# CODING & ROBOTICS PRIMARY SCHOOL OLYMPIADS:

GRADES 4 - 7

E-mail: Info@saolympiads.co.za website : www.saolympiads.co.za

**GRADE 7**

**DATE:** 16 AUGUST 2024

**TIME:** 60 MINUTES

INSTRUCTIONS:

1. This booklet has multiple-choice questions, true or false, computational questions, practical and problem-solving questions
2. The total of this booklet is out of fifty marks.
3. You have 60 minutes for the paper.
4. Read the questions carefully before answering.
5. Visit the website: www.saolympiads.co.za.

| **NAME OF LEARNER:** | |
|---|---|
| **SCHOOL:** | **GRADE:** |

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## SECTION A: MULTIPLE CHOICE QUESTIONS

1. Virtual reality can be used for: (1)

   A. Gaming and entertainment
   B. Education and training
   C. Tourism and travel
   D. Architecture and real estate

2. Augmented reality can be used for: (1)

   A. Enhance user experiences.
   B. Improve learning and training.
   C. Increase engagement in marketing and advertising.
   D. Facilitate design and manufacturing processes.

3. The controller of a robot serves as the? (1)

   A. Legs
   B. Brain
   C. Arms
   D. Body

4. The power source of a robot serves as too: (1)

   A. Automatically control the robot.
   B. Boosts the robot's speed.
   C. Energy provider to the robot.
   D. Shut down the robot.

5. Actuators of a robot are used too: (1)

   A. To physically move the robot's components.
   B. They convert energy into motion.
   C. To enhance the physical appearance of the robot.
   D. To assist in decision-making tasks.

6. What is the primary function of a PID controller in robotics? (1)

   A. To power the robot's actuators.
   B. To process sensory input from the environment.
   C. To regulate the speed and position of the robot's motors.
   D. To control the communication between different robot's components.

7. Which of the following sensors is commonly used in robotics for detecting lines on the ground or surfaces? (1)

   A. Infrared sensor
   B. Ultrasonic sensor
   C. Colour sensor
   D. Gyroscope

8. Which type of sensor is commonly used in robotics for detecting objects and measuring distances? (1)

   A. Infrared sensor
   B. Pressure sensor
   C. Temperature sensor
   D. Light sensor

9. Which wireless communication protocol is commonly used for connecting IoT devices over long distances? (1)

   A. Wi-Fi
   B. Bluetooth
   C. LoRaWAN
   D. Zigbee

10. Which of the following is a common application of IoT technology? (1)

    A. Remote-controlled toy cars.
    B. Smart thermostats for home heating control.
    C. Traditional landline telephones.
    D. Analog watches.

11. Which of the following statements correctly describes the structure of an "if-then" statement in programming? (1)

A. Executes a block of code if a condition is true, otherwise executes another block of code.
B. Executes a block of code only if a condition is true.
C. Executes a block of code repeatedly until a condition is true.
D. Executes a block of code regardless of whether a condition is true or false.

12. What does a "for" loop in programming typically do? (1)

A. Executes a block of code once if a condition is true.
B. Executes a block of code repeatedly until a condition is false.
C. Executes a block of code for each element in a sequence.
D. Executes a block of code based on a predefined number of iterations.

13. Which of the following statements about functions in programming is true? (1)

A. Functions cannot accept parameters.
B. Functions always return a value.
C. Functions can only be called once in a program.
D. Functions help organize code into reusable blocks.

14. In Scratch, which event block is used to trigger an action when the green flag is clicked? (1)

A. When sprite clicked.
B. When this sprite clicked.
C. When green flag clicked.
D. When backdrop switches to [Backdrop].

15. Which of the following components is responsible for interpreting and executing commands in a robot? (1)

A. Actuators
B. Sensors
C. Microcontroller
D. Power source

16. What is a function in coding?

A. A type of computer virus.
B. A block of code that performs a specific task.
C. A device used to store data.
D. A tool for drawing shapes on a computer screen.

17. What is the internet primarily used for?

A. Sending letters by mail.
B. Playing video games.
C. Connecting people and sharing information.
D. Baking cookies.

18. What is the primary purpose of haptic feedback in robotics?

A. To display visual information.
B. To provide auditory cues.
C. To simulate the sense of touch.
D. To enhance smell and taste sensations.

19. What is the main purpose of kinematics in robotics?

A. To control the speed of robotic movements.
B. To design the physical structure of robots.
C. To study the motion of robots and their components.
D. To determine the power source for robotic systems.

20. What is the primary purpose of computer vision in robotics?

A. To control robotic arms.
B. To analyse and interpret visual information.
C. To power robotic locomotion.
D. To provide tactile feedback.

## SECTION B: TRUE OR FALSE STATEMENTS

1. Robots can only be used in manufacturing. (1)

   A. True
   B. False

2. Robots can be programmed to learn new skills. (1)

   A. True
   B. False

3. Robots can be designed to look like humans. (1)

   A. True
   B. False

4. Robots can make decisions on their own without human intervention. (1)

   A. True
   B. False

5. All robots are made of metal. (1)

   A. True
   B. False

**(5)**

**SECTION C: COMPUTATIONAL**

| | |
|---|---|
| when green flag clicked | move (10) steps |
| forever | wait until <touching edge?> |
| turn cw (180) degrees | |

1. Using the lines above. Write a code to make a ball bounce up and down. (5)

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| | |
|---|---|
| when green flag clicked | when I receive [message1] |
| broadcast [message2] | broadcast [message1] |

**2.** Using the lines above. Write the code for back-and-forth broadcasting message between two sprites. (5)

**Sprite A:**

_____

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**Sprite B:**

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**(10)**

## SECTION D: PRACTICAL APPLICATION AND PROBLEM SOLVING

1. You need to programme a robot to clean a room by following a predefined path. The robot should move forward, turn right when it reaches the edge of the room, and continue this pattern until the entire room is clean. Order the codes for this task. (6)

| | |
|---|---|
| repeat until room is clean | turn right |
| move forward | if edge of room detected |
| start | move forward |

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2. You are programming a robot to follow a light source using a light sensor. The robot should turn towards the direction where the light intensity is highest and move forward. Order the codes for this task. (9)

| | |
|---|---|
| repeat forever | start |
| read light intensity from left sensor | turn left |
| turn right | if left sensor detects more light |
| move forward | read light intensity from right sensor |
| else if right sensor detects more light | |

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**TOTAL MARKS = 50**