5th Oct 2020

Studio 8
Mutable Things!

CS1101S AY20/21 SEM 1
Studio 03A

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Studio 8

Agenda

- Recap:
  - Stateful programming
  - Mutable data
- Robotics Mission

Recap

Recap: States

Recap
States

- What are states?
  - Previously you've learnt about constants:
    - Single-state
    - No past, no future :') , only the present
  - With states:
    - Need to account for past, present, and future!

Recap
States

- You’ve learn about constant declaration
- Now face the variable declaration!
  - `const name = expression;  // constant declaration`
  - `let name = expression;    // variable declaration`
- Similar, but variables are “variable”…

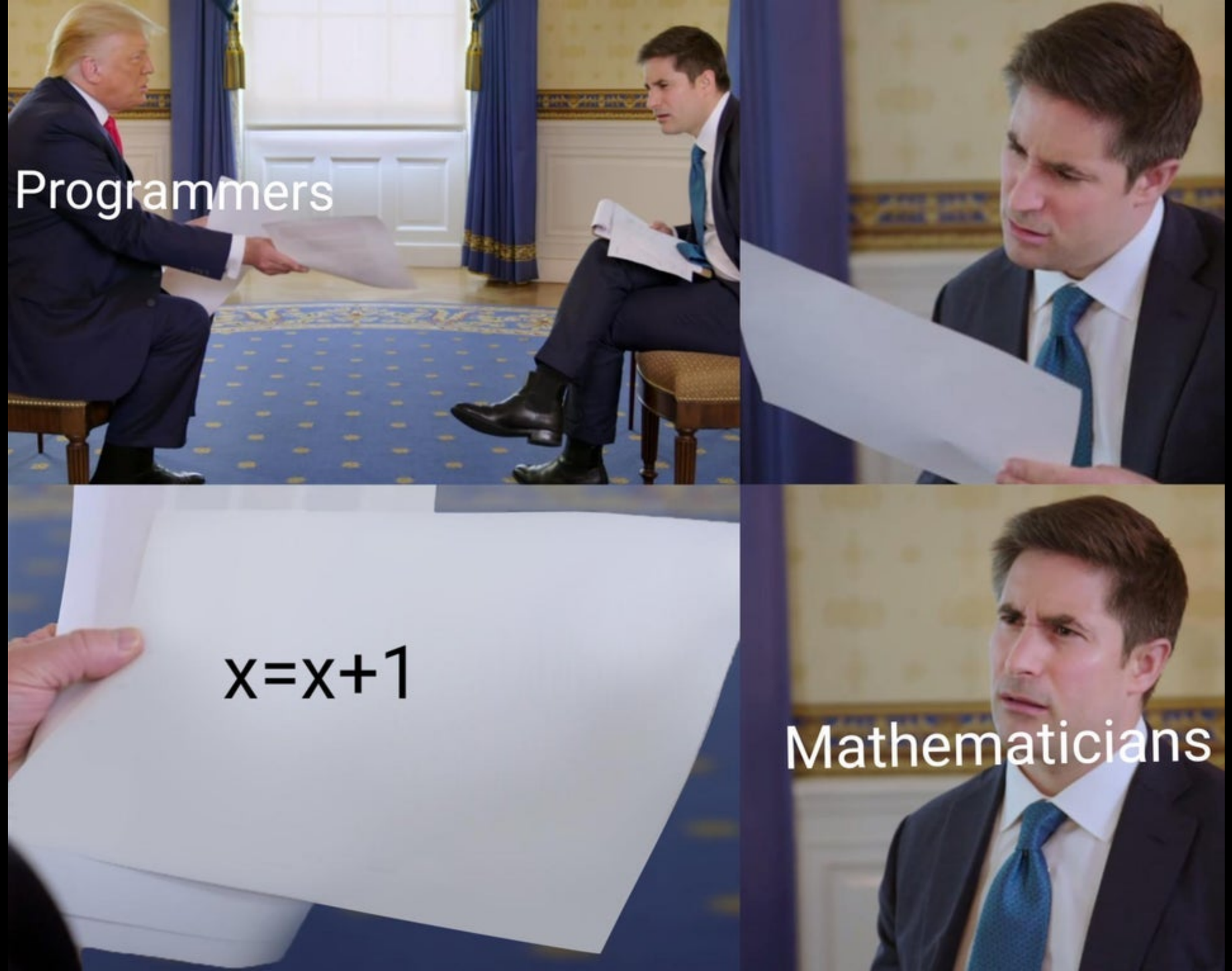
Recap: Mutable Data

Recap
Mutable Data

- Example:
  - `let x = 1;  // declaration`
  - `x = 2;      // assignment (again)`
- Now, x holds the value of 2!

Recap
Mutable Data

- Another example:
  - `let x = 1;  // declaration`
  - `x = x + 1;  // assignment (again)`
- Now, x holds the value of 2!
  - Substitute the original value of x,
  - Add 1,
  - Re-assign the value back into x.



credits:
rProgrammerHumor

Recap
Mutable Data

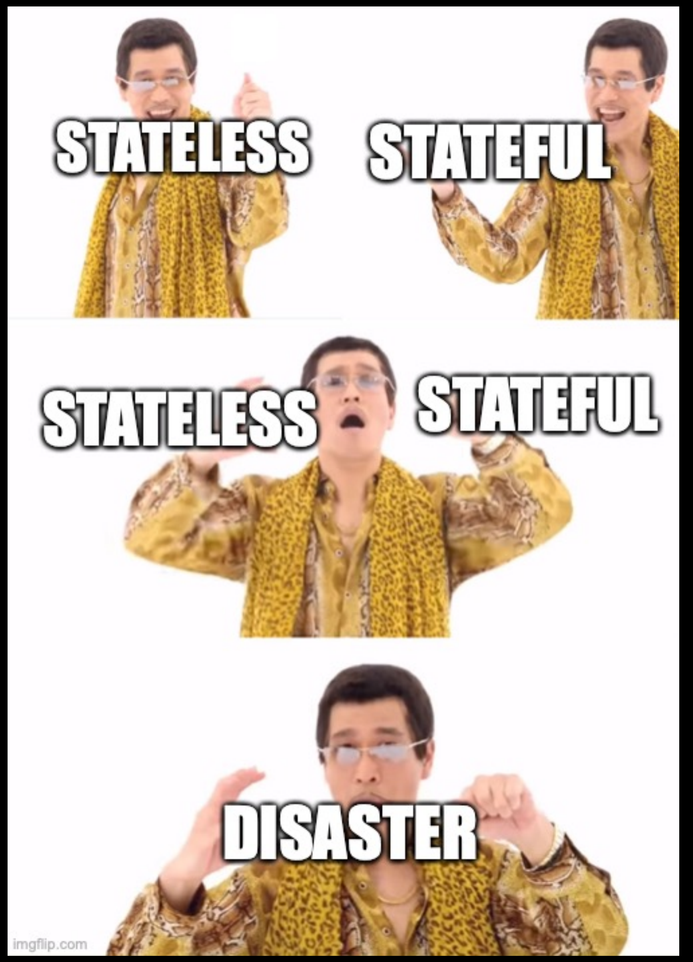
- New intuition:
  - Variables are “containers”
  - Holds some value
  - You can change what’s inside the container

Recap
Mutable Data

- Pair mutators
  - Change head and tail of pair:
    - `set_head(p, x)  // changes head of p to x`
    - `set_tail(p, x)  // changes tail of p to x`
  - Warning:
    - Destructive!

Recap
Mutable Data

- Warning:
  - Destructive!
  - Recall: duplicating lists and pairs
  - With pair mutators, we don’t need that anymore



Recap
Mutable Data

- Example from lecture:
  - `const a = list(1, 2, 3);`
  - `set_tail(tail(tail(a)), a);`
  - `length(a);  // too much recursion!`
  - `// but i like recursion :(`

So What?

Recap
So What?

- With states, we can achieve a lot of things:
  - Loops: something like iterative processes but easier to visualise(?)
  - Updating variables without function calls
  - New data structure: arrays
  - Better algorithms: faster implementation of binary search and quick sort

Any questions?

End of Recap

Work on your robot!

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