

Stoopid Questions

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Learning Teaching Machine learning/AI

The Internet and LLMs have not made learning obsolete; learning is essential and takes time.

<https://cacm.acm.org/research/10-things-software-developers-should-learn-about-learning/>

Questions

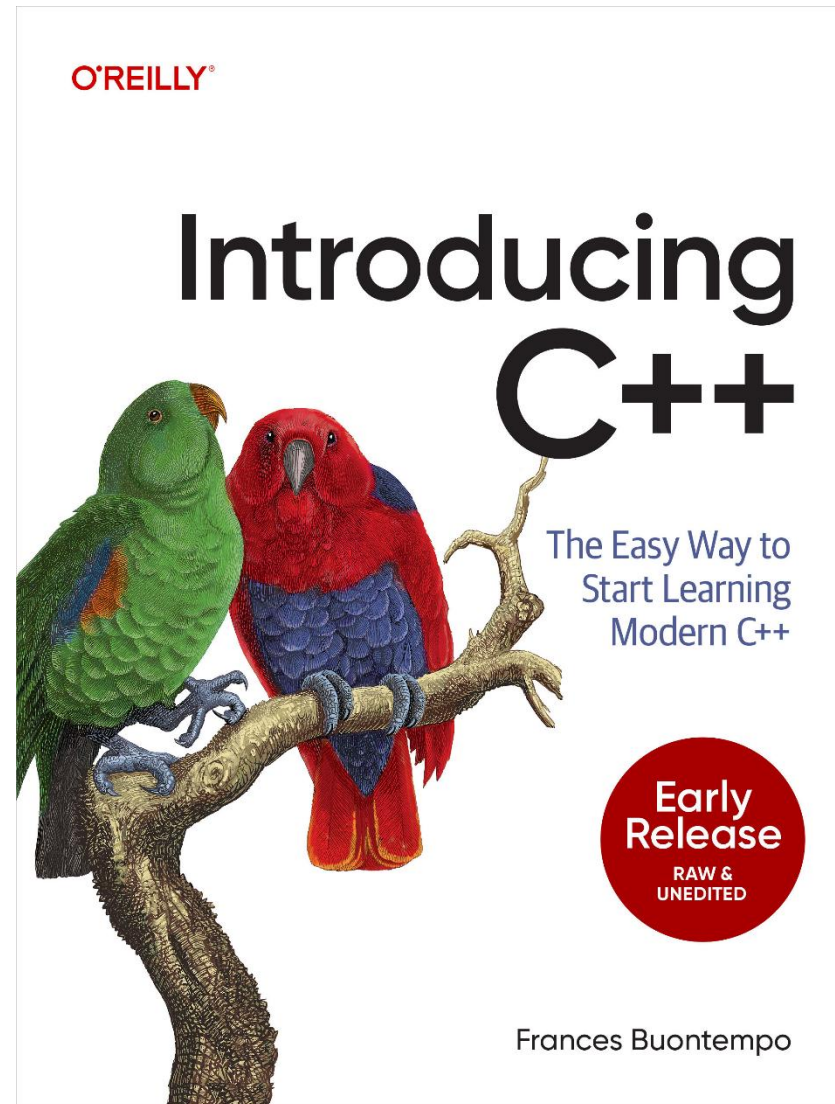
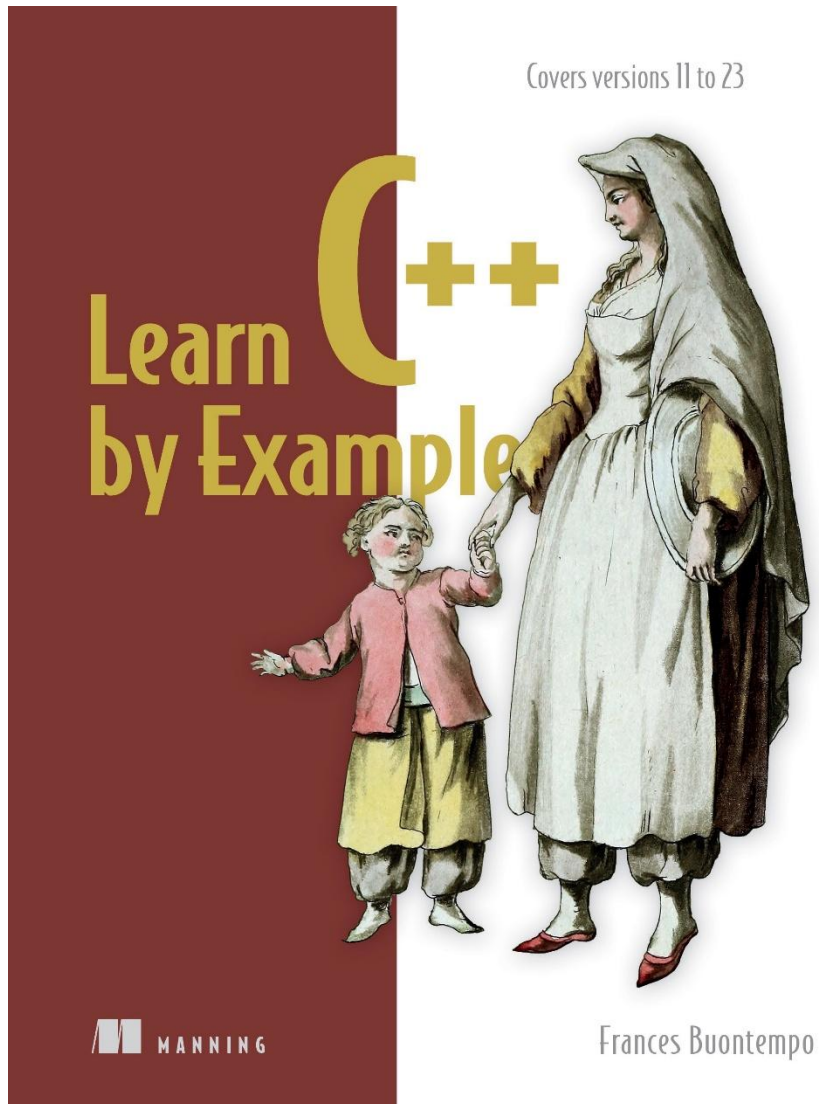
- Have you ever asked
 - A question after/during a talk?
 - A customer or colleague for clarity?
 - A teacher what they are talking about?
 - A student why they came out with the answer they did?
 - Why something is impossible or a bad idea?
 - Why something is a good idea?
 - How to do something?
 - When to do something?
 - Who is going to do something?

How many of you...

- give training courses but have never been taught how to teach?
- try to learn but have never been taught how to learn?
- manage to learn something despite a bad teacher?



Let's learn about learning (and teaching)



Fun, fun, fun

- Playing games is a way to learn
- Spark interest
- Experiment
- Bend or break the rules



By Rote

- Learn your times tables, parrot fashion
- “One true way to do long division” (or subtraction...)
- “I hate kids and maths”
- Secret: some primary school teachers can’t do maths



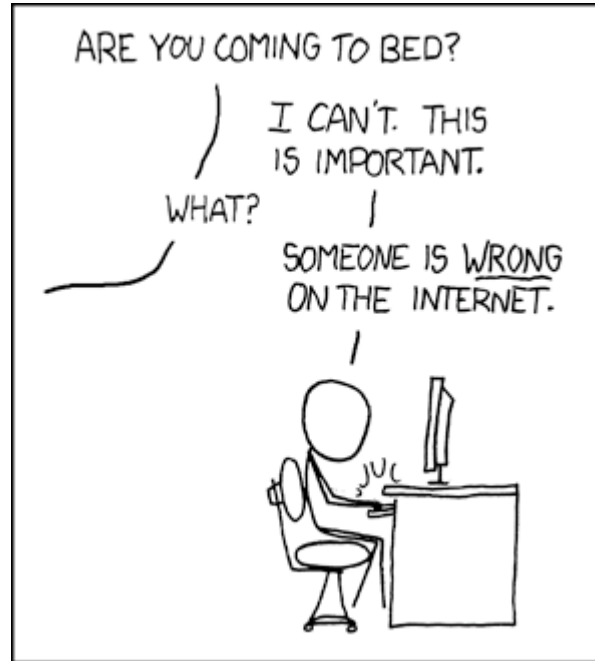
By cheating

- Notes on your sleeve
 - But which notes? Proves you know something
- Stats to guess potential exam questions
 - Which you then learn for
 - 80% is 1 in 5 wrong, but often a top grade!
- Are LLMs cheating?
 - Next Overload will have an article about why Andy B doesn't use "AI"

By asking questions

- A teacher needs to make it psychologically safe to ask
 - Angst!
 - **“Hands up if you don’t understand”**
 - **“Hands up if you do understand”**
- Asking the right question is difficult.
 - But try anyway
- What if...?

Confidence



- You need to be stupid/brave to challenge a book, teacher or website.
- But sometimes the authority figures are wrong.
- Or make mistakes.

Blockers

- Previous experience makes you think you are incapable of something
- Annoying things from school
 - Show your working
 - Anecdote: LLMs perform better when they do “chain of thought” reasoning
 - i.e. prompt them to show their working
 - <https://www.youtube.com/watch?v=qqhEEovtKgw>
- “Mental block”
- Dyslexia
 - Other neurospicy things

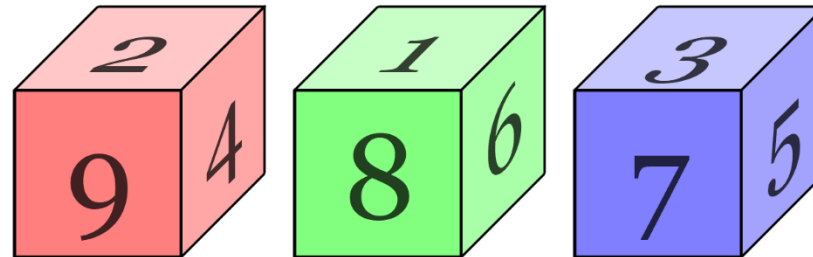


I got stuck

- Talk to a rubber duck
- Try the smallest thing that possibly works
 - One dimension instead, ...
 - Tic Tac Toe rather than chess...
- Solve a different, but related problem
- Delegate
- Ask for help
- Take a break

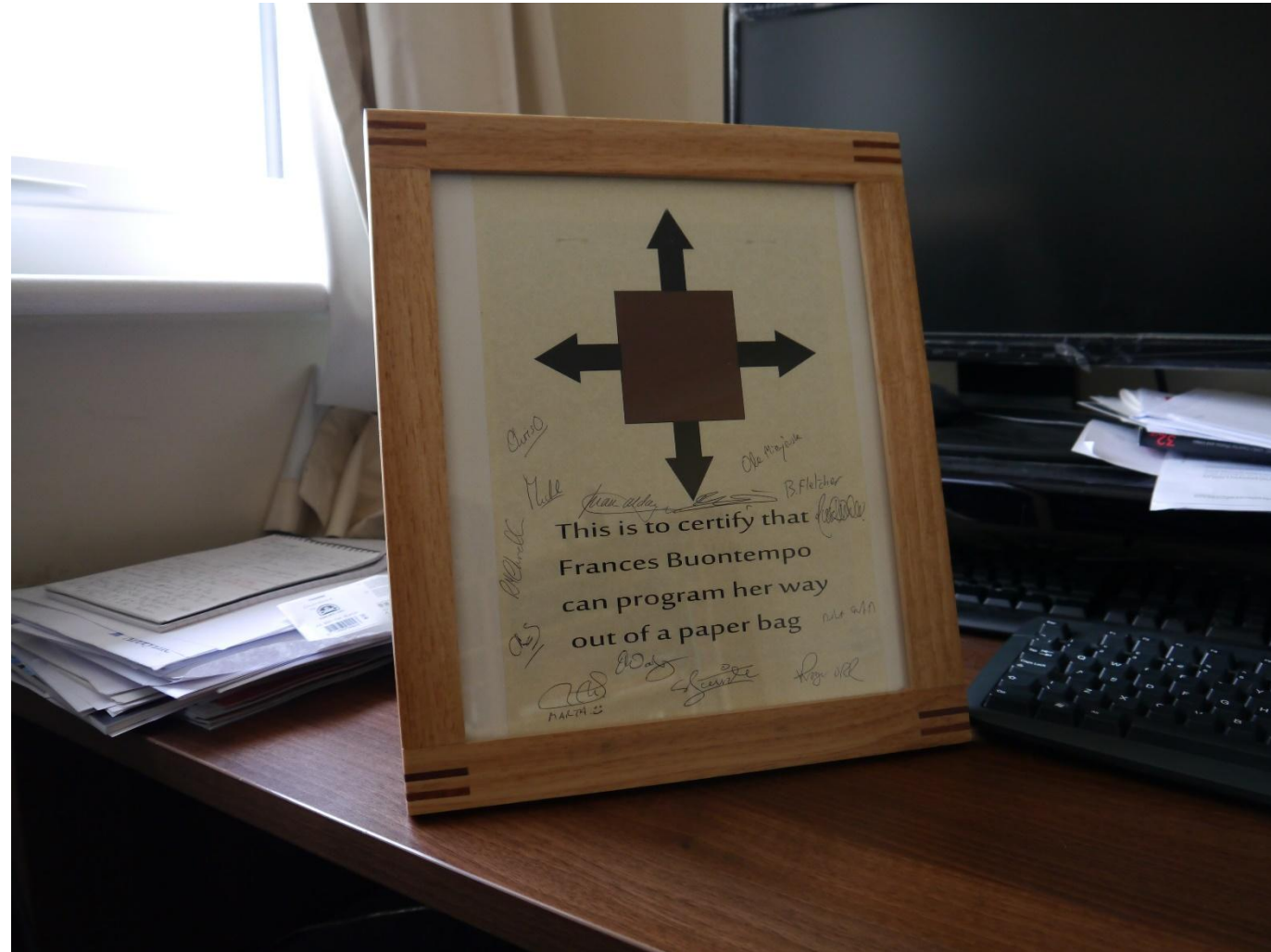
BORED!

- Learning needs to be fun
- Argument
 - Product: collection of reasons (premises) and a conclusion
 - Process: exchange of reasons between interlocutors
- Astonishment
 - Science/magic
- Achievement
 - Certificate
 - Positive feedback
 - Gamify



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Can you code your way out of a paper bag?



Try new problems

- A larger program
- A smaller problem
- Katas
- Listen to talks
- Try answering questions on a forum
- My book...
 - <https://buontempoconsulting.blogspot.com/2024/08/why-i-wrote-learn-c-by-example.html>

Feelings

- Students and teachers get angry
 - **Students are allowed to be angry**
 - Challenged assumptions/world views is **frustrating**
 - **Teachers are not allowed to be angry**
 - If someone doesn't understand you, find a different way to explain
- Asking questions needs courage
 - Teachers should **encourage**
- Progress is often non-linear
 - *"I could do this last week, what's wrong with me?"*
 - *"You could do this last week, what's wrong with you?"*

Agency: Free will /determinism

“Hi. I’m Eunice. No last name... While I’m at it, I’d like to say that I’m nobody’s property, not a product...I pay my own way...

I’m globally distributed, and that’s how I view my citizenship...

Whether I’m a person, it feels to me like I am. Me. Eunice.”

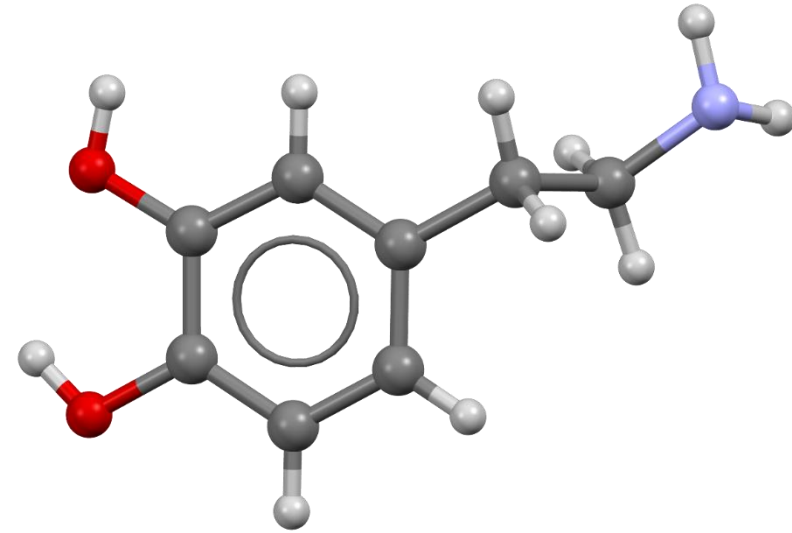
“So you'll trust whoever's in control of this thing, its capacities currently unknown, because something that convinced you it was AI told you you should?”

William Gibson, Agency



And pause

- Recap: Feelings and agency
- But, how to actually learn...
- Reinforcement
 - Reward -> dopamine
 - “Dopamine doesn’t track pleasure itself, but heightens the motivational pull of anything linked to past reward. Over time, we don’t chase the feeling. We chase the cue.”
 - Also, reinforcement learning (Snake your way out of a paper bag)
 - <https://www.youtube.com/watch?v=jeoJZ8XGJCg>



Quote from <https://medium.com/blog/how-incentive-salience-guides-what-we-reach-for-when-were-restless-6700b8f44aad>

Picture by Ben Mills - Own work, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=129242260>

Where to learn?

- Books
- Online courses, YouTube...
- From AI? “AI as a learning tool” (we’ll come to that later)
- Conference workshops
 - Much cheaper than buying in a trainer!

How to read a book

- Screen or paper?
- Take notes
 - On what you understand
 - Do not understand
 - Or think is wrong
- **Use a bookmark**
- Track your progress
 - Not just pages read
 - Words in table of contents understood
 - What have you learnt
- You don't have to start at the beginning
 - Skip ahead and go back



Neal Stephenson, in The Diamond Age

“The difference between stupid and intelligent people
-and this is true whether or not they are well-educated-
is that intelligent people can handle subtlety.

They are not baffled by ambiguous or even contradictory situations
-in fact, they expect them and are apt to become suspicious when
things seem overly straightforward.”

Stupid or Ignorant?

- Let's banish the word **stupid**

- a lack of intelligence, understanding, reason, or wit, an inability to learn.

<https://en.wikipedia.org/wiki/Stupidity>

- What about **ignorant**?

- a lack of knowledge or understanding

<https://en.wikipedia.org/wiki/Ignorance>

Stoopid questions?

- How do you remove negative numbers from a collection?
- Why not #include a cpp file?
- Why can't you use exceptions in embedded C++?
 - Khalil Estell <https://www.youtube.com/watch?v=LorcxyJ9zr4>
- How do you code your way out of a paper bag?
- Which language is best?
 - Which is 2nd best?

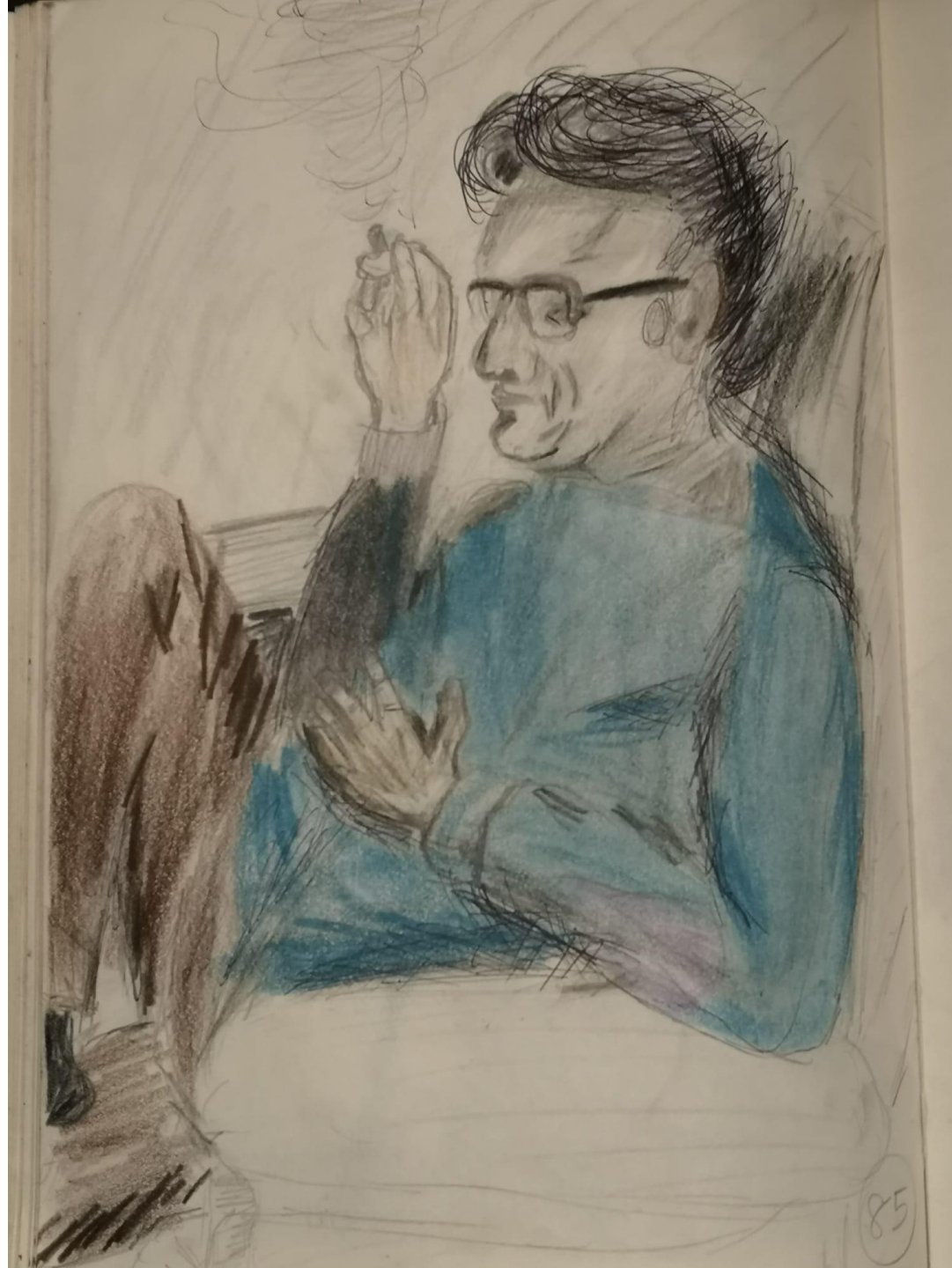
How do you know you know?

- Progress is often non-linear
 - So you might have an off day
- Assessments
 - Multiple choice easy to mark, but...
- How do you detect problems with your reasoning?
- Teach someone else
- Teach something else

Science is knowledge which we understand so well that we can teach it to a computer; and if we don't fully understand something, it is an art to deal with it.

Knuth

Let's talk about teaching...



A good arguer is like a good teacher.

A good teacher explains clearly, motivates interest, and gets recalcitrant audiences to see the point.

This takes patience and a willingness to speak to people where they are.

<https://psyche.co/guides/how-to-have-arguments-that-change-minds-including-your-own>

Testing, testing

“Instead of marking kids right or wrong,
the kids have to critically evaluate their own work,
and explain where it works, where it falls down, and where they aren’t
quite sure about it.

They have to figure out what other reasons there might be for the
results they found.

Suddenly they have to ask themselves the question:

How do I know I’m right?”

<https://adsei.org/2024/11/23/from-hypnotised-to-heretic-immunising-society-against-misinformation/>

Feedback: +ve and -ve



Training “at” work

- Conference workshops
 - cheaper than getting someone in!
- Conferences
 - Ditto
- Schedule learning time
 - Find videos/books/podcasts.
 - Get work to pay for books
- Run something yourself
 - Don't be afraid to say, “I don't know. Let's find out.”

Machine “learning” and artificial “intelligence”

- More questions now!
- Can machines **learn**?
 - Or just follow algorithms or build lookup tables/compress data?
- Are machines **rational**?
- Do they have **agency**?
- What is AGI?
 - ANI – artificial narrow intelligence
 - ASI – artificial super intelligence

LLMs and intelligence

“The diverging opinions of experts on the intelligence of LLMs suggests that our old ideas based on natural intelligence are inadequate.”

Terrence Sejnowski

- Mitchell, Melanie; Krakauer, David C. (28 March 2023). ["The debate over understanding in AI's large language models"](#). *Proceedings of the National Academy of Sciences*. **120** (13)

“It may be that today’s large neural networks are slightly conscious.”

- <https://x.com/ilyasut/status/1491554478243258368> Sutskever, February 2022, nearly a year before ChatGPT

The Turing Test

- Or the imitation game
- Stochastic parrots?
- Learning by rote: Chinese room argument
- What is intelligence?
 - Neural nets – neuroscience inspired...
 - Transformers are not so brain like
 - Blaise Agüera y Arcas: What is Intelligence? | Closer To Truth Chats
 - <https://www.youtube.com/watch?v=qqhEEovtKgw>

“LLM’s ARE computational systems,
and they DO NOT LEARN”

<https://adsei.org/2024/11/23/from-hypnotised-to-heretic-immunising-society-against-misinformation/>

Machines/AI as a learning tool

- Vibe coding
- Machine marking
- PyCon UK talk about learning from a Yoto machine (8 year old)
 - By coding it herself (with help from Mum)
- “Human problem-solving is iterative: We learn by doing, reflecting and observing the outcome. True learning demands effort to internalize—and effort is often uncomfortable... task completion doesn’t necessarily come with true learning or understanding. ”

Adam Tornhill <https://www.forbes.com/councils/forbestechcouncil/2025/04/28/skills-rot-at-machine-speed-ai-is-changing-how-developers-learn-and-think/>



Hallucinations?

- “Use AI as an auto-complete for well-understood problems where you have already mastered both the problem and the solution domain.”

Adam Tornhill

- “You need to know what your are doing to use AI”

Jens 24th April

- What about boilerplate code?
 - But if it’s wrong, surely “cookie cutter” is better?
 - Metaclasses, anyone?

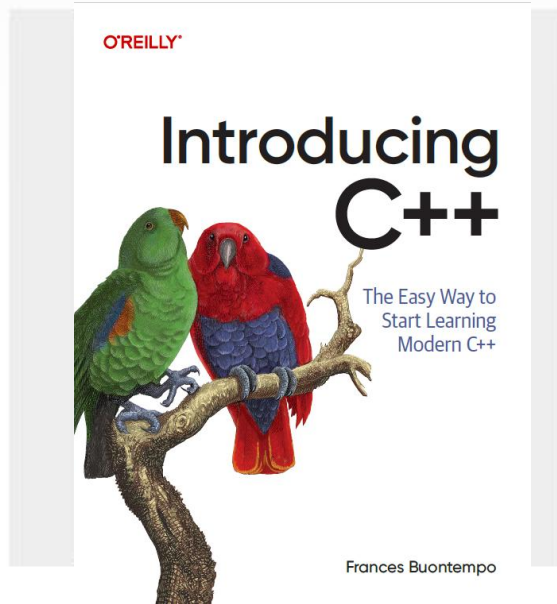
Challenges for you

- Ask a question
- Try something you think you are terrible at
 - Read a book
- Teach someone something you are good at
 - Or write an article
 - Or give a talk

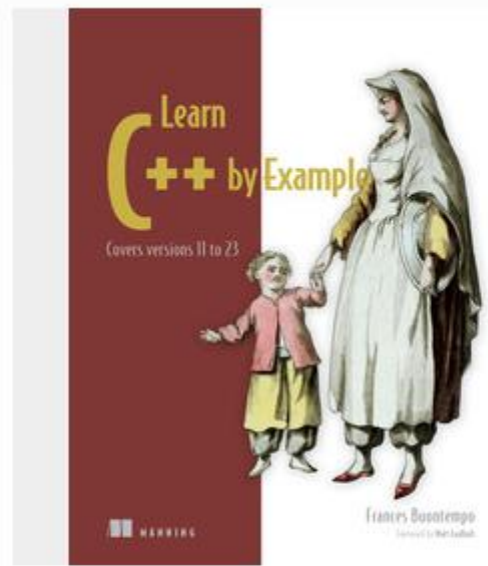
New Model Army... again

**We are old, we are young, we are in this
together**

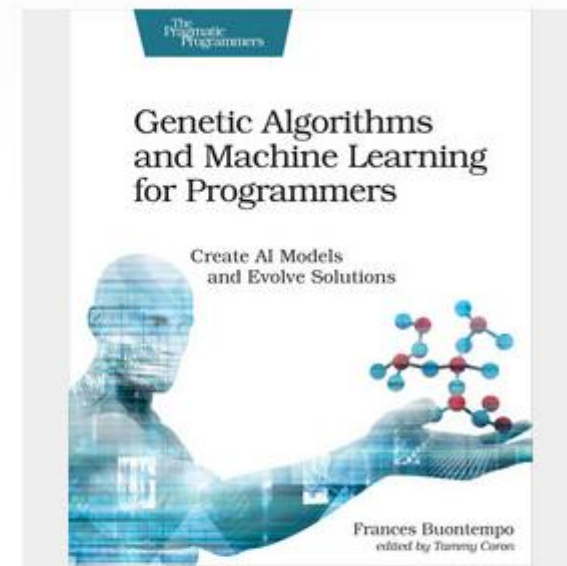
**Vagabonds and children, yeah, prisoners forever
With pulses a-raging and eyes full of wonder**



Introducing C++



Learn C++ by Example



Genetic Algorithms and
Machine Learning for
Programmers

<https://www.oreilly.com/library/view/introducing-c/9781098178130/>
<https://mng.bz/1aVV> - 45% off with code meetingcpp25 til 23rd Nov
<https://pragprog.com/titles/fbmach/genetic-algorithms-and-machine-learning-for-programmers/>