



## A G.A.T.E.WAYS JOURNEY PROGRAM

For gifted Year 5 and 6 children with a  
love of technology and mathematics

**'CODE-ORAMA!!'**

**G.A.T.E.WAYS** is an independent organization offering challenging and enriching activities and experiences to develop and extend highly able children. This *JOURNEY* for both girls and boys will run over four sessions.

Once upon a time computers were just vague ideas in the minds of eccentric mathematicians. In this journey we will take a hands on look at how those ideas found their way into little bodies of microchips and how those microchips teamed up like ant colonies into becoming our first computers. Then we will learn to talk to these computers and teach them some new math tricks, card tricks and even some real world applications! By the end of the journey you'll be taking home a programmable little wonder computer that will come in handy with your school projects and DIY endeavours.

### **Session 1: Make your own computer brain!**

If we are to understand computers we have to start at the beginning! And the beginning for computers dawned 150 years ago when we humans started to make up a very, very precise language, a language called mathematical logic. Today we have tiny little magical devices called transistors that cost only a few cents and you'll be using them to translate mathematical expressions into circuits that run various light shows, conduct electricity through your classmates and even capture radio and phone signals out of thin air!

### **Session 2: Becoming a code whisperer**

Having made our own devices with 2 or 3 transistors, we quickly graduate to devices with several hundred million... also known as computers. Our own little computer's name is Arduino and '(s)he' lives inside a microchip smaller than a 5c coin. In this session you will learn how to write Arduino computer code and how to print commands on the computer screen. You will then create a series of countdown timers and clocks which will connect to various light and sound outputs. At this point you will be able to create a ruckus of your own making... I trust that we can exceed the predictable chimes of church bells and alarm clocks.

### **Session 3: Magic and Maths in Code**

Having done the sound and the light-shows, we step up to the plate with some real mathematics. We learn how to write programs that do simple operations (addition, subtraction, division and multiplication) and then using these operations we create our own calculators and then programs that do a whole lot of division to find out factors of any given number, eventually revealing the factor-less prime numbers. We will also delve into the spooky realm of randomness and design a set of guessing games to test your psychic powers.

### **Session 4: Let's Make a Weather Station.**

In this session we will meet our first ever sensor, a device which describes the outside world to the computer. Our sensor is capable of sensing both the temperature and the humidity and so it can be used to in a variety of ways to sense signs of life, weather or to act as a switch that is tripped by heat or humidity. Then we will go on to program an LCD screen and arrange its 16000 pixels to give us an ongoing reading temperature and humidity!

**What to bring:** Bring your own Laptop if you have one. This will help set you up for homework and let you work alone if you want to. Also bring a notebook, a well-stocked pencil case, a snack (no nuts please); a labelled photograph of yourself, and a stamped, self-addressed envelope for your report.

Please note: this program has a \$25 levy for Arduino kit payable at the time of enrolment.

**About the Presenter:** Sanjin Dedić is a robotics engineer with a background in product development, and a teacher. His main passion in life is presenting programming and robotics with minimal academic jargon and abstract maths, in a way that can be embraced and understood by everyone, especially primary school students. In doing so he hopes that many younger more creative minds can join in the creation of the hi-tech world that is growing up around us.

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