- ☐ Hello, world! Don't panic! 42
- ☐ Hello, world! Don't panic!
- ☐ Hello, world! Don't panic! Hello, world! Don't panic! ... Hello, world! Don't panic!

19. What measures need to be taken to organize a serial port at controller's random pins?

1 point

- ☒ Create an object
- ☐ Use the Serial object
- ☒ Check which pins on the board are free to be used for the creation of the port
- ☐ The Wire library needs to be connected

- ☐ The Wire library needs to be connected
- ☐ Disconnect all devices from pins 0 and 1
- ☒ Connect the SoftwareSerial library

20. What's true concerning the work with encoders?

1 point

- ☒ Encoders allow to monitor actual turning of the wheels
- ☒ The precision, with which the robot's location is determined, can be not that high due to possible wheel slip, when the wheels turn, but the robot is not moving
- ☒ They help calculate the speed and the location of the robot
- ☒ The precision of the calculations is limited by encoder resolution (which part of the turn it is able to capture)

21. Why do we need external interrupts?

1 point

- ☐ To interrupt a certain action when certain conditions have been fulfilled in the code
- ☐ To stop the running program
- ☐ To consider the analog sensor as a digital one

- ☒ To perform a certain action not when it's turn to perform it according to the program, but when a certain event takes place at a certain input

22. What measures can help you customize your robot more quickly and accurately?

1 point

- ☐ Sequential search of ratio values with the smallest search interval
- ☐ Keeping your battery charged to the maximum
- ☒ Monitoring the robot's movement at different values transmitted as motor speed
- ☒ Studying the range of the values read by the sensor