ROBOTICS JUNIOR PROGRAMMES

Level 1: Beginner (Ages 6-8)

Focus: Introduction to robotics, block-based coding, and creative problem solving.

- **Module 1: Introduction to Robotics & AI**
  - What is robotics?
  - Understanding AI in everyday life
  - Introduction to robots and their uses
- **Module 2: Block-Based Coding with Scratch/Blockly**
  - Basic programming concepts (sequence, loops, conditionals)
  - Creating simple games and animations
  - Controlling characters with blocks
- **Module 3: Building Simple Robots with Kits**
  - Introduction to basic components (sensors, motors)
  - Assembling a simple robot
  - Programming the robot using block-based coding
- **Projects:**
  - Build a robot that moves in a maze
  - Create an animation or game with Scratch

Level 2: Intermediate (Ages 9-11)

Focus: Deeper exploration into block coding and introduction to Arduino.

- **Module 1: Advanced Block Coding (Tynker/Blockly)**
  - Variables and data types
  - Functions and events
  - Debugging code
- **Module 2: Introduction to Arduino & Electronics**
  - What is Arduino?
  - Understanding circuits, sensors, and actuators
  - Basic Arduino programming with visual coding platforms (e.g., mBlock)
- **Module 3: Intermediate Robotics Projects**
  - Using sensors for robotic control (light, distance, temperature)
  - Creating interactive robots with Arduino
  - Implementing basic AI behavior (decision-making)
- **Projects:**
  - Line-following robot
  - Light-sensing robot
  - DIY electronic musical instrument with Arduino

Level 3: Advanced (Ages 12-14)

ROBOTICS JUNIOR PROGRAMMES

Focus: Arduino IDE text-based coding and advanced robotics projects.

- **Module 1: Introduction to Arduino IDE and Text-Based Coding**
  - Arduino IDE interface and structure of an Arduino sketch
  - Syntax (variables, loops, conditionals) in C/C++ for Arduino
  - Writing basic Arduino programs (digital/analog I/O, PWM, etc.)
- **Module 2: Advanced Arduino Robotics Projects**
  - Controlling sensors and motors with Arduino IDE text coding
  - Using libraries to integrate advanced components (e.g., servo motors, displays, ultrasonic sensors)
  - Building complex robotic systems (e.g., obstacle-avoiding robots, robotic arms)
- **Module 3: Introduction to Automation & Smart Systems**
  - Automating tasks with Arduino
  - Introduction to IoT concepts with Arduino
  - Controlling robots and devices remotely via Bluetooth or Wi-Fi
- **Projects:**
  - Build a robotic arm controlled by Arduino text coding
  - Create a smart home system with sensors and actuators (e.g., automated lighting)
  - Build a remote-controlled robot using Bluetooth

Additional Notes:

- Focus on fun and creative learning through interactive projects.
- Ensure a hands-on experience at every level to build excitement about robotics and AI.
- As students advance, encourage teamwork and complex problem-solving skills.
