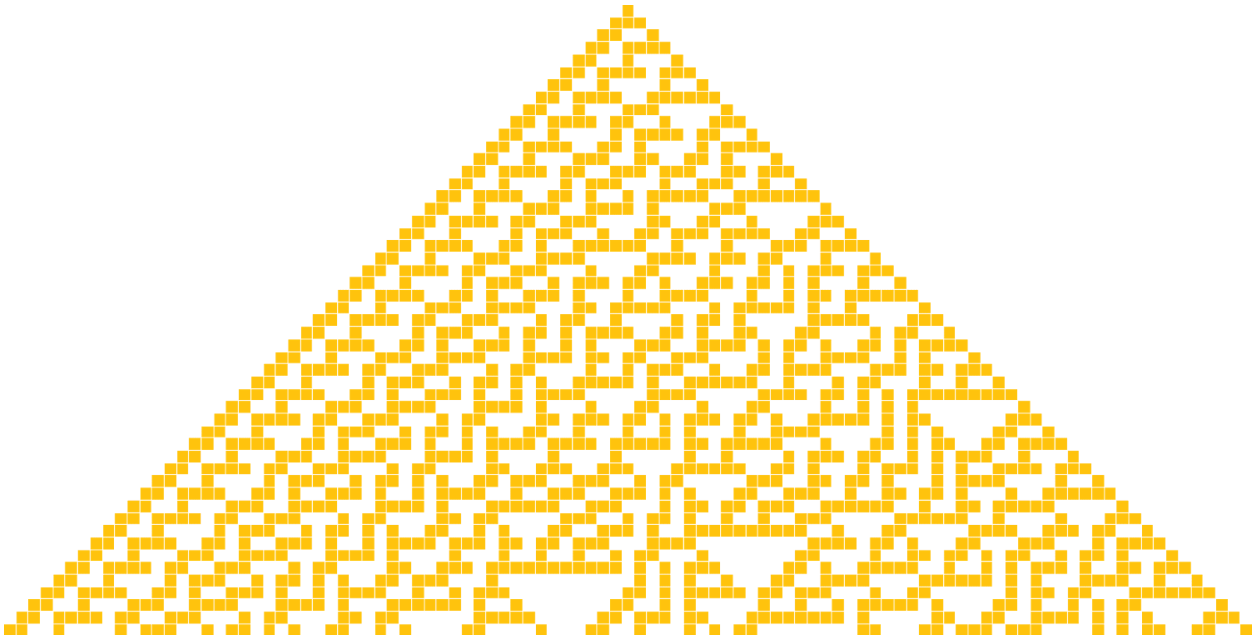
Stephen Wolfram

'Computing the Cosmos'
Into the Impossible Episode 41

Brian Keating April 23, 2020



OBJECTIVES

1. Learn about computation, including the history of computation from the abacus, to the slide rule, to the supercomputer.
2. Learn about important contributors to computation including Charles Babbage and Ada Lovelace.
3. Learn about a new theory of everything proposed by Wolfram and his colleagues.

MATERIALS NEEDED

1. Pencil and paper -- try to solve the problem first or at least make a sketch.
2. Computer or smartphone to solve problems on https://www.wolframalpha.com/

VERIFICATION

Steps to check for student understanding

1. Why is it hard to do symbolic mathematics on a computer?
2. What does it mean for something to be a 'theory of everything'?
3. Play around with WolframAlpha on your iphone or website portal. Use it to solve something interesting like estimate the population of the USA 12 days from now.

ACTIVITY

1. Read: How Do Simple Programs Behave?: A New Kind of Science | Online by Stephen Wolfram [Page 30]
2. Watch his TED talk Computing a theory of everything | Stephen Wolfram
3. Make a comparison of some computed quantity such as the distance to Alpha Centauri divided by the cube root of the volume of the Roman Colosseum!
4. Check if these are true:

$$3^2 + 4^2 = 5^2$$

$$3^3 + 4^3 + 5^3 = 6^3.$$

$$3^4 + 4^4 + 5^4 + 6^4 = 7^4$$

5. Learn his impression of the most important aspects of the history of physics: https://www.youtube.com/channel/UCJekgf6k62CQHdENWf2NgAQ
6. Watch this video on the mathematics of the film Arrival https://www.youtube.com/watch?v=r8nTifCIr0c
7. Play around with the code on GitHub repo to make your own Arrival patterns https://github.com/WolframResearch/Arrival-Movie-Live-Coding