

Extending prerendered-interface voting software to support accessibility and other ballot features

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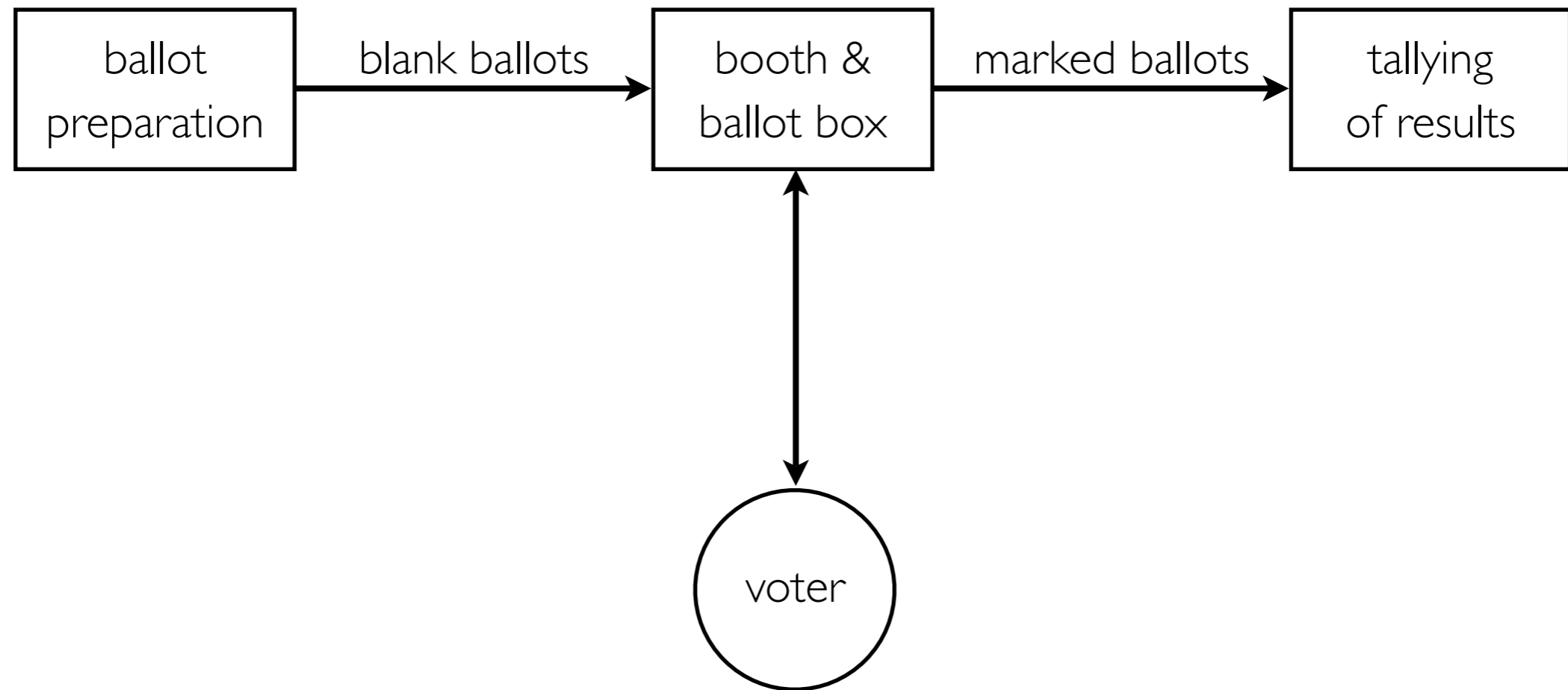
1. The prerendered-interface paradigm

2. Pvote demonstration

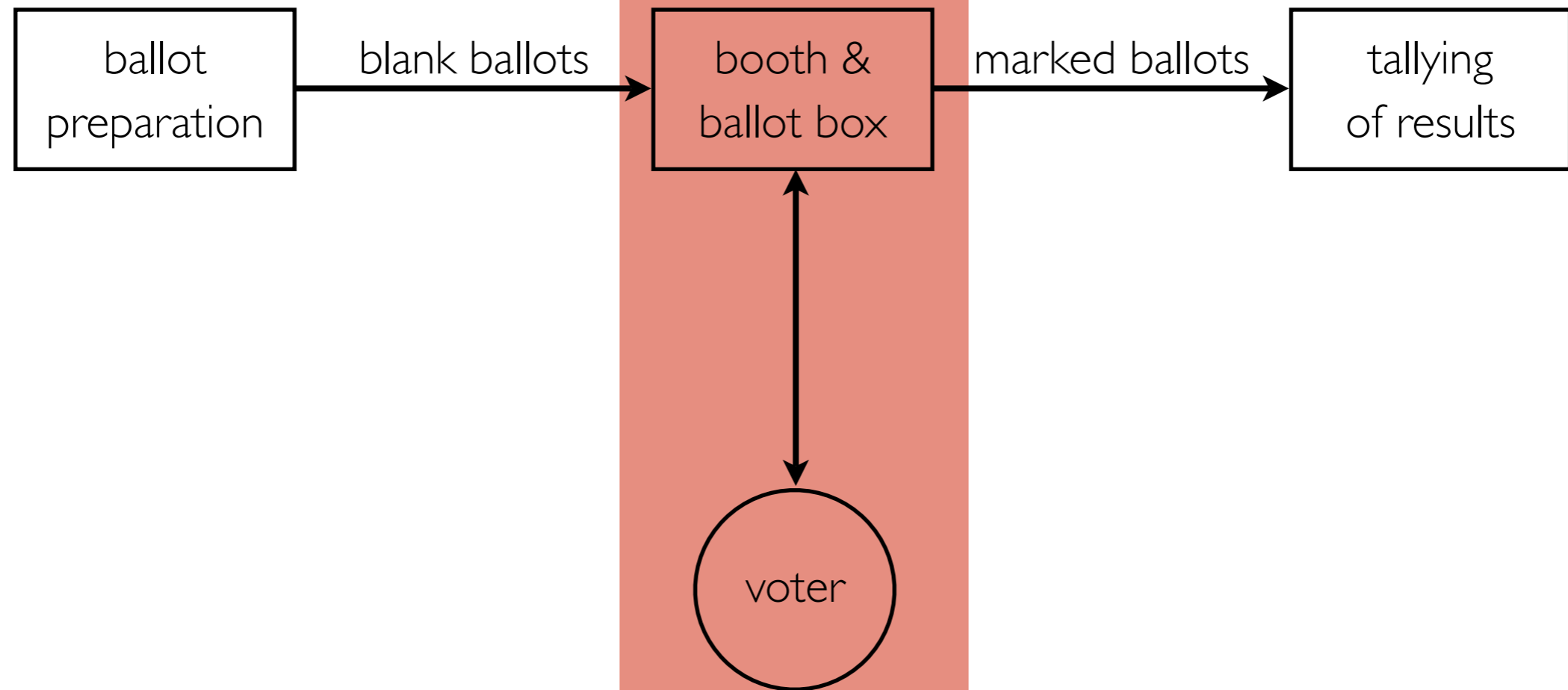
3. Design

4. Complexity and assurance

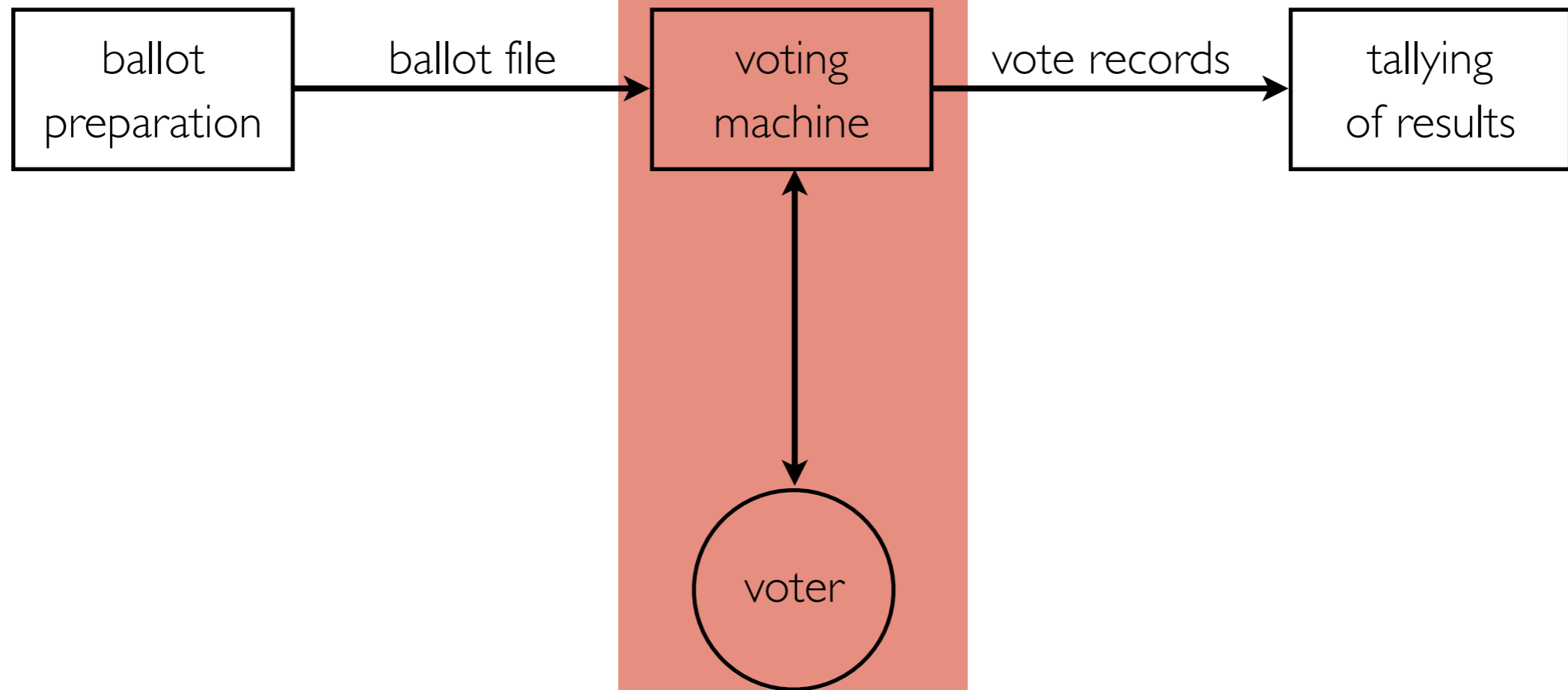
voting on paper



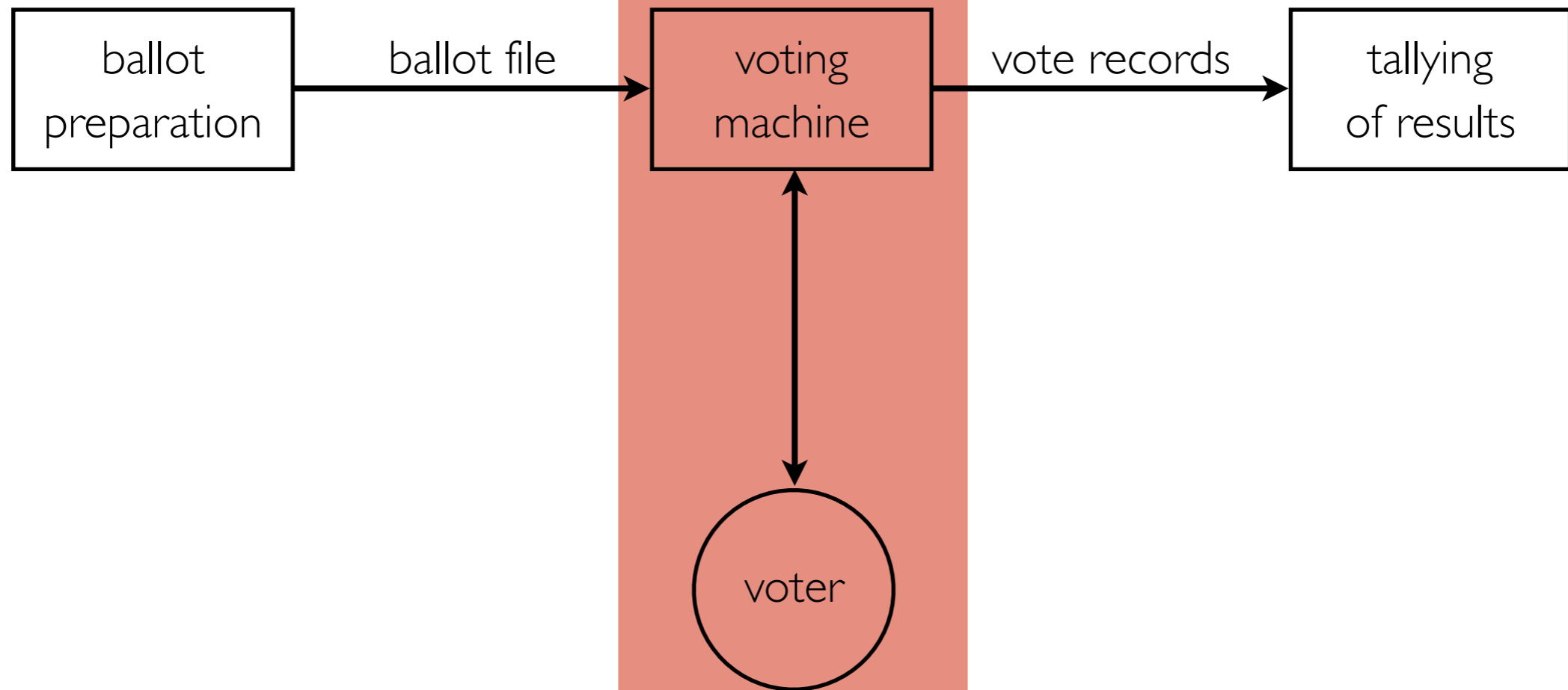
voting on paper



voting by machine



voting by machine



voting

machine

assurance = ?

voting

machine

assurance = disclosure?

voting

machine

assurance = disclosure?

voting

machine

assurance = disclosure + review

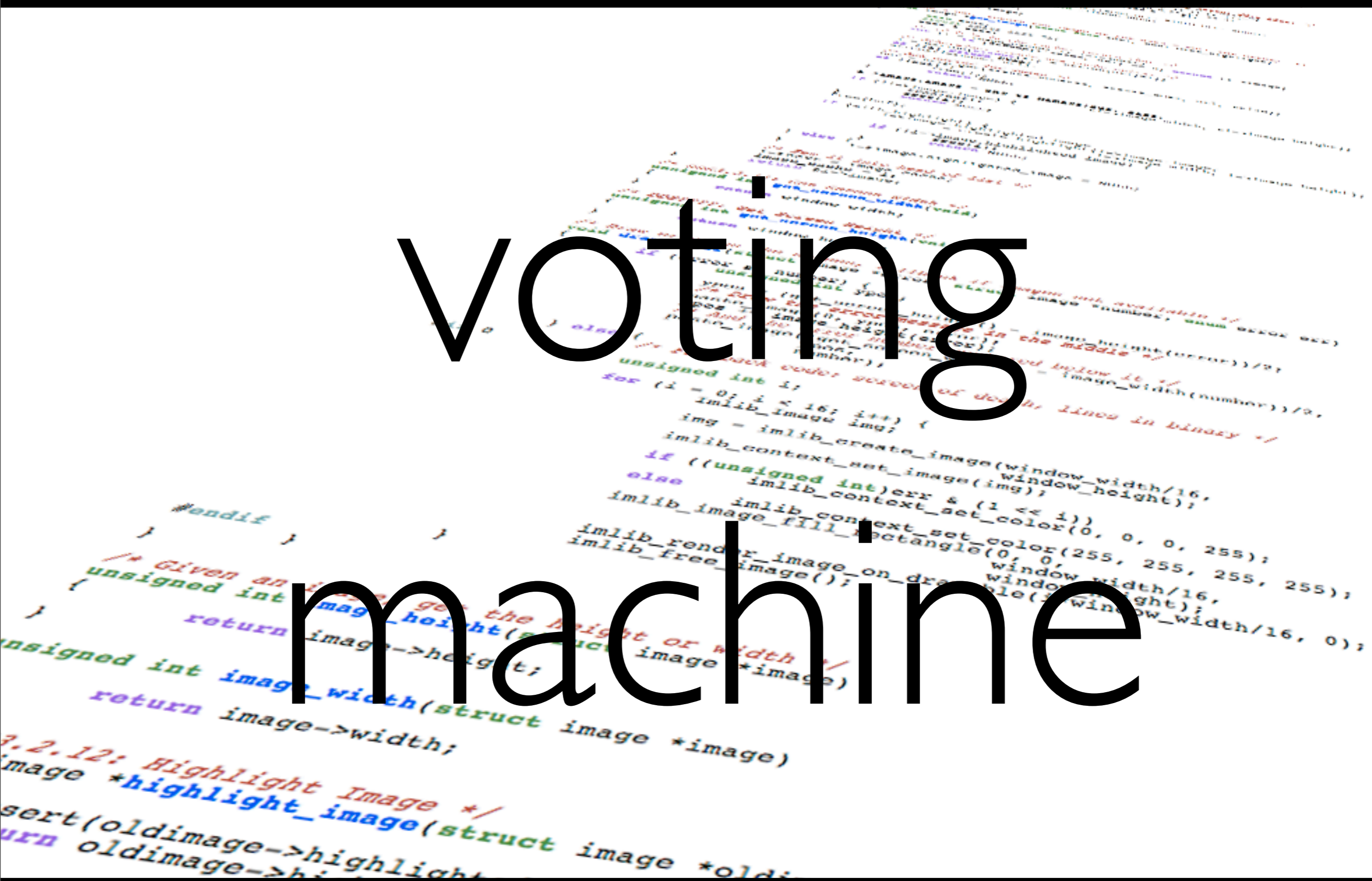
voting

machine

assurance = disclosure + review

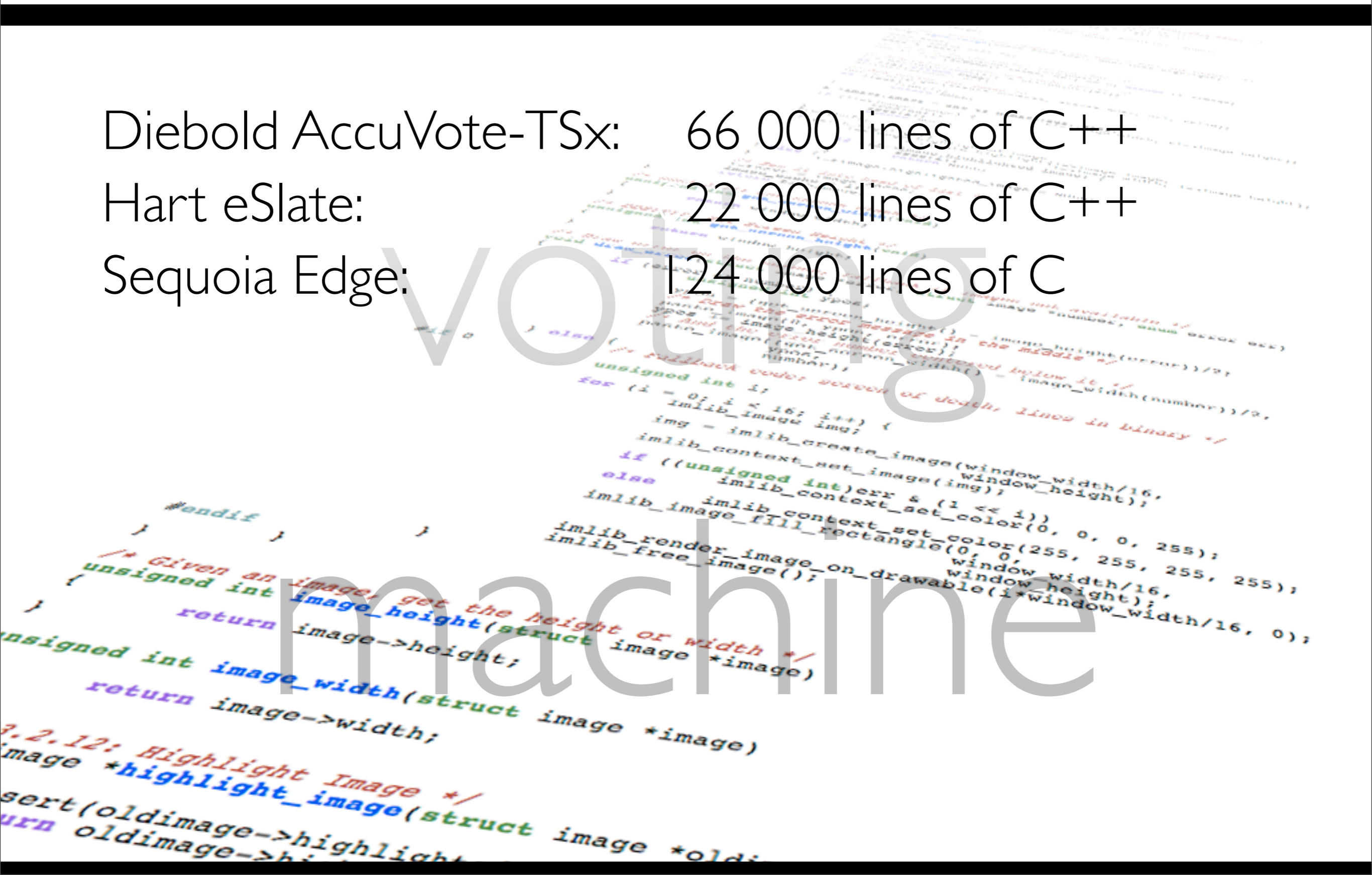
voting

machine

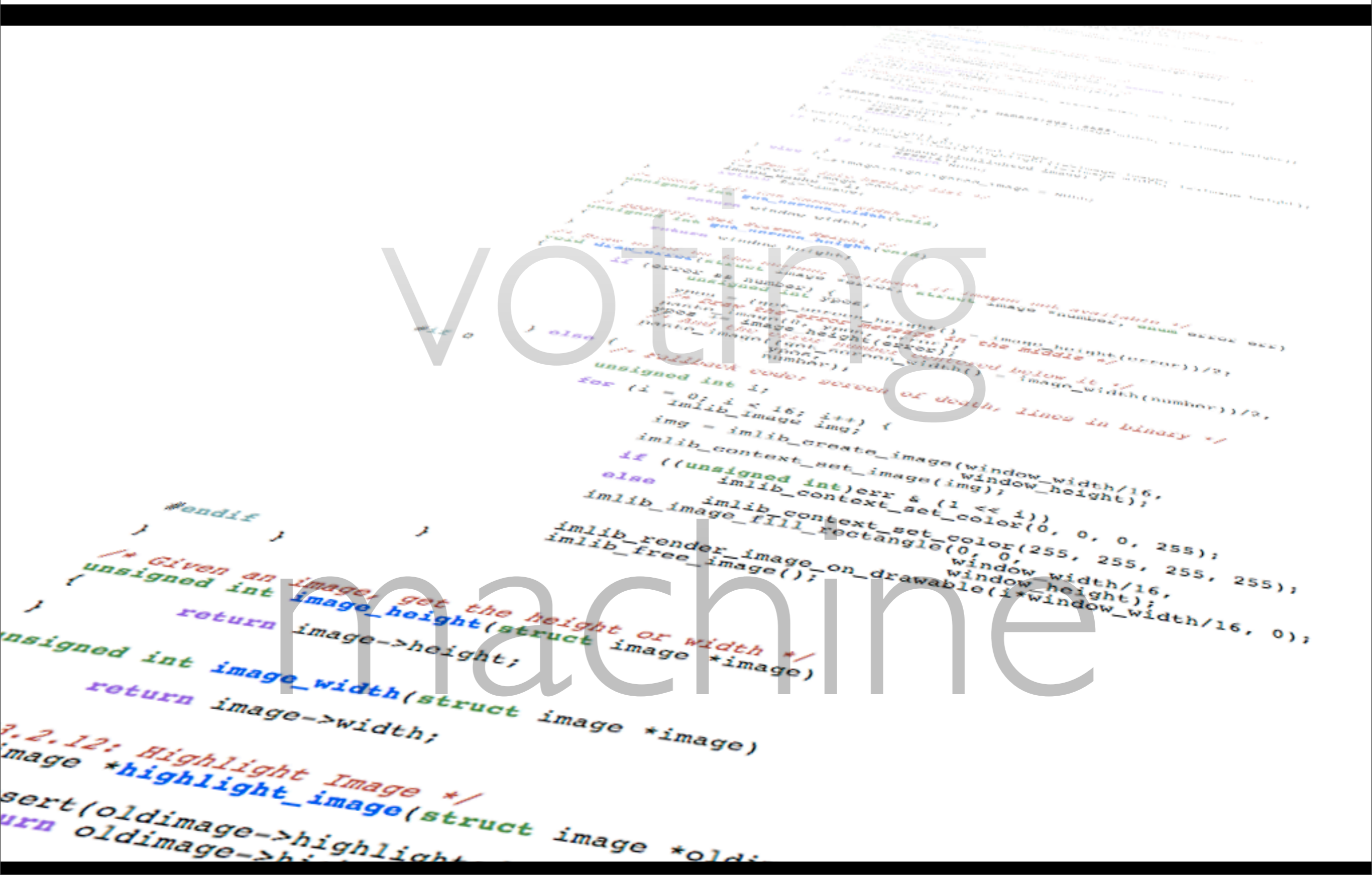


assurance = disclosure + review

Diebold AccuVote-TSx: 66 000 lines of C++
Hart eSlate: 22 000 lines of C++
Sequoia Edge: 124 000 lines of C



assurance = disclosure + review



assurance = disclosure + review

language
handling

widget
look & feel

vote storage
logic

text layout
& rendering

graphics
drawing

device
drivers

font data

selection & interaction logic

assurance = disclosure + review

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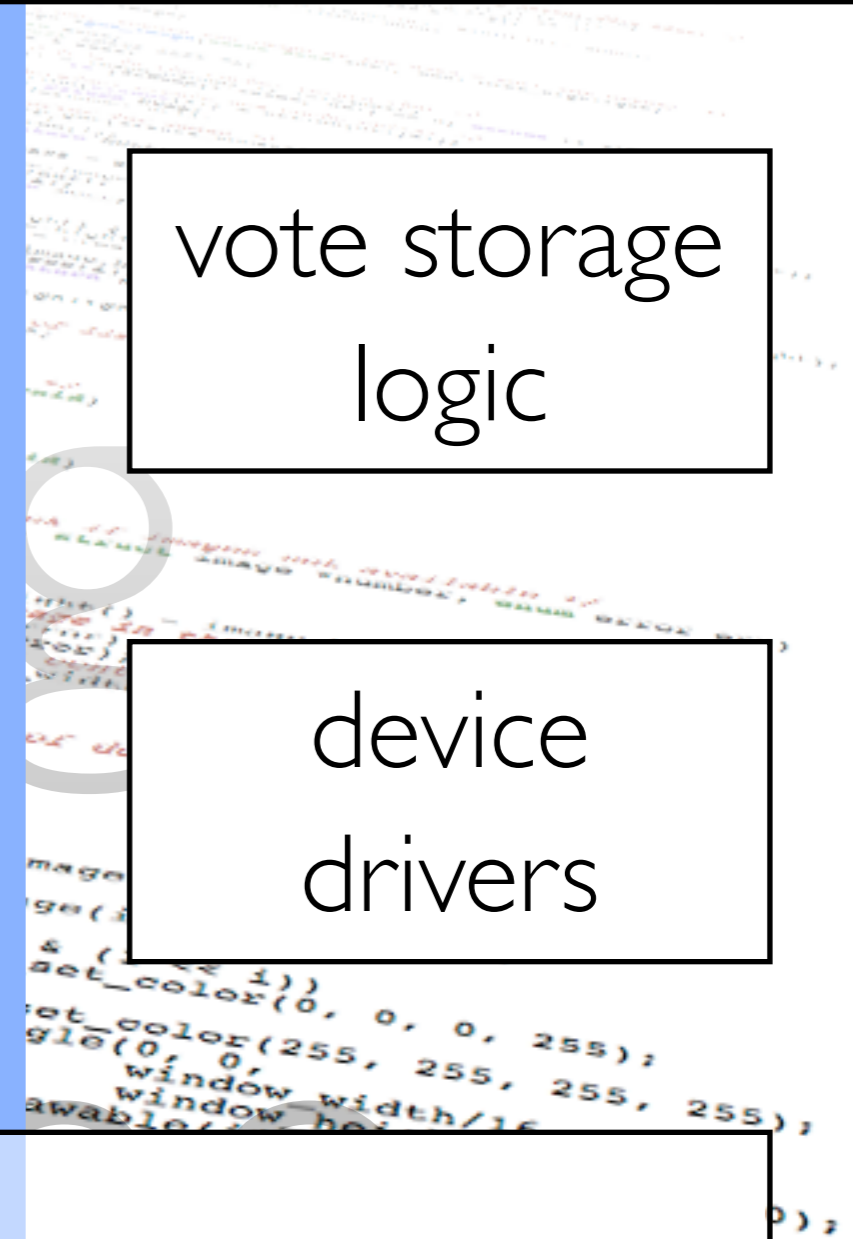
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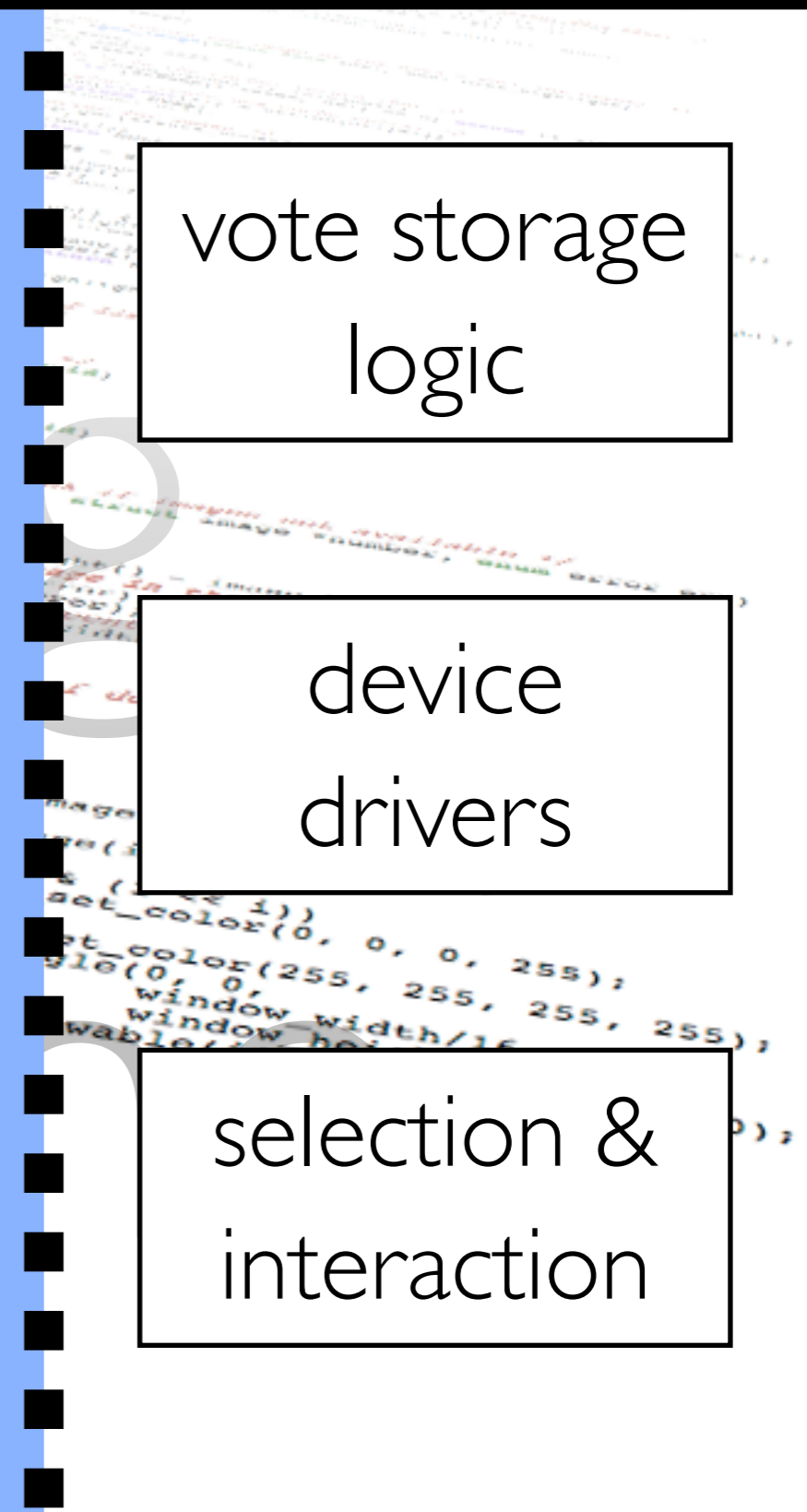
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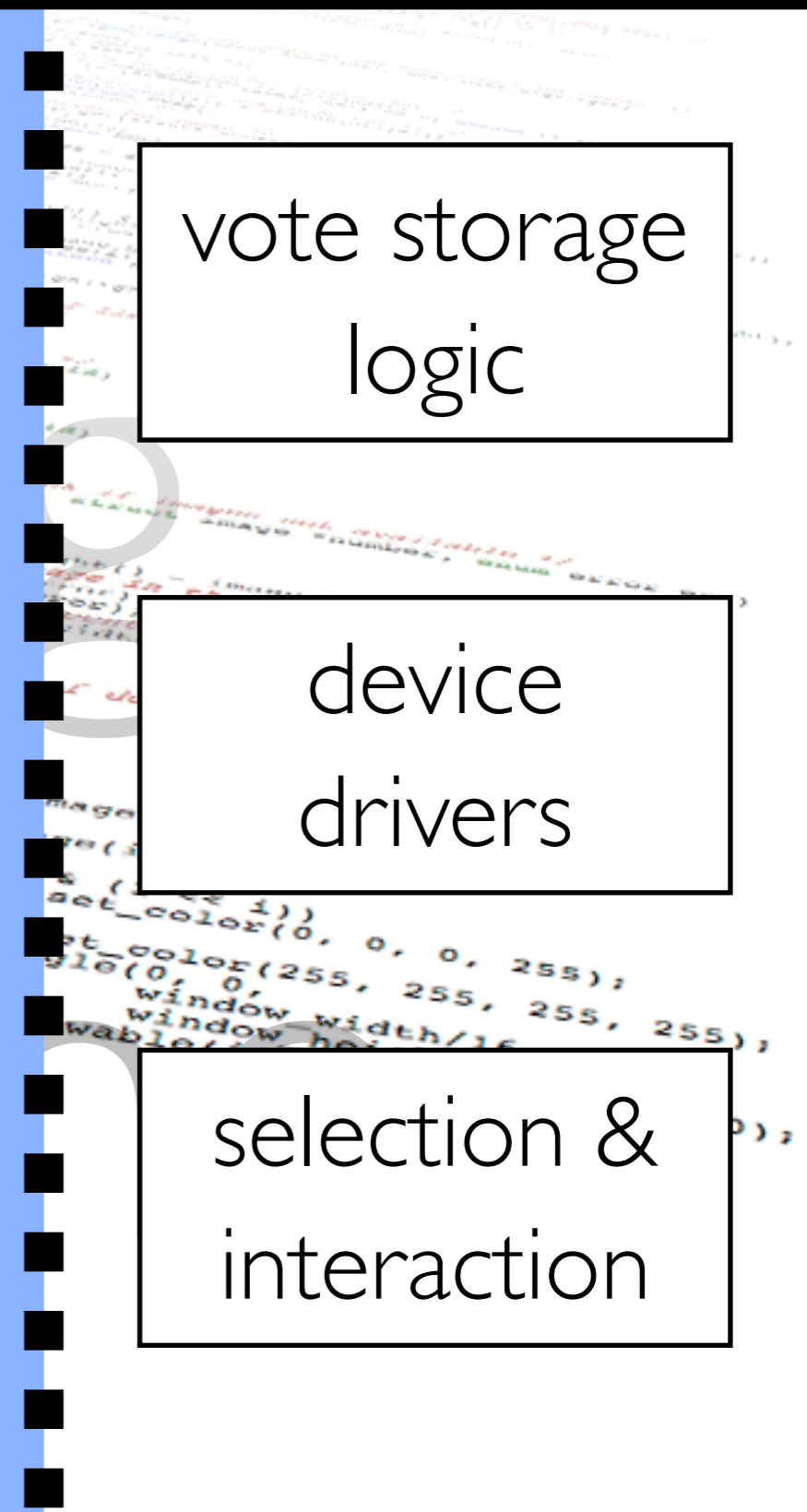
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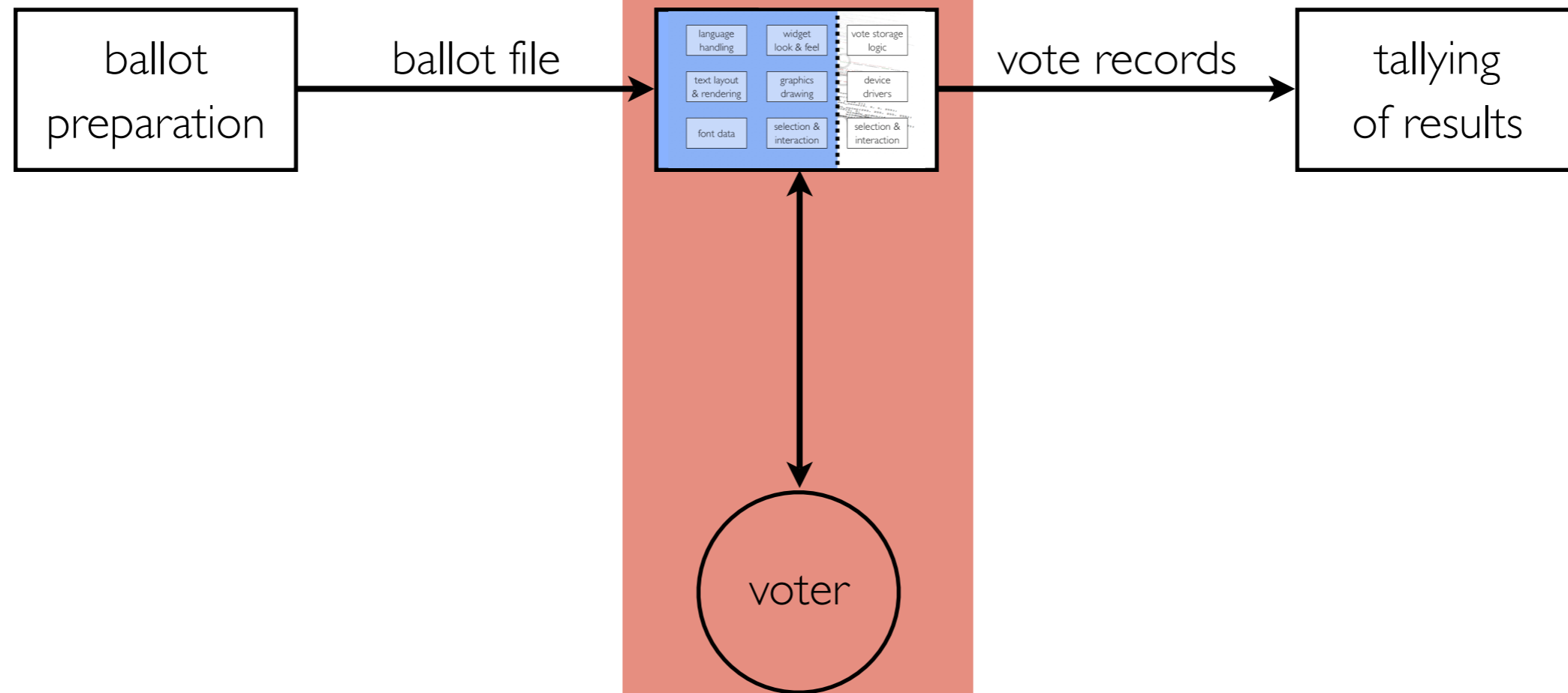
font data

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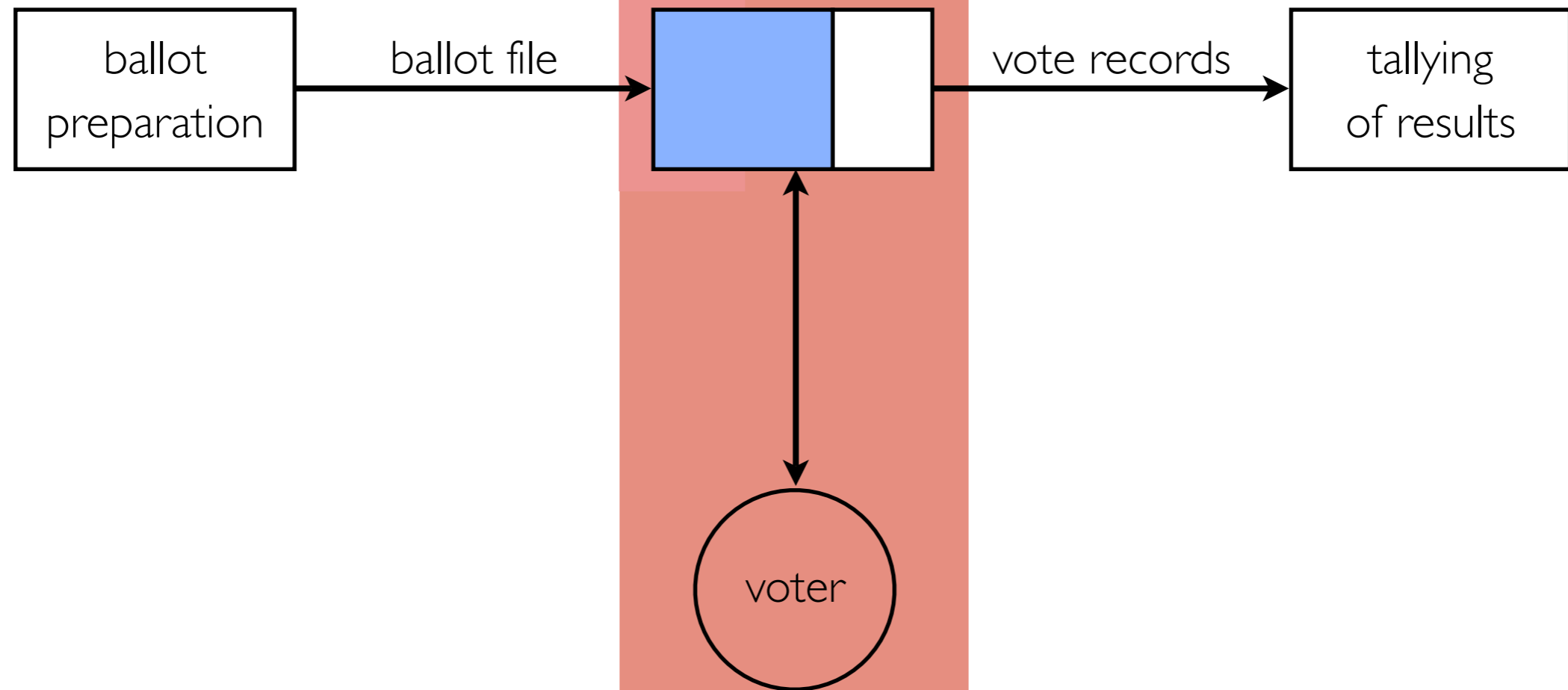
selection &
interaction



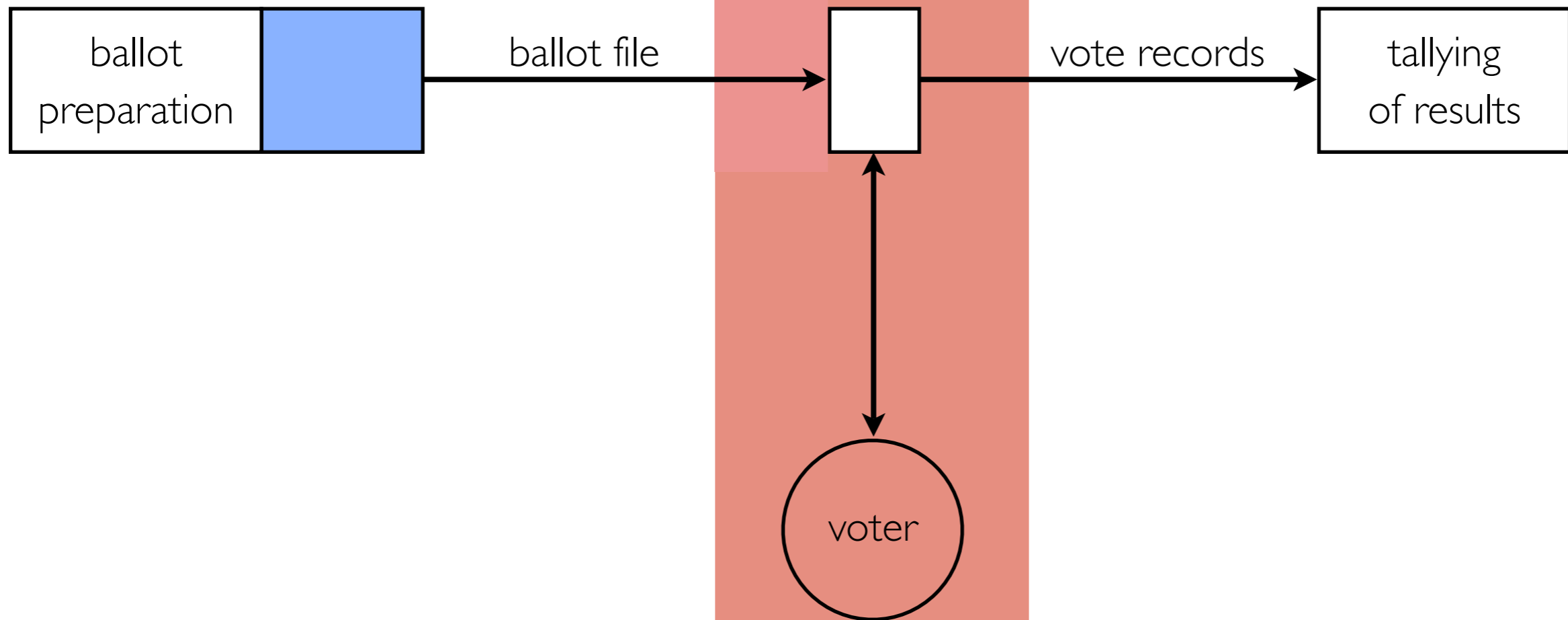
voting by machine



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Pvote:	460 lines of Python
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multimodal interface:

output {
audio only
video only
synchronized audio + video

input {
touchscreen
buttons / keys
assistive devices

vote for one of n

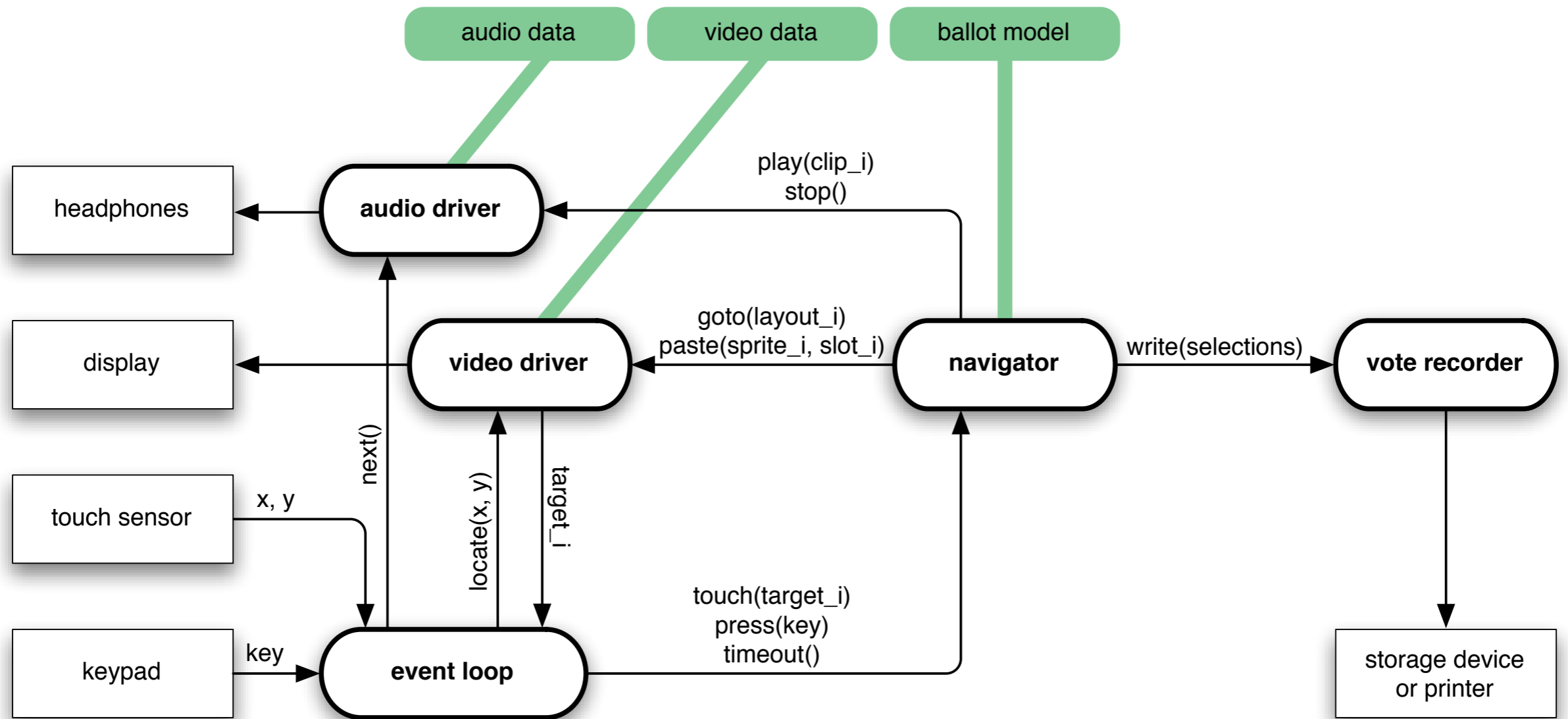
373 ballots

vote for one of n	373
vote for up to k of n	195
vote yes or no	251
ranked choice (up to 3)	7
write-in candidate	318
straight-party vote	60
cross-endorsed candidates	8
multi-party primary	5
party logo images	21
ideographic languages (CJK)	48
multiple languages	53

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all supported
by Pvote



one-way data flow →

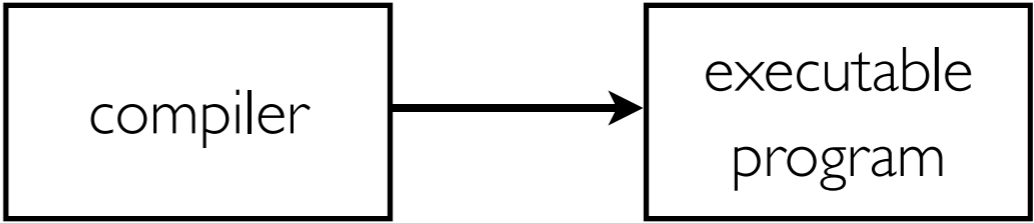
ballot definition

software module

hardware device

program

executable
program



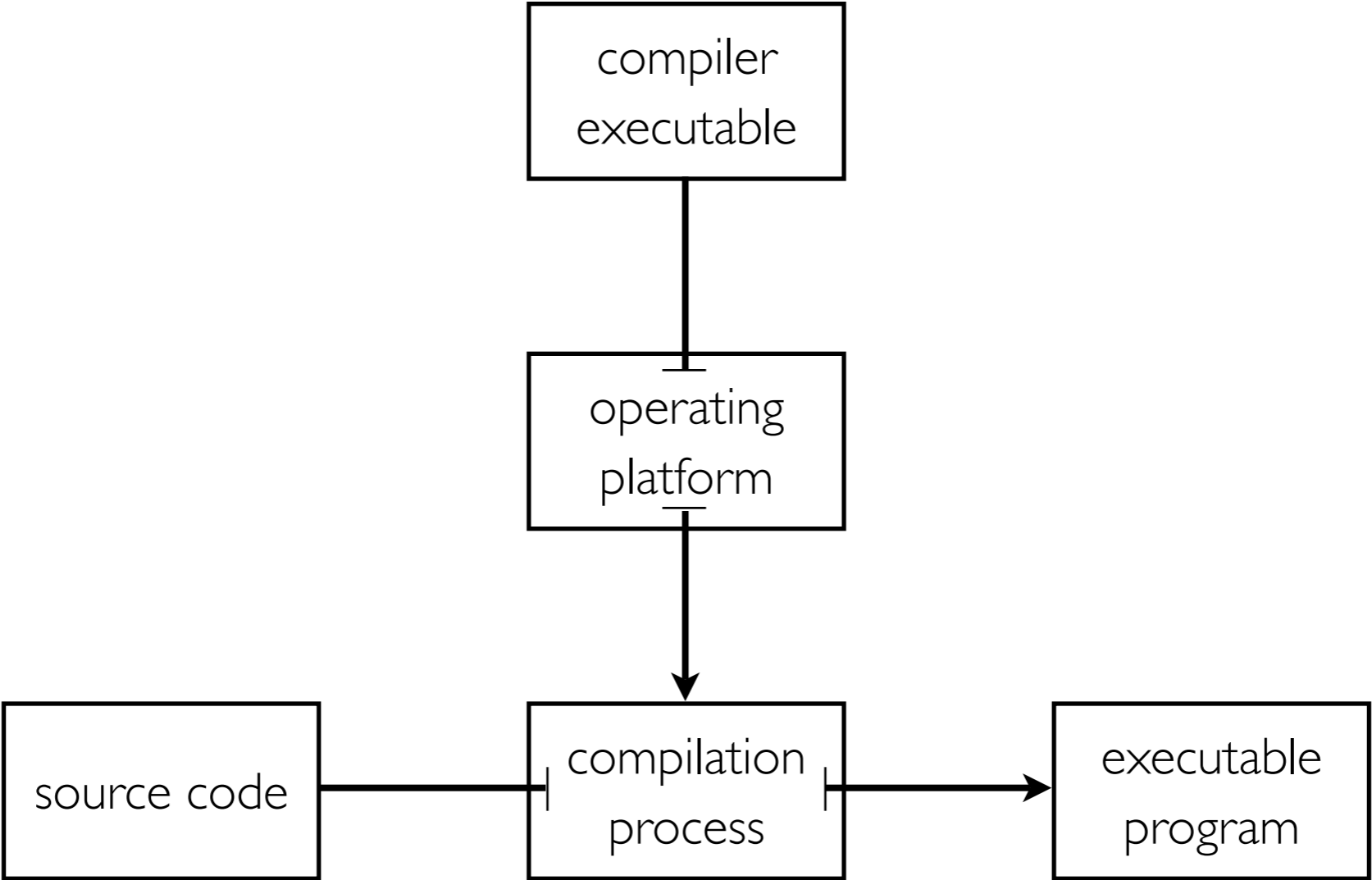
source code

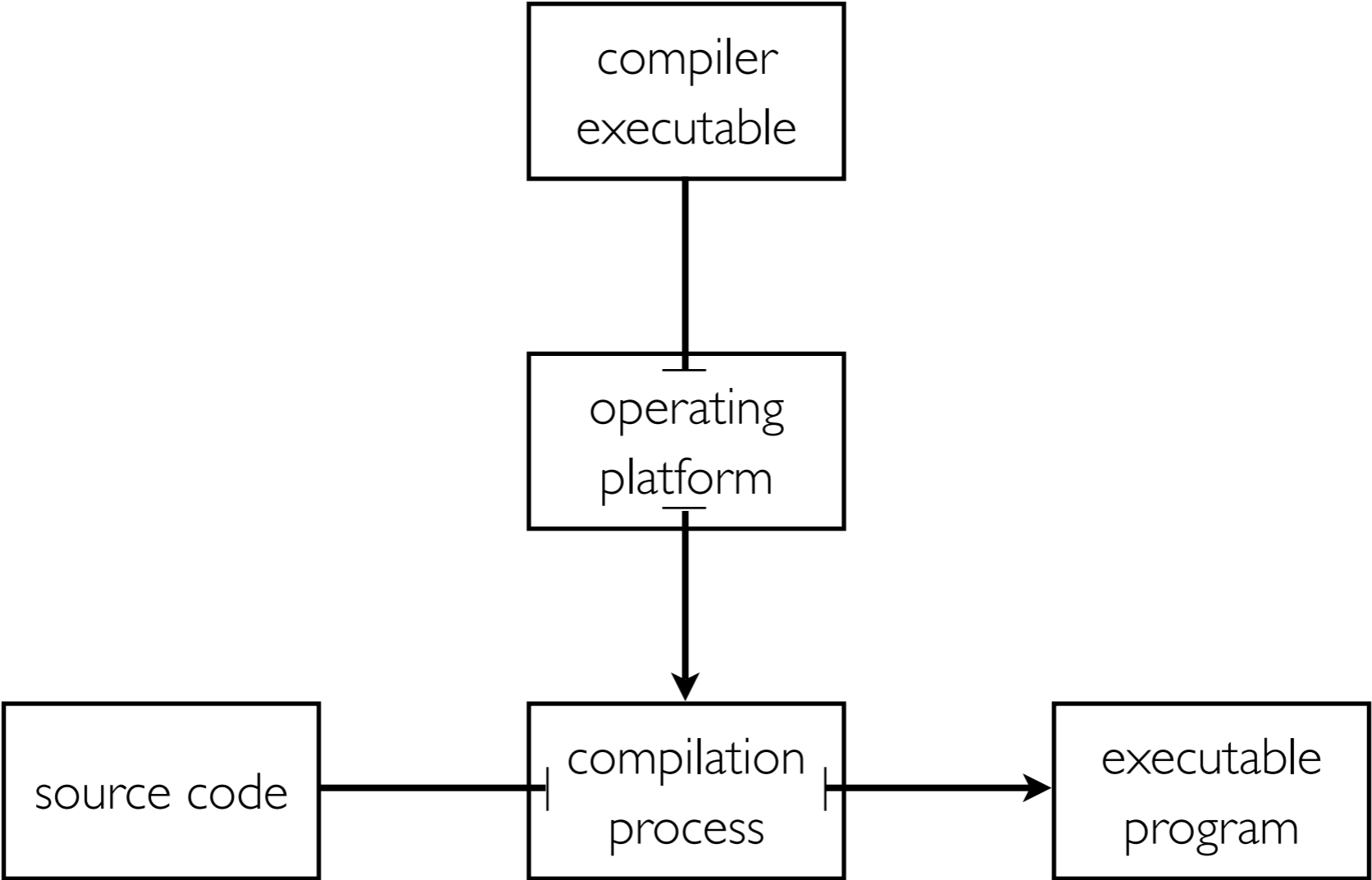
compiler

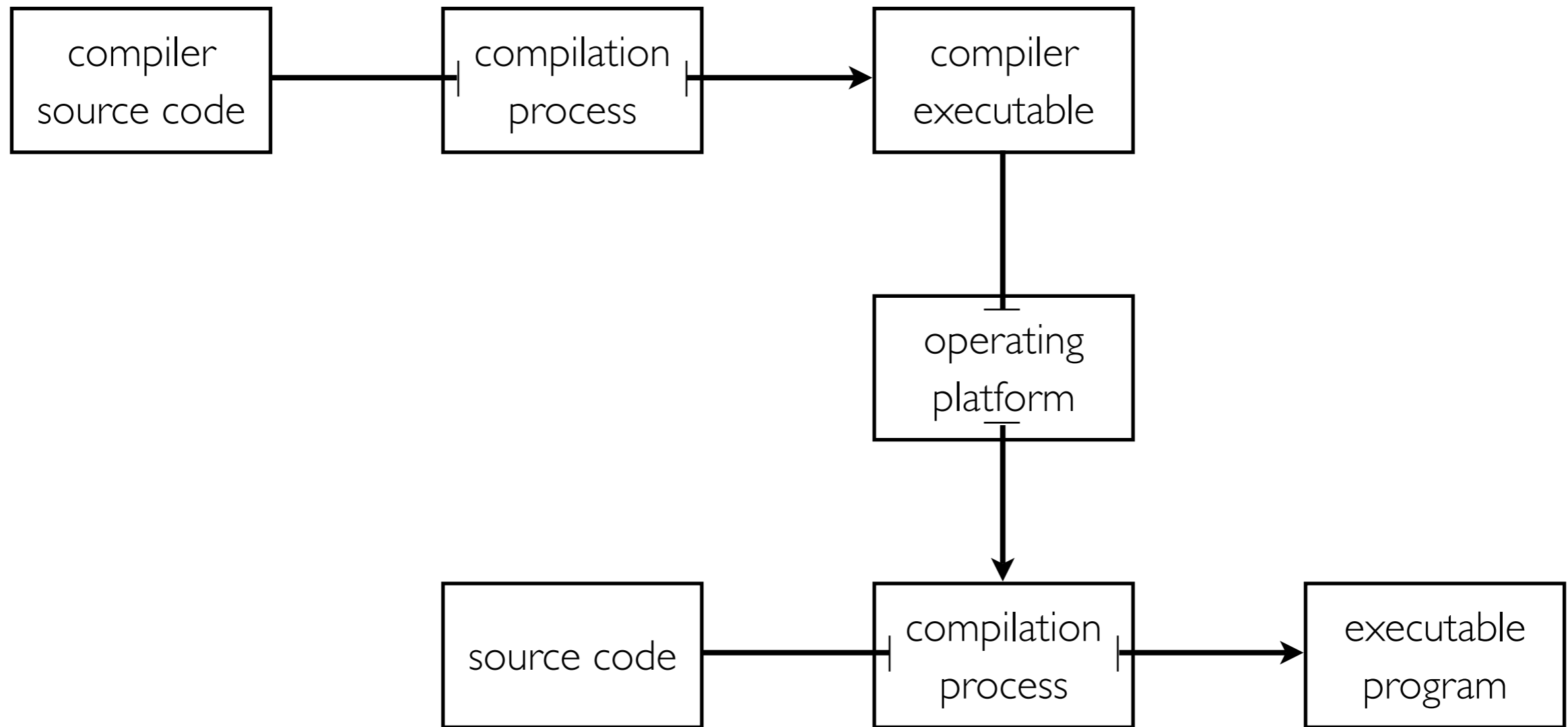
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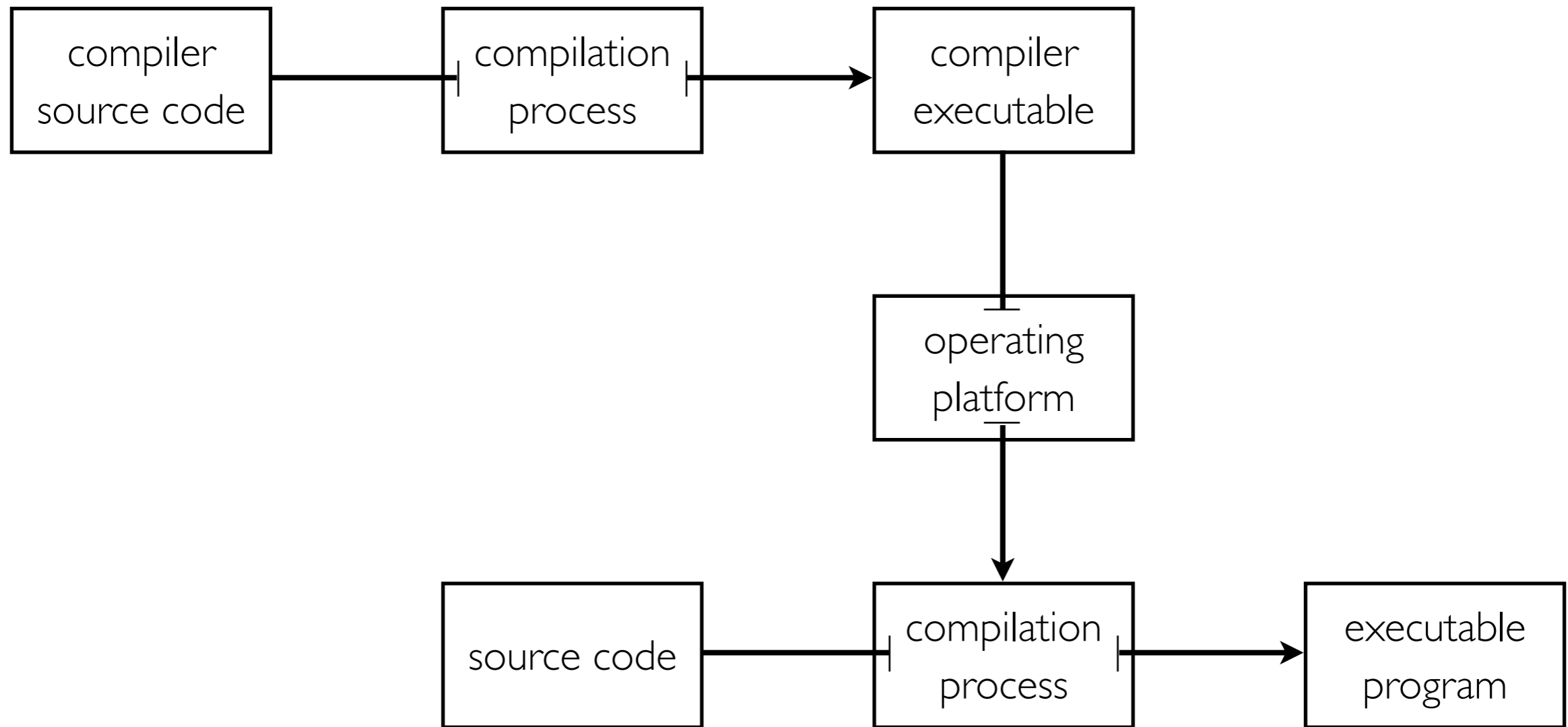


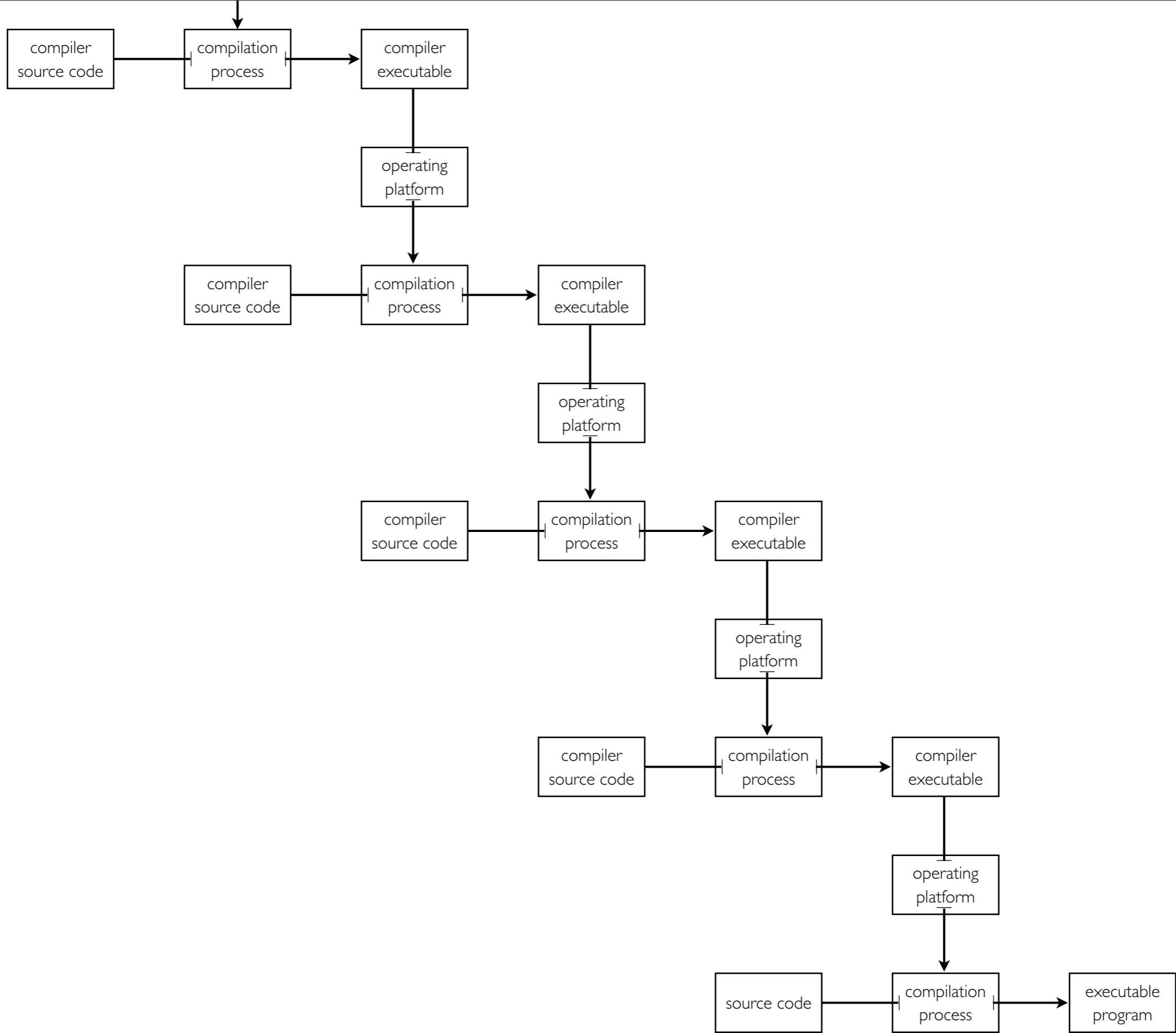












voting user
experience

ballot
definition

voting program
process

voting user
experience



