CODING & ROBOTICS OLYMPIAD GRADE 7

DATE: 25 AUGUST 2026

TIME: 60 MINUTES

INSTRUCTIONS:

This booklet has multiple-choice questions, true or false questions, computational questions, practical and problem-solving questions.

The total of this booklet is out of fifty marks.

You have 60 minutes for the paper.

Read the questions carefully before answering.

Visit the website: www.saolympiads.co.za.

NAME OF LEARNER:	
SCHOOL:	**GRADE:**

SECTION A: MULTIPLE CHOICE QUESTIONS

1. Why is abstraction important in designing programmes? (1)
   A. To remove unnecessary details and focus on key features
   B. To increase memory usage
   C. To slow down programme execution
   D. To prevent user interaction

2. Which sensor would best detect changes in light conditions? (1)
   A. Pressure sensor
   B. Light sensor
   C. Distance sensor
   D. Motion sensor

3. What is the main responsibility of a robot's controller? (1)
   A. Providing mechanical support
   B. Processing inputs and controlling outputs
   C. Supplying electrical energy
   D. Measuring physical distance

4. What happens when an actuator receives a signal from a controller? (1)
   A. Data is stored
   B. The programme stops
   C. The sensor resets
   D. Movement or action is produced

5. Which concept helps programmers identify repeated patterns in problems? (1)
   A. Decomposition
   B. Pattern recognition
   C. Automation
   D. Simulation

6. Which programmable device is commonly used in embedded systems? (1)
   A. Desktop computer
   B. Printer
   C. Microcontroller
   D. Projector

7. Why are algorithms used in navigation systems? (1)
   A. To display maps only
   B. To calculate the most efficient routes
   C. To increase screen brightness
   D. To store user passwords

8. Which structure allows a programme to choose between two or more actions? (1)
   A. Sequence
   B. Loop
   C. Conditional
   D. Variable

9. What does a Boolean expression evaluate to? (1)
   A. A number
   B. A string
   C. True or False
   D. An image

10. What is the purpose of testing a programme during development? (1)
   A. To add new features
   B. To identify and correct errors early
   C. To remove all comments
   D. To improve graphics quality

11. Which component converts electrical energy into physical movement? (1)
   A. Sensor
   B. Controller
   C. Actuator
   D. Processor

12. Which software tool is best suited for simulating robotic behaviour? (1)
   A. Programming environment
   B. Spreadsheet software
   C. Word processor
   D. Presentation software

13. What type of data does a motion sensor provide? (1)
   A. Colour values
   B. Temperature readings
   C. Sound levels
   D. Movement information

14. What does automation reduce in a system? (1)
   A. Accuracy
   B. Human involvement
   C. Efficiency
   D. Reliability

15. Why are nested loops useful in programming? (1)
    A. They allow complex repeated actions
    B. They prevent errors
    C. They stop programmes faster
    D. They reduce variable usage

16. Which loop is best when a condition must be checked before repeating? (1)
    A. For loop
    B. While loop
    C. Forever loop
    D. Event loop

17. What is the purpose of storing data in variables? (1)
    A. To decorate the interface
    B. To stop a programme
    C. To control hardware directly
    D. To keep values for later use

18. How do functions improve programme design? (1)
    A. They duplicate code
    B. They organise and reuse code
    C. They slow down execution
    D. They remove decision making

19. What does an argument provide to a function? (1)
    A. Input values
    B. An error message
    C. A loop condition
    D. A return statement

20. Why is modular design important in large programmes? (1)
    A. It limits collaboration
    B. It makes programmes easier to manage and update
    C. It removes the need for documentation
    D. It combines all logic into one section

(20)

SECTION B: TRUE OR FALSE STATEMENTS

1. Pattern recognition helps programmers solve problems more efficiently. (1)
   A. True
   B. False
2. All robotic systems must be connected to the Internet to function. (1)
   A. True
   B. False
3. Conditional statements allow programmes to respond differently to inputs. (1)
   A. True
   B. False
4. Testing and debugging are the same process. (1)
   A. True
   B. False
5. Automation can improve safety in hazardous working environments. (1)
   A. True
   B. False

(5)

SECTION C: COMPUTATIONAL

1. Using the blocks below, design a Scratch programme where a sprite moves in a spiral pattern. (5)

'change colour effect by (15)' block	'forever' block
'move (5) steps' block	'turn (30 degrees)' block
'when green flag clicked' block	'wait (0.2) seconds' block

2. Using the blocks below, design a Scratch programme that counts points each time a key is pressed. (5)

'repeat (10)' block	'change score by (1)' block
'when key pressed' block	'set score to 0' block
'when green flag clicked' block	'say score for 1 second' block

(10)

SECTION D: PRACTICAL APPLICATION AND PROBLEM SOLVING

(7)

1. A robot sprite must follow a line and stop when the line ends. Order the blocks needed to create this behaviour.

'stop movement' block	'end if' block
'forever' block	'move (10) steps' block
'if <not touching line>' block	'wait (0.1) seconds' block
'when green flag clicked' block	

2. Create a Scratch game where a player controls a character to collect points while avoiding hazards. If the character touches a hazard, the score resets. Sequence the blocks correctly. (8)

'if <touching hazard>' block	'if <left arrow key pressed>' block
'set score to 0' block	'change x by (-10)' block
'forever' block	'change x by (10)' block
'if <right arrow key pressed>' block	'when green flag clicked' block

(15)

TOTAL MARKS = 50