{JIT} ⟶ JUST-IN-TIME COMPILERS

JAVASCRIPT
ENGINE

+ MONITOR/
  PROFILER
  (frequency and type)

WARM

VERY HOT

INTERPRETER

BASELINE COMPILER

OPTIMISED COMPILER

Segment becomes WARM after running a few times.

Segment becomes hot when running too frequently

Creates a faster version of the code

+
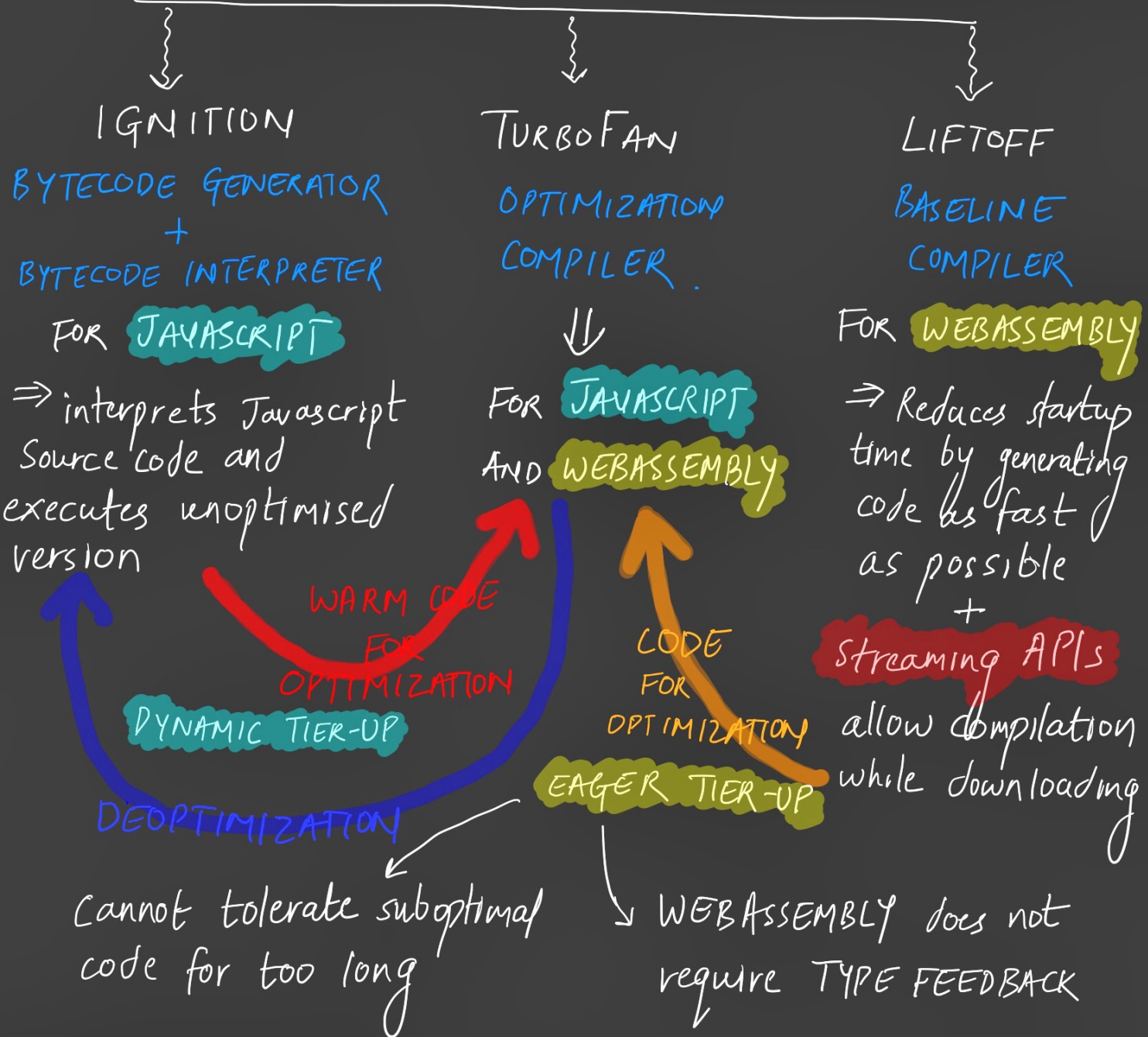Assumptions!

EXAMPE OF OPTIMIZATION

↓

TYPE SPECIALIZATION

Compiled to Stubs.
(Line number + Variable type)

MULTIPLE FOR MANY TYPES

Deoptimization
(Can be slower if happens too frequently)

V8 ⟶ GOOGLE'S OPEN SOURCE HIGH PERFORMANCE JAVASCRIPT AND WEBASSEMBLY ENGINE

IGNITION
BYTECODE GENERATOR
+
BYTECODE INTERPRETER
FOR JAVASCRIPT

⇒ interprets Javascript Source code and executes unoptimised version

TURBOFAN
OPTIMIZATION COMPILER
⇓
FOR JAVASCRIPT AND WEBASSEMBLY

WARM CODE FOR OPTIMIZATION
DYNAMIC TIER-UP

CODE FOR OPTIMIZATION
EAGER TIER-UP

LIFTOFF
BASELINE COMPILER
FOR WEBASSEMBLY

⇒ Reduces startup time by generating code as fast as possible
+
Streaming APIs allow compilation while downloading

DEOPTIMIZATION

Cannot tolerate suboptimal code for too long

⟶ WEBASSEMBLY does not require TYPE FEEDBACK

EAGER TIER-UP: After LIFTOFF compilation finishes, engine starts background threads to generate optimized code for the module

QUICK START + OPTIMIZED PERFORMANCE