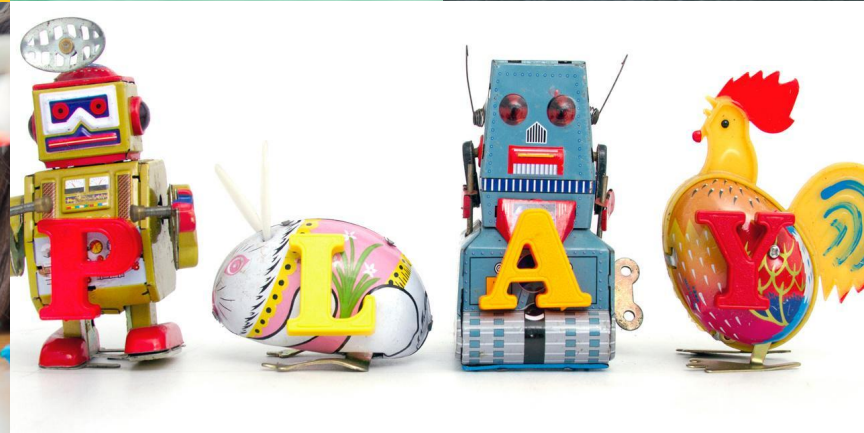
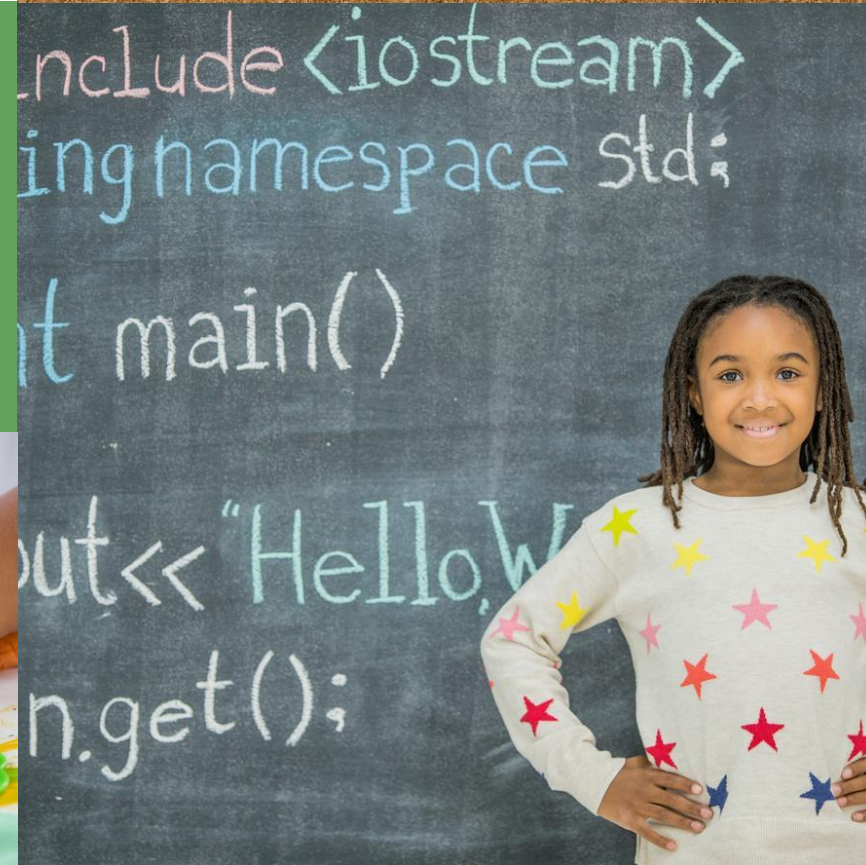


# Computer Science as Creative Practice and Play

Dr. Abigail Joseph

@drabigailjoseph  
#MNCodes





# Who is creative?

Go to [www.menti.com](https://www.menti.com) and use the code 53 50 02 0







# Agenda

Creative Types

CS Core Concepts

Identity

CS Integration

Play

Q&A

@drabigailjoseph #MNCodes



# Dissertation Defense and Dance Shows



# What's your Creative Type?

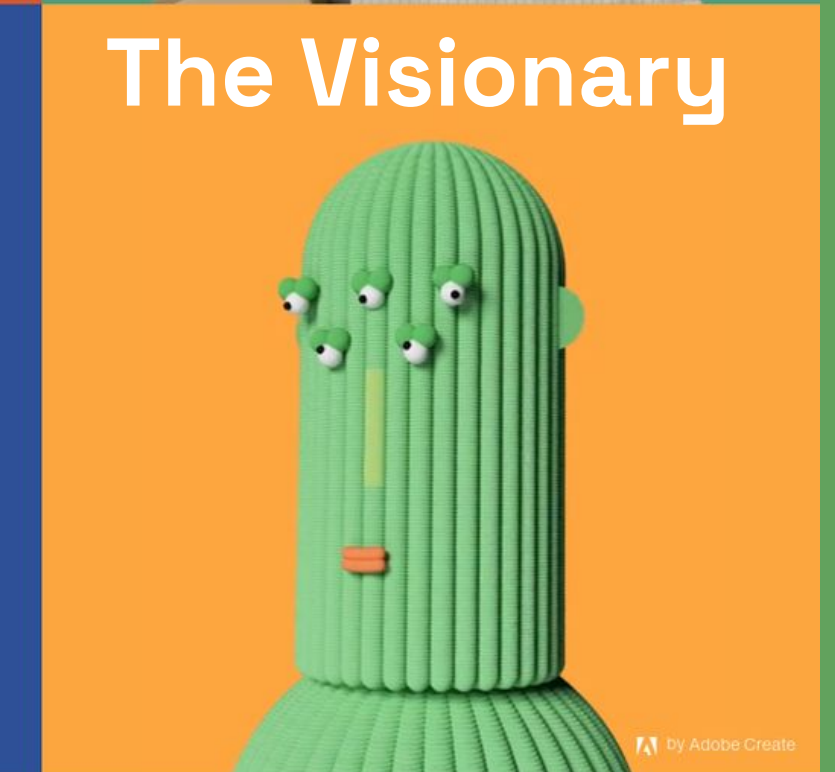
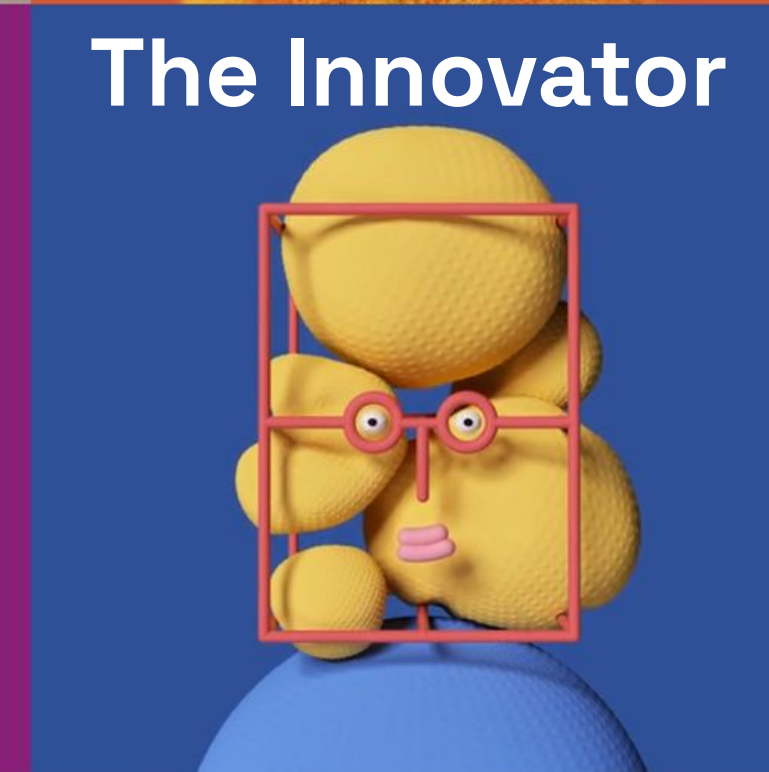
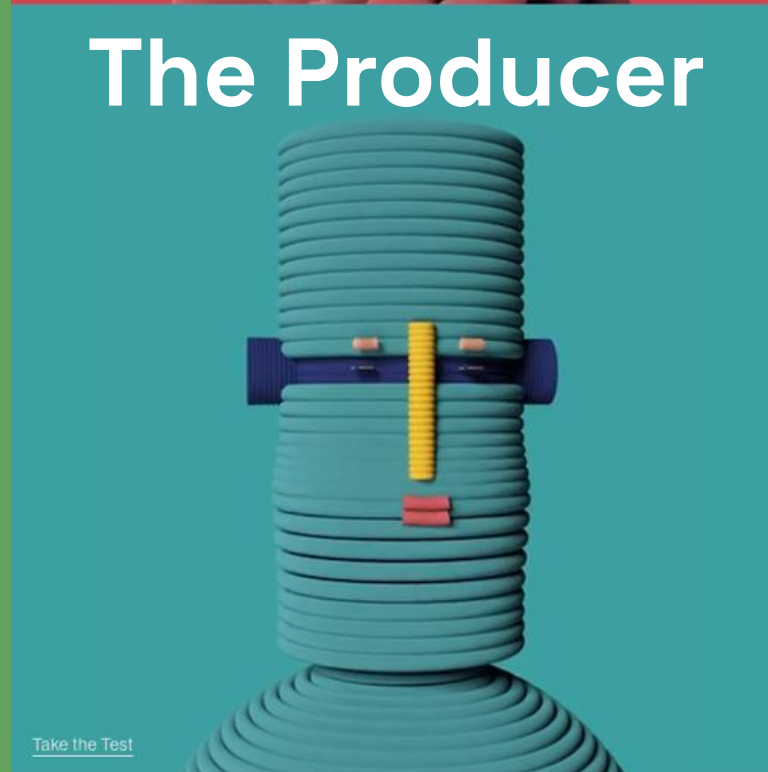
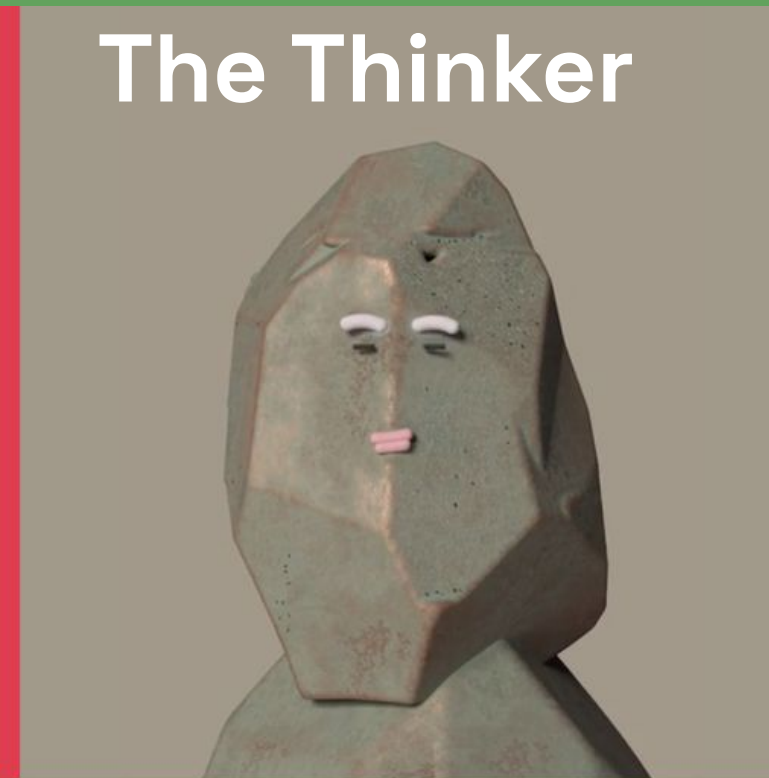
[mycreativetype.com](https://mycreativetype.com)





# What's your Creative Type?

Go to [www.menti.com](https://www.menti.com) and use the code 94 65 20 0



# Creative Types



## The Artist

- Seeing beauty, creating beauty
- Ability to bring ideas and concepts to life

## The Thinker

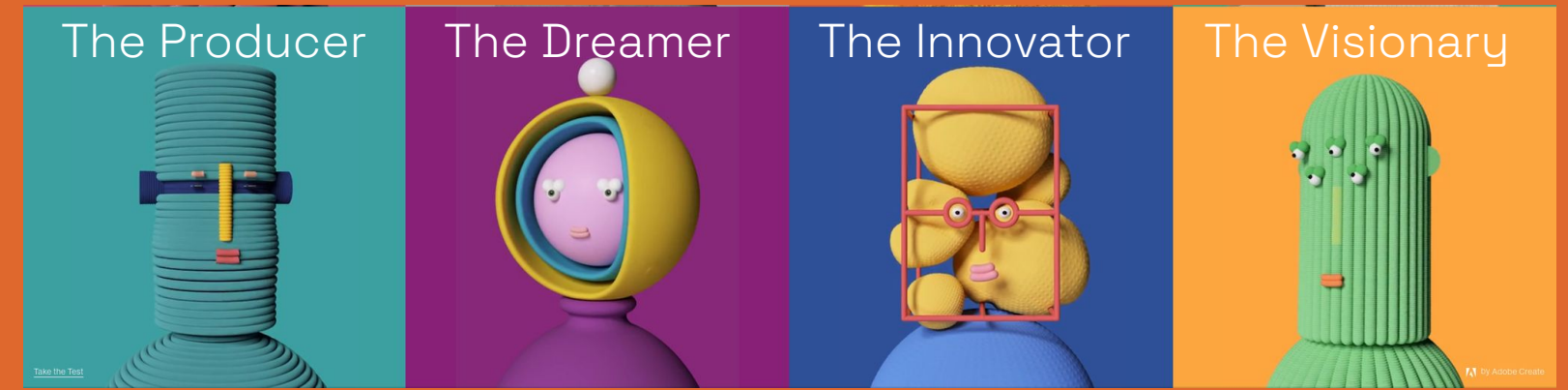
- Deep thoughts, Big Questions
- Intellectual curiosity, ability to find and create meaning

## The Adventurer

- So much inspiration, so little time
- High levels of creative energy, spirit of curiosity and play

## The Maker

- Committed to your craft
- Focus and dedication, ability to achieve mastery



## The Producer

- Process is power
- Strong leadership skills, ability to make things happen

## The Dreamer

- The power of imagination unleashed
- Connection to emotions and imagination, empathy and sensitivity

## The Innovator

- Move, shake, disrupt, repeat
- Ability to generate new ideas and innovative solutions

## The Visionary

- Imagining the impossible
- Full of big ideas, ability to see potential and possibility everywhere



**Creativity is  
intelligence having fun.**

Albert Einstein





# K-12 Computer Science Framework (k12cs.org)

**CORE PRACTICES**  
INCLUDING COMPUTATIONAL THINKING



## 1. Fostering an Inclusive Computing Culture

- Include the unique perspectives of others
- Address the needs of diverse end users
- Employ self- and peer-advocacy

## 2. Collaborating Around Computing

- Cultivate working relationships
- Create team norms, expectations, and equitable workloads
- Solicit and incorporate feedback
- Evaluate and select technological tools

## 7. Communicating About Computing

- Select, organize, and interpret
- Describe, justify, and document
- Articulate ideas responsibly



# K-12 Computer Science Framework (k12cs.org)

**CORE PRACTICES**  
INCLUDING COMPUTATIONAL THINKING



## 3. Recognizing and Defining Computational Problems

- Identify complex, interdisciplinary, real-world problems
- Decompose complex real-world problems
- Evaluate whether it is appropriate and feasible

## 4. Developing and Using Abstractions

- Extract common features
- Evaluate existing technological functionalities
- Create modules

- Model phenomena and processes

## 5. Creating Computational Artifacts

- Plan the development
- Create a computational artifact
- Modify and existing artifact

## 6. Creating Computational Artifacts

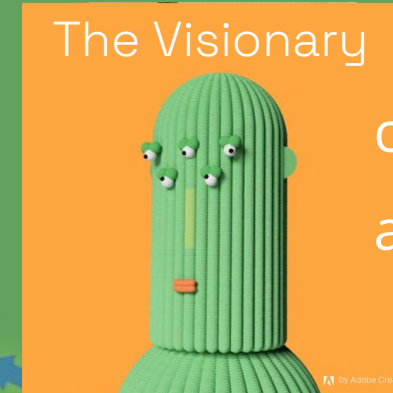
- Systematically test
- Identify and fix errors
- Evaluate and refine



depth of sensitivity and empathy  
consider the needs of diverse users

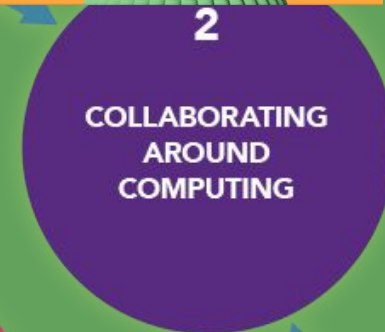


a desire to contribute to society  
produce inclusive computational products

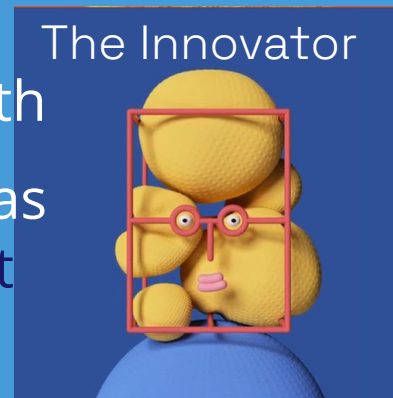


creating community around shared values  
and ideals  
cultivate working relationships

natural storytellers and performers  
personal expression and exchange  
ideas with others



experiment and play with  
ideas  
testing and refinement



## PRACTICES

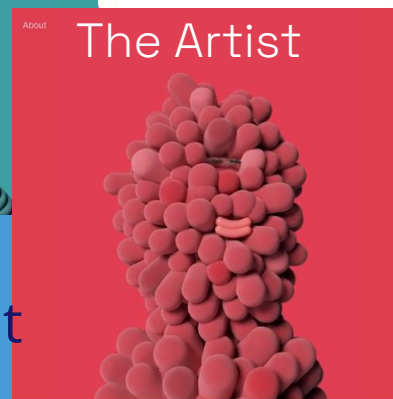


almost always busy solving  
problems  
solving problems with a  
computational approach

implement ideas, joy in the process  
of creating  
develop computational artifacts



big questions and abstract thinking  
create generalizations



have a strong aesthetic orientation  
create artifacts that are personally relevant



# The original "Big Eight" Social Identifiers

Ability  
(Mental and/or  
physical)

Age

Ethnicity

Gender

Race

Religion

Sexual  
Orientation

Socio-Economic  
Status/Class





# Student Voice

depth of sensitivity and empathy  
consider the needs of diverse users

## PERSPECTIVE TAKING

natural storytellers and performers  
personal expression and exchange  
ideas with others

## COMMUNICATION

experiment and play with  
ideas  
testing and refinement

## FLEXIBLE

implement ideas, joy in the process  
of creating  
develop computational artifacts

## CREATIVE

have a strong aesthetic orientation  
create artifacts that are personally relevant

a desire to contribute to society  
produce inclusive computational products

## EMPATHY

creating community around shared values  
and ideals  
cultivate working relationships

## COLLABORATION

## PROBLEM SOLVING

almost always busy solving  
problems  
solving problems with a  
computational approach

## CRITICAL THINKING

big questions and abstract thinking  
create generalizations

## CURIOUS





# Disciplines of Study

**Math**

**Science**

**Physical  
Education**

**Art**

**History**

**Social Studies**

**Music**



**English  
Language Arts**

**World  
Languages**

**Writing**





# Empowered Learner

PERSPECTIVE  
TAKING



COMMUNICATION



FLEXIBLE



CREATIVE



EMPATHY



COLLABORATION



PROBLEM  
SOLVING

CRITICAL THINKING



CURIOUS





# How do you cook?

Go to [www.menti.com](https://www.menti.com) and use the code 50 97 59 1



Precisely measure  
and follow recipe  
step-by-step



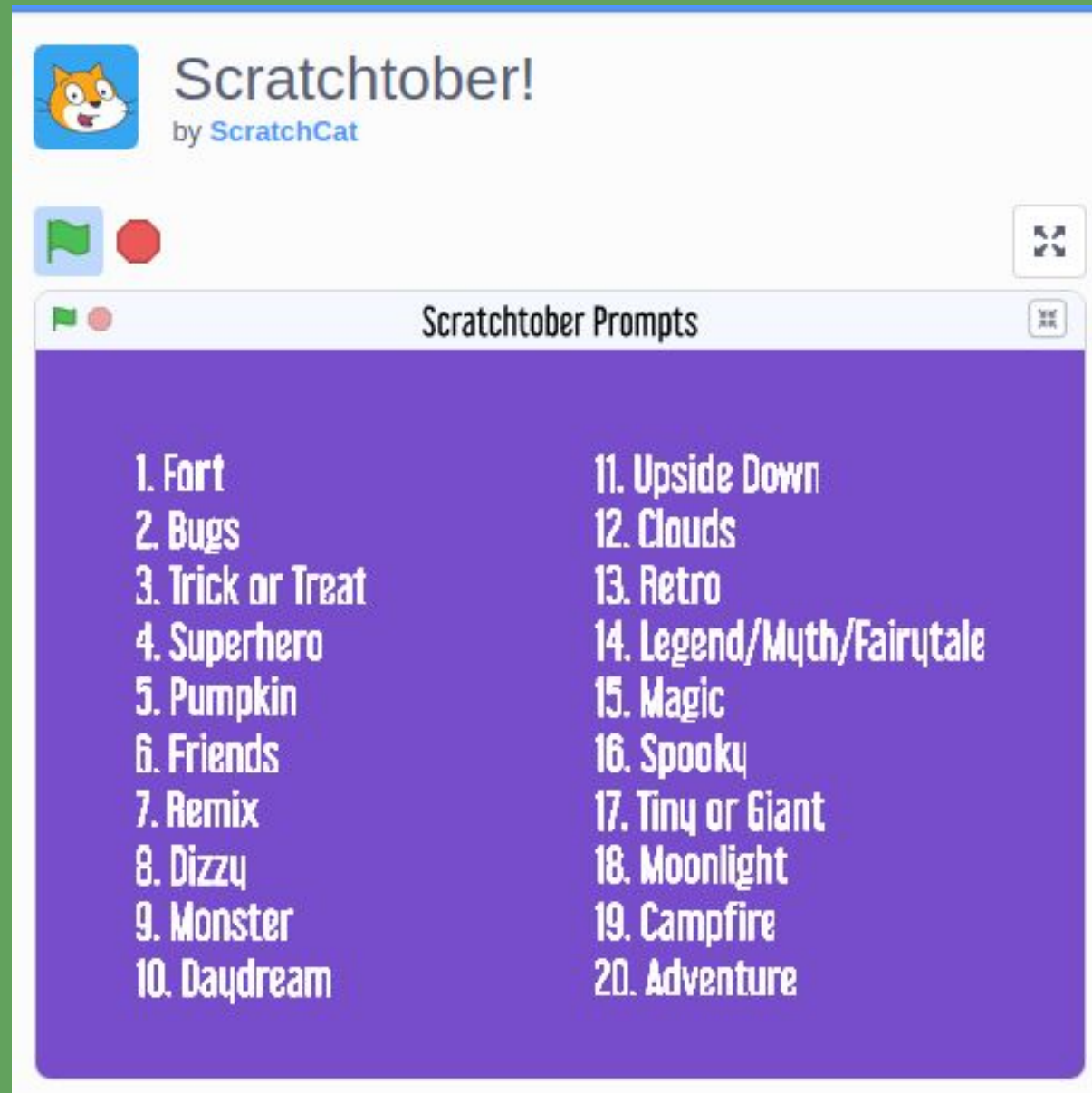
Estimate  
measurements, but  
follow the recipe  
step-by-step



Use the recipe as  
inspiration



# Where creativity and computer science meet



# Play

## **ENVIRONMENT (The Container)**

What are the criteria and constraints?

## **EXPRESSIVE MEDIUM (The Language)**

What is the choice for expression?

## **INSTRUCTION (Teacher Role)**

How is learning facilitated?

## **PEERS (Collaboration)**

Who are they working with?



# Play Example

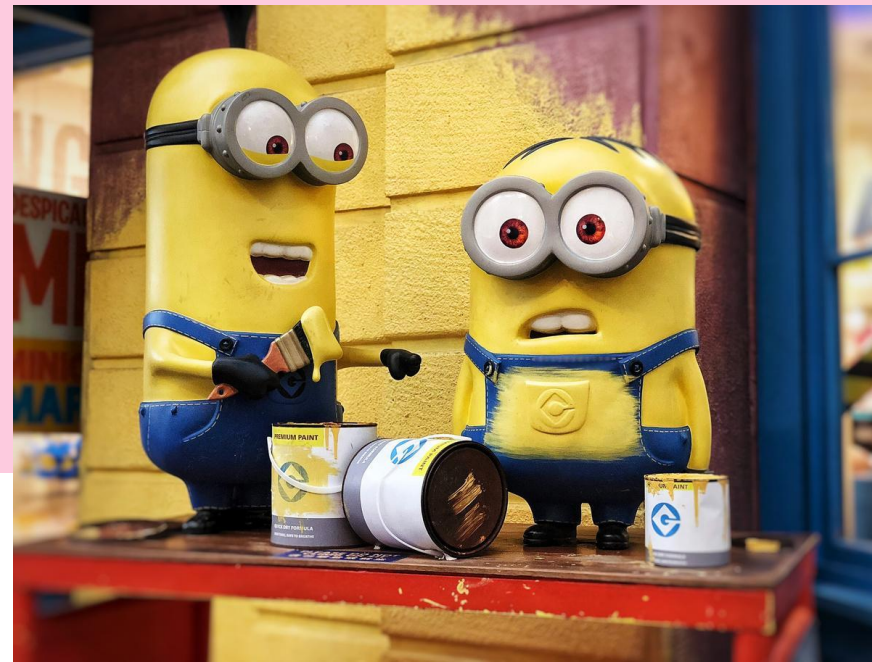


Photo by Justin Lim on Unsplash

## ENVIRONMENT (The Container)

What are the  
criteria and  
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## EXPRESSIVE MEDIUM (The Language)

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## PEERS (Collaboration)

Who are they  
working with?



Creative Types

CS Core Concepts

Questions?

Play

Identity





# Let's continue the conversation

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 [@edstoria](https://twitter.com/edstoria)