Light up your classroom
Teaching color mixing and variables with micro:bit and LED rings

Alexandra Maximova
alexandra.maximova@inf.ethz.ch
Supervisor: Dennis Komm
ETH Zurich

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Introduction

In recent years, the integration of physical computing devices like micro:bit into the classroom has transformed the way programming is taught, making abstract concepts more tangible and engaging for students. This workshop is rooted in the context of lower secondary education, where students are beginning to explore the fundamentals of programming through tools that bridge the gap between the digital and physical worlds.

The activity presented in this workshop draws on the educational philosophy that hands-on, experiential learning is crucial for grasping complex programming concepts. By using micro:bit paired with LED rings, students are not only introduced to basic coding principles but also encouraged to experiment and see real-world applications of their code.

This workshop is designed with a specific focus on color mixing and the introduction of variables—a topic that can be challenging for beginners but is an essential building block in any programming curriculum. The activities showcased here have been developed and refined in a classroom setting, targeting students who are already familiar with basic programming constructs like loops, functions, and conditionals.

By participating in this workshop, educators will gain insights into how to effectively employ micro:bit and LED rings to create an interactive and supportive learning environment, where students can explore and master foundational programming concepts through creative experimentation.

Activity

This 45-minute session showcases three engaging activities designed for an introductory Python programming course aimed at lower secondary school students.

Participants will first immerse themselves in a hands-on experience of color mixing using LED lights, exploring how red, green, and blue light combine to create a spectrum of colors. This initial phase is deliberately non-programming, allowing students to grasp the concept of light mixing in a tangible way before diving into code.

The second and third activities tackle the challenging yet essential topic of variables, often a stumbling block in beginner programming courses. Utilizing the LED ring and sensors, you'll discover how to introduce variables in a step-by-step, understandable manner, building on students' prior knowledge of loops (e.g. TigerJython's specific `repeat` loop that does not need any variables), functions, and conditionals.

Throughout the workshop, you'll have the chance to experience these activities as your students would, followed by reflective discussions with peers on effective teaching strategies. By the end of the session, you'll walk away with fresh ideas and practical insights for integrating micro and LED rings into your programming curriculum.

Number of participants

The activity can accommodate up to 15 participants.

Number of sections

I can repeat the workshop twice, but I will need some time to reset the activity (about 30 minutes).

Duration

The activity will last 45 minutes.

Technical Requirements

The participants will need a laptop with an internet connection, a Chromium-based browser and the possibility to connect a USB-A cable (they might need an USB-A to USB-C adapter).

I will need a beamer to show my screen to the participants.