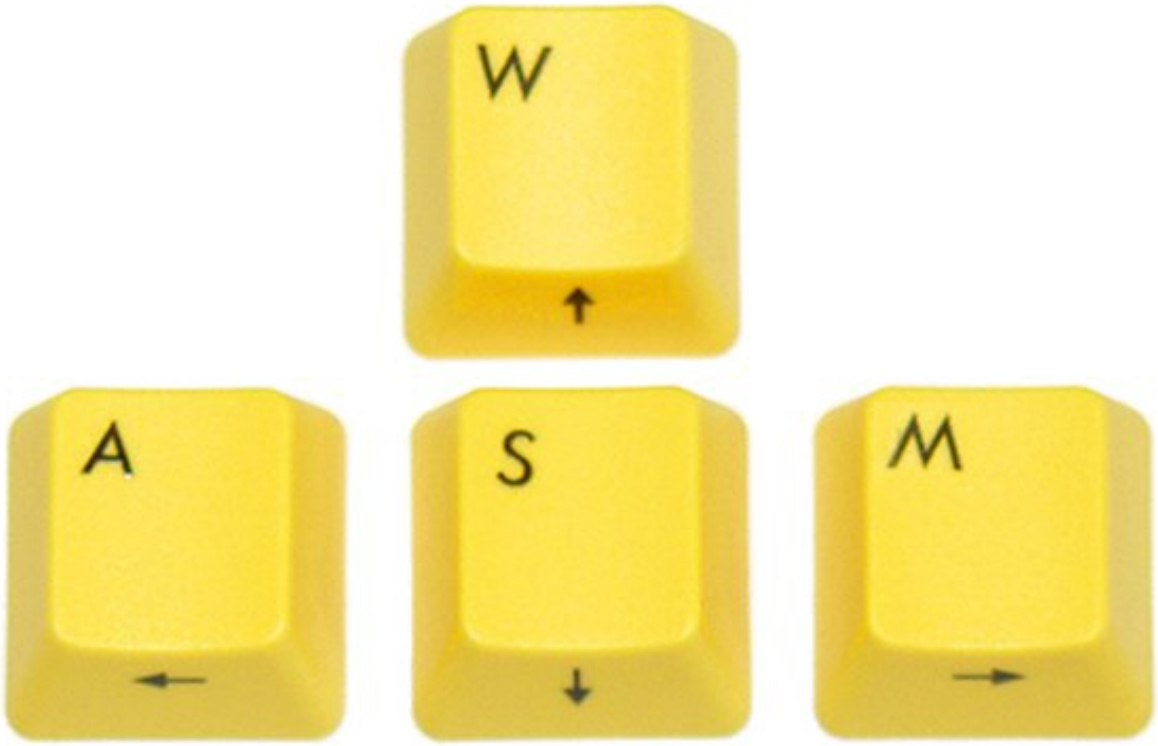

WebAssembly Specification

Release 1.0

WebAssembly Community Group

Nov 23, 2016

Contents

1 Introduction **1**

2 Concepts **3**
2.1 Overview . . . 3
2.2 Conventions . . . 3
2.3 Validation . . . 3
2.4 Execution . . . 3
2.5 Binary Format . . . 4

3 Modules **5**
3.1 Overview . . . 5
3.2 Instantiation . . . 5
3.3 Invocation . . . 5
3.4 Type Section . . . 5
3.5 Import Section . . . 5
3.6 Function Section . . . 6
3.7 Table Section . . . 6
3.8 Memory Section . . . 6
3.9 Global Section . . . 6
3.10 Export Section . . . 6
3.11 Start Section . . . 6
3.12 Element Section . . . 7
3.13 Code Section . . . 7
3.14 Data Section . . . 7
3.15 User Section . . . 7
3.16 Summary: Abstract Grammar of Modules . . . 7
3.17 Summary: Validation of Modules . . . 7
3.18 Summary: Execution of Modules . . . 8
3.19 Summary: Binary Encoding of Modules . . . 8

4 Instructions **9**
4.1 Overview . . . 9
4.2 Control Instructions . . . 10
4.3 Variable Instructions . . . 10
4.4 Parametric Instructions . . . 10
4.5 Numeric Instructions . . . 10
4.6 Memory Instructions . . . 10
4.7 Instruction Sequences . . . 10
4.8 Summary: Abstract Grammar of Instructions . . . 11
4.9 Summary: Validation of Instructions . . . 11
4.10 Summary: Execution of Instructions . . . 11
4.11 Summary: Binary Encoding of Instructions . . . 11

5 Appendix: Formal Properties 13

6 Appendix: Validation Algorithm 15

Index 17

CHAPTER 1

Introduction

Todo

All there is to say

CHAPTER 2

Concepts

2.1 Overview

Todo

Describe

2.2 Conventions

Todo

Describe

Testing math: $C \vdash e^* : t^*$ defined for C by

$$\frac{C \vdash e^* : t_1^* \to t_2^*}{C \vdash \mathsf{func}\ tf\ \mathsf{local}\ t^*\ e^*}$$

and bla.

2.3 Validation

Todo

Describe

2.4 Execution

Todo

Describe

2.5 Binary Format

Todo

Describe

CHAPTER 3

Modules

3.1 Overview

Todo

Describe general structure of modules

3.2 Instantiation

Todo

Describe the semantics of module instantiation

3.3 Invocation

Todo

Describe the semantics of invoking exports

3.4 Type Section

Todo

Describe

3.5 Import Section

Todo

Describe

3.6 Function Section

Todo

Describe

3.7 Table Section

Todo

Describe

3.8 Memory Section

Todo

Describe

3.9 Global Section

Todo

Describe

3.10 Export Section

Todo

Describe

3.11 Start Section

Todo

Describe

3.12 Element Section

Todo

Describe

3.13 Code Section

Todo

Describe

3.14 Data Section

Todo

Describe

3.15 User Section

Todo

Describe

3.16 Summary: Abstract Grammar of Modules

Todo

Grammar summary

3.17 Summary: Validation of Modules

Todo

Summary of typing rules

3.18 Summary: Execution of Modules

3.18.1 Instantiation

Todo

Summary of instantiation rules

3.18.2 Invocation

Todo

Summary of invocation rules

3.19 Summary: Binary Encoding of Modules

Todo

Encoding summary

CHAPTER 4

Instructions

4.1 Overview

Todo

Describe

4.2 Control Instructions

4.2.1 Block Instructions

4.2.2 Branch Instructions

4.2.3 Call Instructions

4.2.4 Miscellaneous Control Instructions

4.3 Variable Instructions

4.4 Parametric Instructions

4.5 Numeric Instructions

4.5.1 Numeric Instructions

4.5.2 Integer Test Instructions

4.5.3 Integer Comparison Instructions

4.5.4 Floating Point Comparison Instructions

4.5.5 Unary Integer Instructions

4.5.6 Unary Floating Point Instructions

4.5.7 Binary Integer Instructions

4.5.8 Binary Floating Point Instructions

4.5.9 Conversion Instructions

4.5.10 Reinterpretation Instructions

4.6 Memory Instructions

4.6.1 Load Instructions

4.6.2 Memory Instructions

4.6.3 Store Instructions

4.7 Instruction Sequences

Todo

Describe

4.8 Summary: Abstract Grammar of Instructions

Todo

Grammar summary

4.9 Summary: Validation of Instructions

Todo

Summary of typing rules

4.10 Summary: Execution of Instructions

Todo

Summary of reduction rules

4.11 Summary: Binary Encoding of Instructions

Todo

Encoding summary

CHAPTER 5

Appendix: Formal Properties

Todo

Describe and sketch proof (progress, preservation, uniqueness)

CHAPTER 6

Appendix: Validation Algorithm

Todo

Describe algorithm, state correctness properties (soundness, completeness)

B

binary encoding
  instructions, 11
  modules, 8
binary format, **4**

C

code
  section, 7

D

data
  section, 7

E

element
  section, 7
execution, **3**
  exports (invocation), 8
  instructions, 11
  modules (instantiation), 8
export
  section, 6
exports
  invocation, 5, 8

F

function
  section, 6

G

global
  section, 6
grammar
  instructions, 11
  modules, 7

I

import
  section, 5
instantiation, **5**, 8
instructions, **9**
  binary encoding, 11
  execution, 11
  grammar, 11
  validation, 11
invocation, **5**, 8

M

memory
  section, 6
module
  instantiation, 5
modules, **5**
  binary encoding, 8
  code section, 7
  data section, 7
  element section, 7
  export section, 6
  function section, 6
  global section, 6
  grammar, 7
  import section, 5
  instantiation, 8
  memory section, 6
  start section, 6
  table section, 6
  type section, 5
  user section, 7
  validation, 7

N

notation, **3**

S

section
  code, 7
  data, 7
  element, 7
  export, 6
  function, 6
  global, 6
  import, 5
  memory, 6
  start, 6
  table, 6
  type, 5
  user, 7
start

section, 6

T

table
section, 6
type
section, 5

U

user
section, 7

V

validation, **3**
instructions, 11
modules, 7