

21st Century: Code is here to stay

So kids should learn it?
Yes? No?

Should we learn kids to write code?



Let's watch a short movie



Movie from: www.code.org

Professional Learning

What grades do you teach?



I teach elementary school



I teach middle or high school

Children must
be taught
how to
think
not what
to think
- Margaret Mead

Margaret Mead (December 16, 1901 – November 15, 1978)
was an American cultural anthropologist

“Learn how to think”

Where does learning to code fit in?

What is the practical use?

Thought:

Computer literacy is fundamental to most careers of the future. But I think the situation is similar to speaking English a couple of decades ago. By itself, speaking English has value. You can teach it to others, become a translator or a linguist. But its biggest value is in unlocking communications with many other people and allowing individuals to contribute to much broader society in whatever function they can. That is, a Russian doctor who can read world's best medical publications in English can do a much better job being a doctor.



Similarly, I think, being a programmer can allow you to develop applications that reach huge markets, **but by itself it is limited.** You need to **have some other skill**, maybe even within Computer Science itself, like AI, Big Data, Security, etc. Or have competency in other fields of knowledge or trade. That, in combination with computer literacy, I think is the way to go. Another important aspect of being prepared to the future is **having a skill that is not going to be done by a computer.** This means creative skills and people skills are going to be in higher demand.

In a nutshell:

Looking at the future, we do need to teach kids how to code.
Not for the code itself but to pair and combine it with other skills.

Agree?

Should we learn kids to write code?

NO? Story ends here – bye.
YES? Let's carry on...

So we learn kids to write code!
But where to start???

Good news!

Plenty online learning tools
for all ages!

Bad news!

Plenty online learning tools
for all ages!


First stop:


TEACH YOUR KIDS CODE
CODE. BUILD. CREATE.

www.teachyourkidscode.com

www.teachyourkidscode.com

8 Reasons
WHY EVERY CHILD SHOULD
LEARN TO CODE



www.teachyourkidscode.com

www.teachyourkidscode.com

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www.teachyourkidscode.com

TEACH YOUR KIDS CODE
CODE. BUILD. CREATE.

5 Coding
CONCEPTS
5 YEAR OLDS
CAN UNDERSTAND

But how soon is not too late?

Kindergarten?
Elementary school?
Teenagers?


No idea... (PS I was 11 y/o)

Learning kids to code:
online (free) tools

code.org
Scratch
Tynker
Tinkercad (±off topic)




C O D E code.org

- Non-profit organization
- Target audience: "K-12"
- Various levels (age)
- Many topics




code.org

- Gentle learning curve
- Lessons have specific topic
- Teacher – student accounts






Industrial ICT (16-17 y/o) students:

- Student self-study
- Basic principles of programming
- Teacher can track progress




Scratch

by MIT Media Lab 
(also App Inventor!)

Target audience: **kids 8 to 16 y/o**


Open source!



Scratch


- Online: in browser
- Offline: install Scratch software

Offline version offers special features like programming Arduino (!) or interface with HW

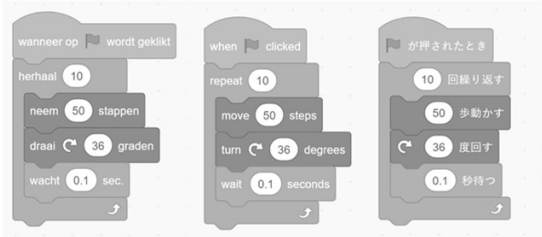


Scratch


- Graphic programming with blocks
- Block function explains what it does
- Text in MANY languages



Scratch - languages




The image shows three columns of Scratch code blocks. The first column is in Dutch, the second in English, and the third in Japanese. Each column shows a sequence of blocks: a 'when clicked' trigger, a 'repeat' loop block, a 'move' block, a 'turn' block, and a 'wait' block.




Scratch

Demo:
Remember Greece
in September?



Scratch

- Target audience is obviously KIDS
- Learn to think like a programmer:
Basic programming structures available
- Keep it simple:
Abstraction of syntax of real programming languages




Scratch keeps it simple

Scratch	C++	VisualBasic.NET
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```
int Countez;
void DoSomething() {
  Counter = 0;
  for (int i = 1; i <= 10; i++)
  {
    Countez++;
  }
}
```

```
Dim counter As Integer
Sub DoSomething()
  counter = 0
  For i As Integer = 1 To 10
    counter += 1
  Next
End Sub
```







Scratch


- Vivid online community / support
- Printed books available (also for kids):
reading AND learning
- Modest learning curve:
easy success



A practical STEM project


+

=


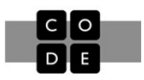




versus

steep
all at once
no lessons

learning curve



smooth
step by step
complete course

Tynker

ABOUT

Tynker is the #1 Kids Coding Platform, where millions learn to code. Tynker offers self-paced online courses for children to learn coding at home, as well as specially designed curriculum for schools and camps.

Tynker

- Commercial = NOT free
- Game-based
- Seems US-centered?
- Never used myself

Tynker

Why should kids learn to code?



Technology has never been more prevalent in our lives. Code is revolutionizing every aspect of today's world - think self-driving cars, robot-assisted surgery, social media, new jobs, and more. Picking up coding helps children become better architects of their futures.

But learning to code isn't just about the ability to program a computer. Coding teaches important academic skills and builds crucial soft skills like perseverance and organization. It establishes valuable 21st century skills that can translate into a career.



Experience Level

Never Coded Beginner	Coded Before Intermediate	Coded A Lot Advanced
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What subjects are you interested in?

Storytelling	Barbie	Art & Animation	Minecraft	Game Design
AI & Robotics	Multiplayer	HTML & CSS	JavaScript	Python

START LEARNING!

JS
JAVASCRIPT 1

JAVASCRIPT 1!
Code fun browser-based apps using JavaScript and the HTML5 Canvas. Build 11 mini-games like Snake and Pong!

Ask Your Parents for Access

Your parent's email: _____

I'm 13 years or older

ASK MOM OR DAD

Remember:
Code coupled to other skills

Why not try...
ELECTRONICS?

Maker Community

Code + electronics = Arduino

Arduino

- Arduino = development board
- attach electronics / peripherals
- microcontroller needs code

= Combining code with hardware

Tinkercad

- Not really a code-learning platform
- **Simulation** of basic electronic circuits
- Integration of Arduino,
both HARDware and SOFTWARE
- Arduino-code = REAL C/C++

Tinkercad: code for Arduino

- Draw circuit
- Write the code
- Simulate complete project
- When success:
make circuit and program Arduino

Tinkercad