Complete Search

Sometimes you just have to check every single thing....

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Pro Tip

- Get a good note-taking system that can last you for life. I recommend logseq or obsidian.
- When you discover how to solve a problem on the job, write up what you did in your system.
Objectives

- Explain how complete search (a.k.a. brute force) is different from Monte Carlo.
- Use complete search to solve the \( \pi \) problem from last time.
- Use complete search to solve the \( n \) queens problem.
Complete Search

▶ Sometimes called “brute force”.
▶ Concept: “search space”.
  ▶ Physical space is a metaphor for “the things you need to check”.
  ▶ Anyone here know about FFT?
Problem 1 — $\pi$

Let’s use Python to compute the value of $\pi$ like before, but this time do it by iterating over the points instead of using randomness. Use `linspace`, `meshgrid`, and `count_nonzero`
Problem 2 — \( n \) queens

- Given a chessboard of size \( n \times n \), can you put \( n \) queens on the board?
  - Remember a queen can attack horizontally, vertically, and diagonally.

```
 X  X
X  X  X
X  Q  X  X  X
X  X  X
 X  X
```

- Try to put a queen in each column so that no two queens can attack each other. Example of \( 4 \times 4 \) board:
```
 Q
 Q
 Q
 Q
```