NOVA GEN × Scooby Doo's Boom

KAMPALA · UGANDA
13–20 / ONE WEEK

A JUNIOR ROBOTICS & ELECTRONICS CAMP

From a battery and a wire to a walking robot.

A five-day, one-hour-a-day robotics curriculum for children aged 8–15 — built and delivered by Nova Generation Limited in partnership with Scooby Doo's Boom. Every child builds something new every single day.

CURRICULUM & PARTNERSHIP PACK

Junior Robotics Camp

Five Days · One Hour a Day · Ages 8–15

Prepared by

Nova Generation Limited

Trainers: Tonny Nteza & Rahmah Nanyonga

THE PARTNERSHIP

Two teams. One unforgettable week.

Why Nova Generation and Scooby Doo's Boom are building this together.

Scooby Doo's Boom has spent over a decade giving Ugandan children safe, joyful, expertly-run experiences — trusted by families and major corporates alike. Nova Generation Limited builds real engineering systems for real companies, from network infrastructure to embedded electronics. Together, we are bringing that same seriousness of craft to something far more fun: putting a working robot in a child's hands for the first time.

This is not a lecture series. Every single day, each child leaves with something they built themselves — a lit-up circuit, a spinning fan, a moving car, a walking robot. By the end of the week they will have assembled and understood every stage of how a robot actually works, from the wire to the motor to the moving limb.

What We're Doing — In Plain Language

Robotics is really just two ideas working together: **electricity** (the power that makes things turn on) and **kinetics** (the science of things that move). A robot is simply a machine that uses electricity to move, sense, or respond on its own. We see them everywhere already — in the fan in your living room, the toy car that drives itself, the robotic arm on a car factory floor, even the Mars rovers exploring another planet. This week, the children stop watching robots and start building them.

DAY 1
Electricity & Safety

DAY 2
Motors & Fans

DAY 3
Kinetics & Cars

DAY 4
Servos & Movement

DAY 5
Capstone Build

Who This Is For

A **Ages 8–15**
Grouped by age and ability on Day 1 so younger and older builders both stay challenged and supported.

B **No prior experience needed**
We start from "what is a wire" and end the week with a moving, lit-up robot. Every concept builds on the last.

C **Hands-on, every day**
One hour a day, every day a build. No day is "just theory" — every session ends with something working.

D **Small groups**
Children work in small teams of 2–3 per kit, with a trainer circulating throughout to guide and check safety.

1

DAY ONE · 60 MINUTES

Electricity, Safety & The First Circuit

Before anyone builds anything that moves, every child needs to understand the invisible force that makes it all happen: electricity. Day 1 is hands, eyes, and safety first.

What We Cover

1. **What is electricity?**
   A simple, visual explanation: electricity is energy that flows through a path, the same way water flows through a pipe.
2. **Where electricity comes from**
   Batteries store it, wall sockets carry it from the grid. We show both and explain why batteries are safer to learn with.
3. **What is a wire?**
   A road for electricity to travel on. If the road is broken, nothing flows — that's a circuit.
4. **What is a switch?**
   A gate on the road. Closed gate, electricity flows. Open gate, it stops. That is the whole idea behind "on" and "off."

SAFETY FIRST

We only ever use low-voltage batteries (1.5V–9V) — never wall power. Children learn the real rules early: never touch a wall socket or exposed wiring, never put a battery in water, never let a wire get hot, and always tell an adult if something feels warm or smells strange. These rules apply for life, not just for camp.

Day 1 Capstone Build

WHAT EACH CHILD BUILDS

Every child wires their own simple circuit: a battery, a switch, and an LED light. They press the switch, the light turns on. They release it, the light turns off. Simple as it looks, this is the exact same principle behind every robot built for the rest of the week — a power source, a path, and a control point.

`9V battery + clip` `Push-button switch` `LED bulb` `Jumper wires` `Breadboard`

2

DAY TWO · 60 MINUTES

Motors, Rotation & Building a Fan

Yesterday the children made electricity flow. Today, they make it spin.

What We Cover

1. **What is a motor?**
   A device that turns electrical energy into spinning motion. We open one up so the children can see the spinning part inside — the rotor.
2. **Reversing direction**
   Swap the two wires on a motor, and it spins the opposite way. We let every child try this themselves and watch it happen.
3. **Controlling speed**
   A simple variable resistor (potentiometer) lets less or more electricity through — slower or faster spin, on demand.
4. **Building on Day 1**
   The same battery, switch, and wiring skills from yesterday are reused here — just now powering a motor instead of a light.

Day 2 Build

WHAT EACH TEAM BUILDS

Working in pairs, each team mounts a small fan blade onto a DC motor, wires it through their switch from Day 1, and adds a speed dial. They test spinning it forward, reversing the wires to spin it backward, and turning the dial to slow it down or speed it up — their own working desk fan, built from scratch.

`DC motor (TT or N20)` `Fan blade attachment` `Potentiometer (speed dial)` `9V battery + clip` `Switch & wires from Day 1`

> "Same wire, same switch, same battery — but now it spins." That single sentence is the whole lesson of Day 2.

3

DAY THREE · 60 MINUTES

Kinetics — Building a Moving Car

If a motor can spin a fan blade, it can spin a wheel. Today the build leaves the table and starts moving across the floor.

What We Cover

1. **What is kinetics?**
   The science of things in motion. A spinning motor is kinetic energy — today we point that spin at the ground instead of the air.
2. **From spin to roll**
   Attach a wheel instead of a fan blade, and the same rotation that spun air yesterday now drives a car forward.
3. **Two motors, two directions**
   One motor per side. Reverse one and not the other, and the car turns — the same wire-reversing trick from Day 2, now steering.
4. **Forward and reverse**
   Using the same switch logic from Day 1, the children wire a simple forward/reverse control for their car.

Day 3 Build

WHAT EACH TEAM BUILDS

Each team assembles a small chassis with two DC motors and wheels, wires both motors to a shared battery and switch, and tests their car rolling forward. Then they reverse the wire connections to send it backward on command — their own simple, drivable robot car, using only what they learned on Day 1 and Day 2.

`Chassis kit` `2x DC motors + wheels` `Battery pack` `Direction switch` `Caster wheel (balance)`

4

DAY FOUR · 60 MINUTES

Servos — Robots That Move Like Us

A motor that spins forever is useful. But a hand that waves, a leg that steps, or a tail that wags needs to move to an exact position and stop — that's a servo, and it's the part that makes a robot feel alive.

What We Cover

1. **What is a servo?**
   A small motor that moves to a precise angle and holds it — the same part behind a waving hand, a crawling leg, or a wagging tail.
2. **Pre-programmed for the day**
   An Arduino board, already programmed by our trainers, drives the servo movement. Children focus on assembly, wiring, and powering it on — not code.
3. **Lights and sound**
   An LED and a small buzzer are added to the build, so the robot doesn't just move — it lights up and makes sound as it goes.
4. **Choose your creature**
   Each team picks a build: a crawling insect, a walking dog, or a waving hand — same core electronics, different character.

Day 4 Build

WHAT EACH TEAM BUILDS

Children assemble their chosen creature kit around the pre-programmed Arduino board — attaching the servo "limb," the LED, the buzzer, and the battery pack. Once wired correctly, they power it on and watch it move forward, move backward, light up, and buzz — entirely their own assembly, built from parts they now understand inside out.

`Pre-programmed Arduino board` `Servo motor` `LED + buzzer module` `Creature frame (insect / dog / hand)` `Battery pack`

> No code is written on Day 4 — the children build and power the brain, the trainers have already taught it to move.

5

DAY FIVE · 60 MINUTES

Capstone — Build, Present, Celebrate

Five days of circuits, motors, wheels, and servos come together. Today is not a new lesson — it is proof of everything learned.

How Capstone Day Works

1. **Their own capstone kit**
   Each child receives a complete kit covering every stage from Day 1 to Day 4 — circuit, motor, wheels, and a servo element — to assemble unaided.

2. **Assemble from memory**
   Trainers step back and observe. Children wire the circuit, mount the motor, attach the wheels, and fit the servo — using only what they remember from the week.

3. **Present their build**
   Each child or team presents their finished robot to the group: what it does, how it's powered, and what they're proudest of.

4. **Certificates & celebration**
   Every child leaves with their robot, a certificate of completion, and a week's worth of confidence they didn't have on Monday.

THE FULL ARC, IN ONE SENTENCE

A child who walked in on Day 1 not knowing what a wire does walks out on Day 5 holding a robot they built, wired, powered, and explained themselves.

> This is the proof point for parents, for Scooby Doo's Boom, and for Nova Generation: the camp didn't just entertain for a week — it taught something that sticks.

THE PEOPLE LEADING THE WEEK

Built by engineers.
Taught with patience.

Every session is led by a trainer who can both build the thing and explain it to an eight-year-old.

LEAD TRAINER · ELECTRONICS & ROBOTICS

Tonny Nteza

Tonny leads the technical design of the camp — from the Day 1 circuit kits through to the pre-programmed Arduino builds on Day 4. With a background in embedded electronics and hands-on hardware training, he has a gift for breaking complex engineering ideas into something an eight-year-old can hold, wire, and understand. He runs the room with calm energy: safety-first, hands-on, and endlessly patient with "what does this wire do?"

LEAD TRAINER · CURRICULUM & FACILITATION

Rahmah Nanyonga

Rahmah designs how each day flows and ensures every child — whether eight or fifteen — stays engaged, challenged, and supported. She brings a strong facilitation background working with young learners, translating technical concepts into clear, age-appropriate language and hands-on activities. She is the trainer who notices the quiet child still figuring out the wiring and gets them there without taking over.

How They Work Together

Tonny owns the engineering — the kits, the wiring, the safety briefings, the Arduino boards. Rahmah owns the room — the pacing, the group dynamics, the presentation moments on Day 5. Together they make sure every child leaves each session having actually built something, understood why it works, and wanting to come back the next day.

On behalf of Nova Generation Limited,

Tonny & Rahmah

Tonny Nteza & Rahmah Nanyonga
Lead Trainers · Junior Robotics Camp · Nova Generation Limited