Heads or tails?

Andrew Fowlie

What is a coin flip?

Heads or tails?

- **Where are coin flips used?**

- **Why are they used?**

Can you think of examples?

We will understand coin flipping

- Why coin flips are considered fair
- Ways in which coin flips are *not* fair
- The interpretation of probability in a description of a coin flip

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Probability and the coin flip

- For a *fair coin*, what is the probability of heads?
- What is the probability of two heads in a row?

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50-50?

- Why do we consider the coin flip to be 50-50?

What does it mean?

- **Property of long-run behaviour of coin and coin flipping mechanism**
- **Statement of our belief about the coin flip at hand**

50-50 is long-run behaviour

- Flip the coin over and over again

- As the number of flips gets larger and larger, the proportion of heads (or tails) gets closer and closer to ½

- American mathematician Persi Diaconis performed these experiments — what do you think he found?

50-50 is reflection of knowledge

- What if you discover that I've purchased a coin with two sides that are both heads?

- What if you found out that I spent hours perfecting coin flips trying to make it land on heads?

- What if you measured the weight-distribution of the coin?

De Finetti

PROBABILITY DOES NOT EXIST

IT EXISTS ONLY IN OUR MINDS

- **De Finetti argued that it was subjective and personal**

- **Not a property of the coin, or even of the coin-flipper system, but a reflection of our knowledge about them**

50-50?

- **What two ways can we interpret a coin flip as being 50-50?**
- **Why did de Finetti say that *probability does not exist?***

Flipping a coin one more time

- Coin flips used in dispute resolution and decisions since Roman times

- There are two-competing interpretations

    - 50-50 reflects long-run behaviour

    - 50-50 reflects what we know about the coin and coin-flipper

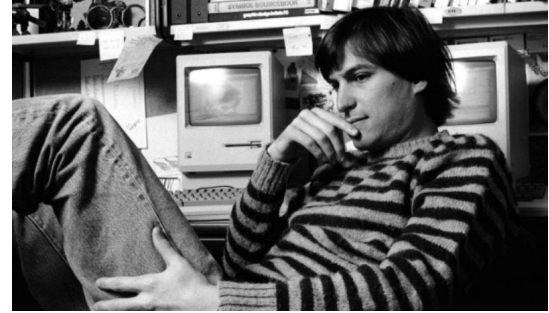- Why do they agree?

Hello World!

Say hello to programming in Python

Computer programs are everywhere!

— — —

- How many computer programs are you running right now?
- Your phone and laptop, perhaps even your watch, are running computer programs
- How do they work?

Objectives

- Understand philosophy and applications of Python programming language
- Understand the `import` and `def` keywords & `print` function in Python
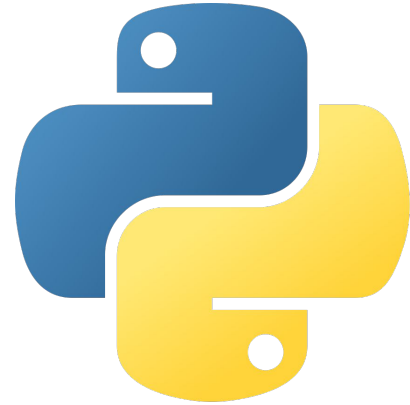- Write a basic program in Python

— — —

Do you code?

— — —

- Have you written a computer program?
- Have you ever written a website?
- What are programming languages?
- What does a computer program look like?

What is Python?

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- Programming language created in 1980s by Guido van Rossum in the Netherlands
- Design philosophy of
  - Beautiful is better than ugly
  - Explicit is better than implicit
  - Simple is better than complex
  - Complex is better than complicated
  - Readability counts

Where is Python?

— — —

- Python the most popular programming language — e.g. most github repos
- Web apps — e.g. Instagram, Netflix, Spotify, Dropbox, Uber & Reddit
- Scientific computing — e.g. simulating, analyzing and plotting data at CERN & NASA
- AI and generative AI — e.g. TensorFlow & Pytorch — used in ChatGPT and other LLM

EVERYWHERE

Now it is (y)our turn

— — —

- Together, let's write a Python program
- The program will output a randomly selected message to the screen
- ChatGPT style ;)

Let's go

https://www.online-python.com/

Now it really is your turn

— — —

- What is Python and where is it used?
- What do the **import** and **def** keywords & **print function** mean in Python?
- Can you write a simple Python program that uses them?

Goodbye, World

- Python is a programming language with emphasis on **simplicity** and **readability**
- Broad applications across the web, science and AI
- **import** is a keyword used to access a Python modules
- **def** is a keyword used to define a function
- **print** is a function that prints to the screen

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Why do we make art & music & crafts?

Andrew Fowlie

Big Tech says ...

It's not really enjoyable to make music now ...
it takes a lot of time, it takes a lot of practice, you
have to get really good at an instrument ...
I think the majority of people don't enjoy the majority
of time they spend making music

CEO of Suno AI, Gen AI for Music

Why do we make art & music & crafts?

01.

Does creative expression exists in every culture?

02.

Did earliest societies value creative expression?

03.

Is "Every child is an artist"?

04.

Is creativity part of humanity?

Do you create?

- Did you ever do a craft?
- Do you ever play music?
- Do you ever make art?
- Do you ever sing?

Why do we do these things?

Cave painting of rhinos, France, 35,000 years old

Shell carvings, Netherlands, 500,000 years old.

As old as humanity

Art fond everywhere
humans are found

Aboriginal art (Women
Gathering At Waterholes
By Merryn Apma Daley)

"Every child is an artist"

A famous quote by Pablo Picasso. What you think he meant?

Have you observed even babies making music, banging things as though they were drums and giggling?

Why do we value children's art if it isn't very "professional"? Gen AI can make more professional looking pictures

Think again

- Did you ever do a craft?
- Do you ever play music?
- Do you ever make art?
- Do you ever sing?

Why do we do these things?

Why do we make art & music & crafts?

01.

Evidence that creative expression exists in every culture?

02.

Evidence that earliest societies valued creative expression

03.

"Every child is an artist"? - think about your own experiences

04.

Human creativity is part of humanity

Don't give it away to tech bros