CODING & ROBOTICS PRIMARY SCHOOL OLYMPIADS:

GRADES 4 - 7

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

GRADE 6

DATE: 16 AUGUST 2024

TIME: 60 MINUTES

INSTRUCTIONS:

1. This booklet has multiple-choice questions, true or false questions and short answer 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:**

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

SECTION A: MULTIPLE CHOICE QUESTIONS

1. Which of the following statements describe operators. (1)

    A. Operators are people who run the code programmed by the programmers.
    B. In coding, operators are symbols or keywords that perform various operations on one or more values or expressions.
    C. Sorting and searching algorithms.
    D. Kernel-level programming.

2. What event block in Scratch is triggered when the green flag is clicked to start the program?

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

3. Which of the following are functional uses for humidity sensors? (1)

    A. HVAC systems: Humidity sensors are used in heating, ventilation, and air conditioning systems.
    B. Industrial settings: Humidity sensors are used in industrial settings to monitor humidity levels in manufacturing processes.
    C. Colour systems. Humidity sensors are used to detect and define colour ranges.
    D. Detecting motion or movement.

4. Tactile sensors are used for: (1)

   A. Automotive industry: Tactile sensors are used in the automotive industry to detect when a passenger is in a seat and to adjust the airbag deployment accordingly.
   B. Food industry: Tactile sensors are used to measure humidity in refrigerated areas.
   C. Medical devices: Tactile sensors are used in medical devices, such as prosthetic limbs and surgical instruments, to provide feedback on pressure and touch.
   D. Education: Tactile sensors are used to select correct information from textbooks.

5. Force sensors are used for: (1)

   A. Medical devices: Force sensors are used in medical devices, such as surgical instruments and prosthetic limbs, to provide feedback on the force being applied.
   B. Industrial automation: Force sensors are used in industrial automation to monitor and control the force being applied to machines and components.
   C. Automotive industry: Force sensors are used to select the correct colour range in spray-painting.
   D. Educational industry: Force sensors are used to detect the amount of force school equipment endures.

6. What is the purpose of a motor controller in robotics? (1)

   A. To power the robot's sensors.
   B. To provide instructions to the robot's actuators.
   C. To process data collected by the robot's cameras.
   D. To control the robot's power supply.

7. What is the purpose of a conditional statement in programming? (1)

   A. To execute a block of code repeatedly.
   B. To store and organize data.
   C. To make decisions based on specified conditions.
   D. To perform mathematical calculations.

8. What does the acronym "HTML" stand for in web development? (1)

   A. Hyper Text Markup Language
   B. High-Tech Multimedia Language
   C. Hyperlink Text Management Language
   D. Home Technology Markup Language

9. Which of the following sensors is commonly used in robotics to detect obstacles and measure distances? (1)

   A. Infrared sensor
   B. Thermocouple sensor
   C. pH sensor
   D. Geiger-Muller counter

10. Which wireless communication protocol is commonly used for low-power, short-range communication between IoT devices? (1)

A. Bluetooth
B. Wi-Fi
C. Ethernet
D. Cellular

11. Which of the following actions helps protect your online privacy?

A. Sharing passwords with friends.
B. Posting personal information on social media.
C. Using strong, unique passwords for each online account.
D. Clicking on links in unsolicited emails.

12. Which of the following is a good practice to enhance online security? (1)

A. Sharing passwords with friends and family.
B. Using the same password for multiple accounts.
C. Ignoring software updates on devices.
D. Enabling two-factor authentication for online accounts.

13. Which of the following components is essential for a robot to sense its surroundings? (1)

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

14. Which of the following is a characteristic feature of IoT devices? (1)

A. They operate in isolation.
B. They are not connected to the internet.
C. They can communicate with other devices.
D. They have limited functionality.

15. What technology is commonly used to connect IoT devices to the internet? (1)

A. Bluetooth
B. Ethernet
C. Wi-Fi
D. NFC

16. What does the term "variable" mean in coding?

A. A fixed value that cannot be changed.
B. A placeholder for storing data that can change during program execution.
C. A type of loop used for repeating actions.
D. A function that performs a specific task in a program.

17. What does the term "syntax error" refer to in coding?

A. A bug that causes a program to crash.
B. A type of programming language.
C. An error that occurs when the code violates the rules of the programming language.
D. A technique for optimizing code performance.

18. What does the term "debugging" mean in coding?

A. Writing code from scratch.
B. Testing a program to ensure it works correctly.
C. Adding new features to a program.
D. Deleting unnecessary code from a program.

19. What is the purpose of a conditional statement in coding?

A. To repeat a block of code multiple times.
B. To perform a specific action based on certain conditions.
C. To define a function that can be reused in different parts of a program.
D. To store and organize data for easy access.

20. What does a "while loop" do in coding?

A. It repeats a block of code a specific number of times.
B. It performs a specific action based on certain conditions.
C. It defines a function that can be called multiple times.
D. It stores a collection of data for easy access.

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

SECTION B: TRUE OR FALSE STATEMENTS

1. Control Systems: Control systems are used to regulate the behavior of a robot.(1)

   A. True
   B. False

2. Actuators: Actuators are devices that convert electrical energy into mechanical energy. In robotics, actuators are used to control the movement of the robot's joints and limbs. (1)

   A. True

   B. False

3. In robotics, sensors are used to detect obstacles, measure distance and speed, and gather other data that is used to control the robot. (1)

   A. True

   B. False

4. Robot: A robot is a machine that is capable of carrying out complex actions autonomously or under the control of a human operator. (1)

   A. True

   B. False

5. Robots come in various shapes and sizes and can be used for a wide range of applications. (1)

   A. True

   B. False

(5)

SECTION C: COMPUTATIONAL

go to x: (0) y: (0)	wait (2) seconds
go to x: (50) y: (50)	when flag clicked
turn right (15) degrees	

1. Using the lines above. Write a line of code to create a short animation.(5)

_____

_____

_____

_____

_____

_____

_____

2. Creating a background animation in Scratch can vary depending on the complexity of the animation you want to achieve.Using the lines above. Write a line of code to create a short animation. (5)

switch backdrop to [Backdrop1 v]	wait (1) secs
when green flag clicked	forever
switch backdrop to [Backdrop2 v]	

(10)

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

SECTION D: PRACTICAL APPLICATION AND PROBLEM SOLVING

1. In a Scratch project, you want to create a game where a sprite collects falling apples. The apples should fall from random positions at the top of the screen and the sprite should catch them at the bottom. Order the blocks needed to achieve this. (12)

forever	wait (1) second
repeat until <touching [edge] or touching [sprite]>	wait (0.1) seconds
if <touching [sprite]>	when flag clicked
when I start as clone	change y by (-10)
create clone of [apple]	go to x: pick random (-240) to (240) y: 180
change score by (1)	delete this clone

_____

_____

_____

_____

_____

_____

2. You are creating a Scratch project where a sprite follows the mouse pointer. Order the blocks needed to make the sprite continuously move towards the mouse pointer. (3)

forever
go to [mouse-pointer]
when flag clicked

_____

_____

_____

_____

_____

_____

_____

TOTAL MARKS = 50