

Coding :

programming microcontrollers

Brian M. Andrus
Extension Program Coordinator
21st CCLC Pathways & TRIO UBMS
Center for College Access and Success
Northeastern Illinois University

Aaron Cortes
Director
21st CCLC Pathways & TRIO UBMS
Center for College Access and Success
Northeastern Illinois University

Workshop session agenda

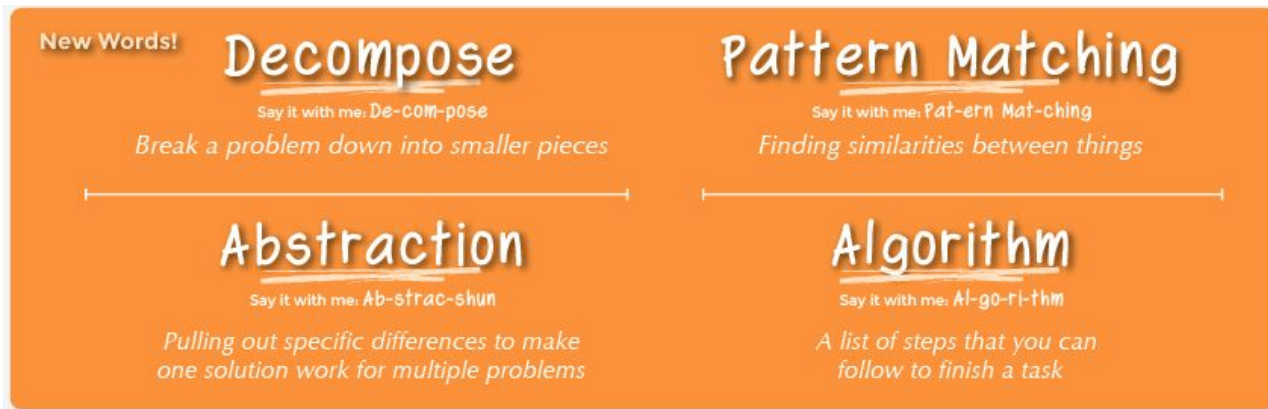
- Overview of coding & its relevancy
- Our project: How we implement coding
- Hands-on (programming microcontrollers)
- Resources and collaborations

Coding: a tale of access for career and skill development

- Illinois currently has **21,094** open computing jobs (**4** times the average demand rate in Illinois)
- The average salary for a computing occupation in IL is **\$86,131**, which is significantly higher than the average salary in the state (**\$49,970**)
- The existing open jobs alone represent **\$1,816,847,314** opportunity in terms of annual salaries
- Illinois had only **1,768** computer science graduates in **2015**; only **13%** were female
- Only **2,938** high school students in Illinois took the AP Computer Science exam in **2016**; only **21%** were female; only **330** students were Hispanic or Latino; only **52** students were Black; only **3** students were Native American or Alaska Native; only 1 student was Native Hawaiian or Pacific Islander
- Only **123** schools in IL (**17%** of IL schools with AP programs) offered the AP Computer Science course in **2015-2016**
- There are fewer AP exams taken in computer science than in any other STEM subject area

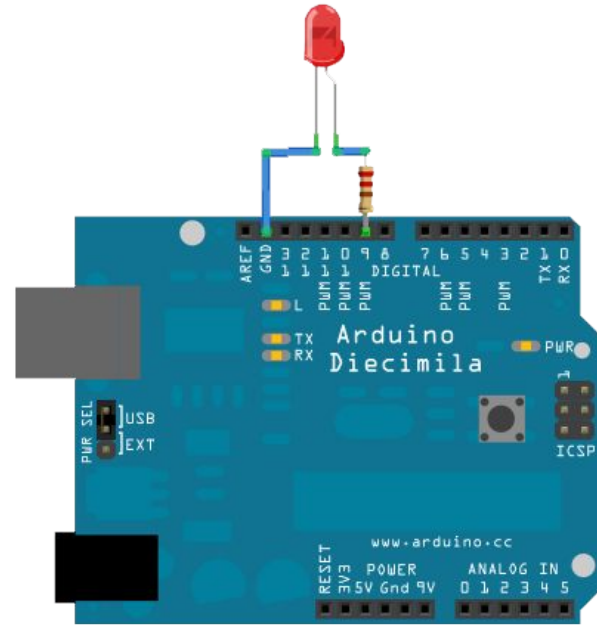
Coding

- Computational Thinking (CT) is a problem solving process that includes a number of characteristics and dispositions. CT is essential to the development of computer applications, but it can also be used to support problem solving across all disciplines, including the humanities, math, and science. Students who learn CT across the curriculum can begin to see a relationship between academic subjects, as well as between life inside and outside of the classroom.



Our Project

- Middle School services
 - Summer program 2016
 - Spring 2017 - afterschool
 - Coding Academy for Girls - Chicago Sky



Our Project

- Coding Academy for Girls with Chicago Sky STEM fest!

Center for College Access and Success
Making College Real

..... TRIO UBMS

Pathways
University Bound

CODING ACADEMY
EXPLORE + CREATE + MAKE

The path to careers in STEM is within your reach and 21st CCLC Pathways is here to help you by inviting you to be part of our 8 day introduction to computer programming and careers in STEM.

- Microcontroller programming (Arduino & LilyPad)
- Wearable prototyping technology
- Attend the Chicago Sky Women's Basketball STEM contest & Game

Space is limited

Join today!

May 11th, 2017 - May 24th, 2017
2:00 pm - 3:15 pm
Unity Middle School

<http://www.ubmsneu.org>
ubms@neu.edu
(312) 884-9472
Attention to: Aaron Cortes

Open to all students that participate in Unity's girls' sport & STEM clubs.

SPRING 2017

Northeastern
ILLINOIS UNIVERSITY

UPWARD BOUND
MATH & SCIENCE

CHICAGO SKY

21st CCLC is one of multiple programs we have developed at the Center for College Access and Success at NEIU to help students gain access to and succeed in college.
Funded through the Illinois State Board of Education.

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Our Project

- Description of High School coding project
 - Scratch & App Inventor
 - EasyC for VEX Robots & Zero Robotics
 - Arduino & Raspberry Pie
 - Khan Academy, Code Academy, Code School



Our Project

- Google Ignite CS with Computer Science department

Center for College Access and Success

Computer Science Department & Pathways Initiatives

Google igniteCS

Engagement Series 2017

About the Workshop

Interested in learning more about computer science and the applications that programming microcontrollers have in day-to-day life interactions? Are you curious about pathways to STEM careers? Ever wonder how a college project looks like?

Join us, as we engage in the world of coding with our Computer Science Department College students at Northeastern Illinois University in our Google Ignite CS pre-college academy.



Workshop At-A-Glance

- Learn about STEM Careers
- Engage in hands-on activity and projects using microcontrollers
- Interact with and get tips from current NEIU Computer Science students

Register Now!

Space is limited! Reserve your space by completing the application using the link below, or use the QR code, or contact TRIO UBMS at ubms@neiu.edu or at 312.563.7216

<< <https://goo.gl/S5fe46> >>



Aaron Cortes 312.563.7216
Director, TRIO UBMS & 21st CCLC
Center for College Access and Success
acortes@neiu.edu

Free to all current Roosevelt High School SOPHOMORES

Northeastern ILLINOIS UNIVERSITY

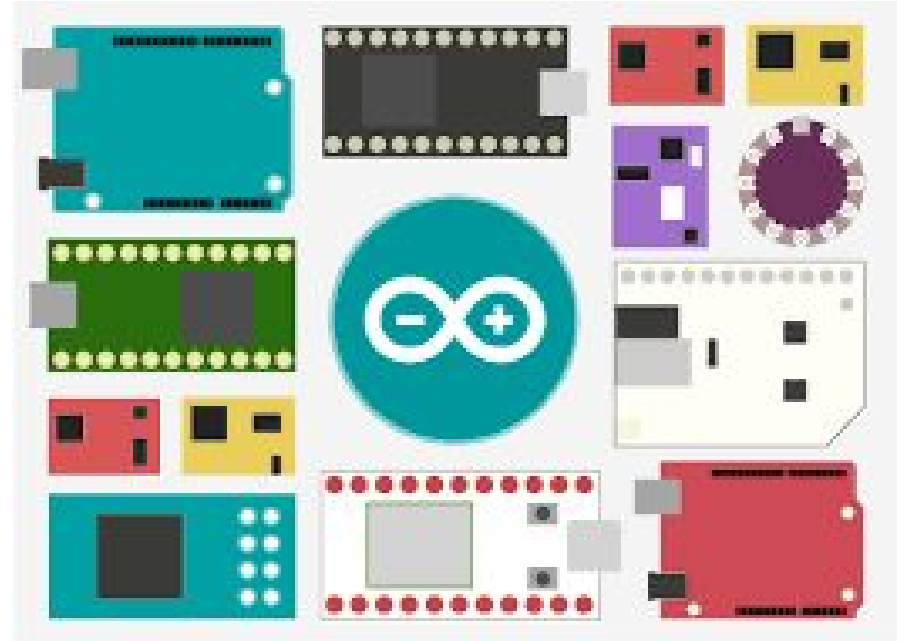
TRIO UPWARD BOUND MATHS SCIENCE

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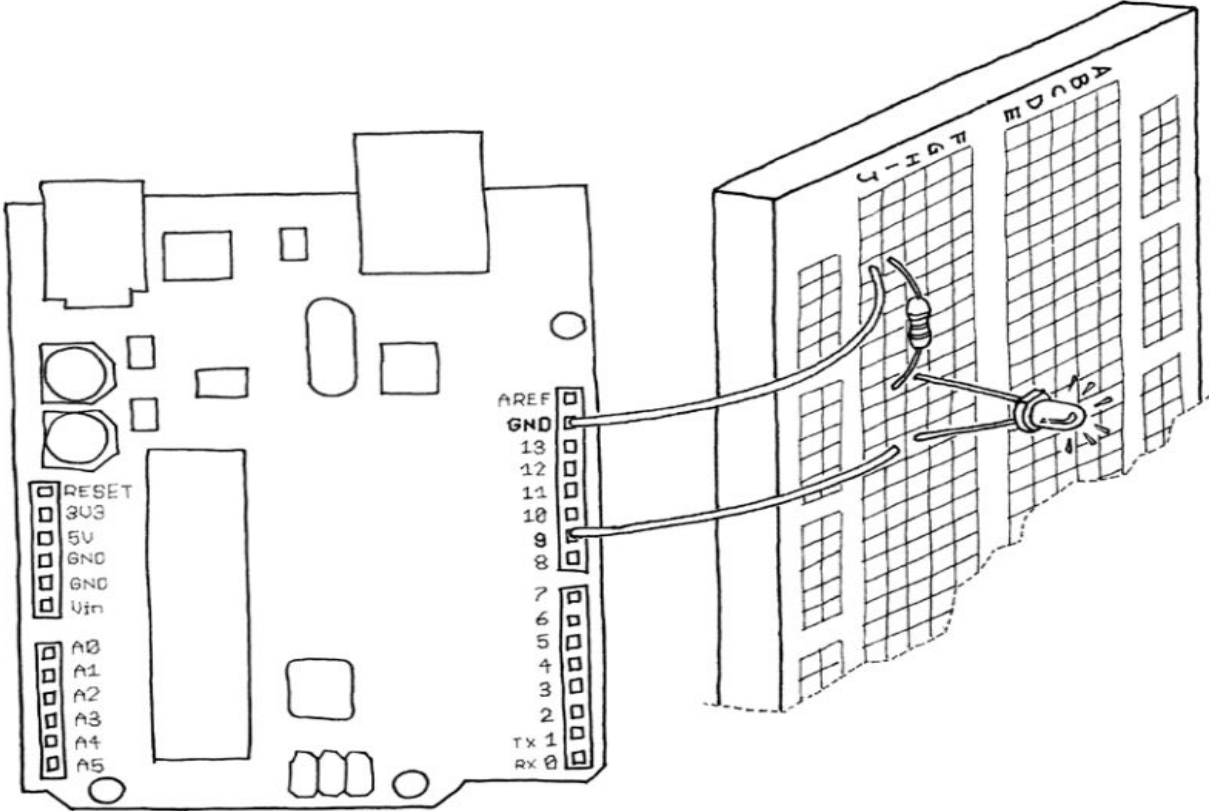
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Hands-on coding

- Overview of activity
- List of steps
- Programming
- Results & Edits
- Advance challenge



Blinking LED - Circuit

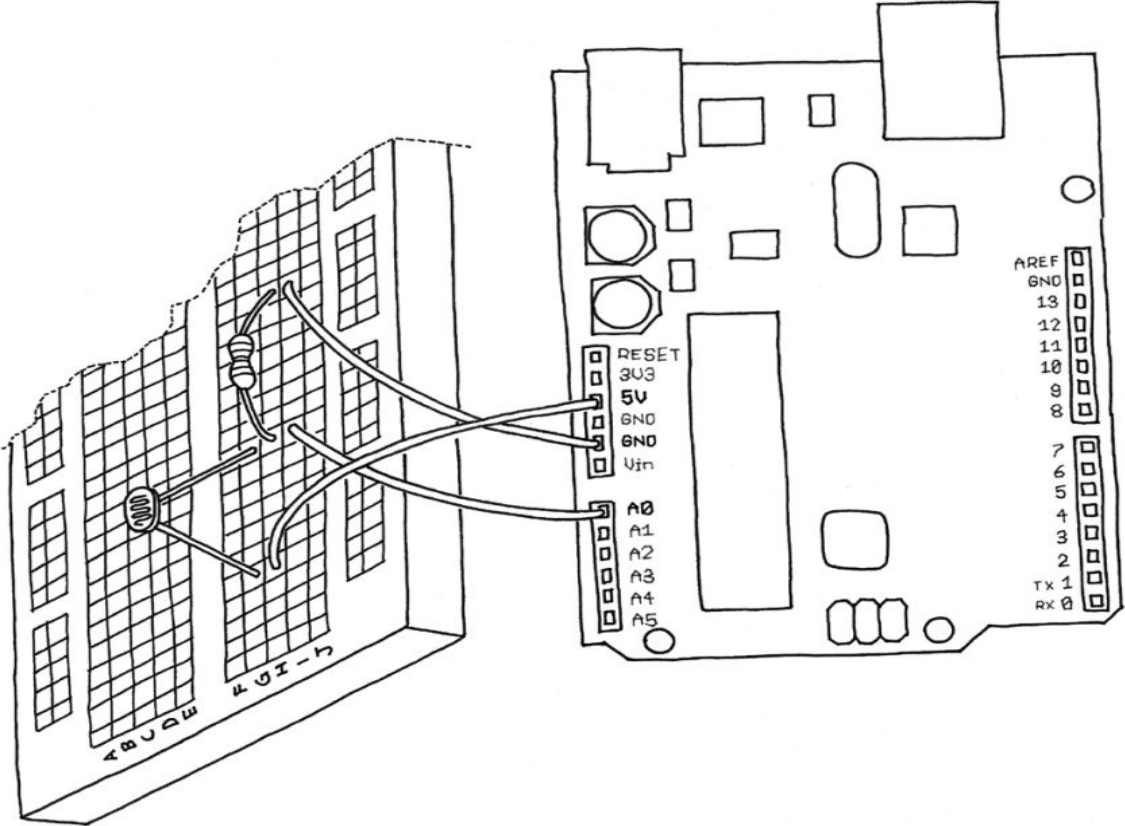


Blinking LED

// Example 01 : Blinking LED

```
const int LED = 13;           // LED connected to // digital pin 13
void setup()
{
  pinMode(LED, OUTPUT);      // sets the digital pin as output
}
void loop()
{
  digitalWrite(LED, HIGH);   // turns the LED on
  delay(1000);               // waits for a second
  digitalWrite(LED, LOW);    // turns the LED off
  delay(1000);               // waits for a second
}
```

Photoresistor - Circuit

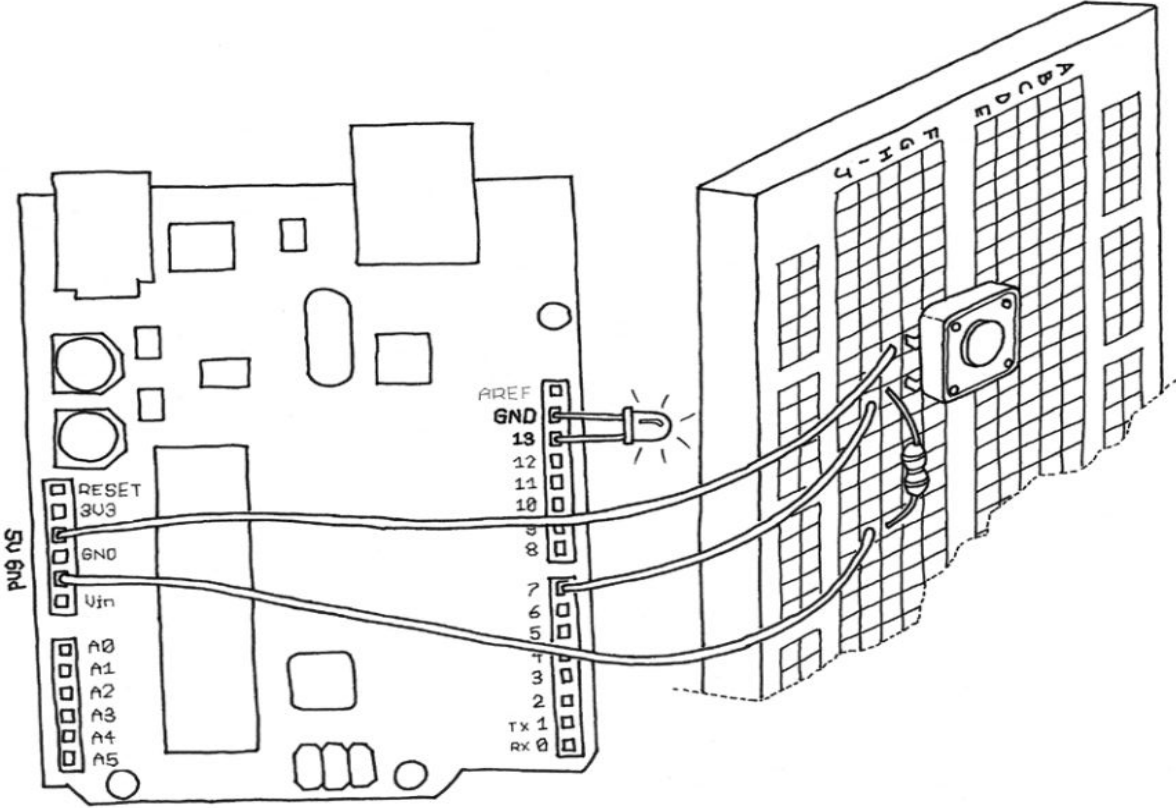


Photoresistor - Code

// Example 06B: Set the brightness of LED to value of the analogue input

```
const int LED = 9;           // the pin for the LED
int val = 0;                 // variable used to store the value coming from the sensor
void setup()
{
  pinMode(LED, OUTPUT); // LED is as an OUTPUT *Analogue pins are automatically set
  // as inputs
}
void loop()
{
  val = analogRead(0);      // read the value from the sensor
  analogWrite(LED, val/4);  // turn the LED on at the brightness set by the sensor
  delay(10);               // stop the program for some time
}
```

Pushbutton LED - Circuit



Pushbutton LED - Code

// Example 02: Turn on LED while the button is pressed

```
const int LED = 13;           // the pin for the LED
const int BUTTON = 7;        // the input pin where the pushbutton is connected
int val = 0; // val will be used to store the state of the input pin
void setup()
{
  pinMode(LED, OUTPUT);      // tell Arduino LED is an output
  pinMode(BUTTON, INPUT);    // and BUTTON is an input
}
void loop(){
  val = digitalRead(BUTTON); // read input val and store it check whether the input is HIGH
  if (val == HIGH) {
    digitalWrite(LED, HIGH); // turn LED ON
  } else { digitalWrite(LED, LOW);
  }
}
```

Resources and Collaborations

- Khan Academy
- Code Academy
- Code School
- Code.org
- Code Monster
- Scratch and App Inventor
- Exploring Computational Thinking with Google
- CS Unplugged
- Makey makey
- Arduino
- Raspberry Pie
- Kano
- Dash Dot & Sphero
- Little bits

Q & A

Brian M. Andrus

bmandrus@neiu.edu

3125637111

Aaron Cortes

acortes@neiu.edu

3125637216