

x	$::=$	$\text{ALPHANUMERIC} \mid \star\text{ALPHANUMERIC}$	<i>variables</i>
ℓ	$::=$	$\ell \mid *$	<i>labels</i>
T	$::=$	$[t, \dots]$	<i>stack</i>
t	$::=$	$\ell \times S$	<i>stack frames</i>
S	$::=$	$[s, \dots]$	<i>programs</i>
d	$::=$	$x = e \mid \text{return } x \mid \text{goto } \ell \mid \text{goto } \ell \text{ if not } x$ $\mid \text{raise } x \mid \text{catch } x$	<i>directives</i>
B	$::=$	$\{x \mapsto m, \dots\}$	<i>bindings</i>
H	$::=$	$\{m \mapsto v, \dots\}$	<i>heap</i>
v	$::=$	$\mathbb{Z} \mid [m, \dots] \mid (m, \dots) \mid B \mid F \mid M \mid \text{undefined} \mid \text{None}$	<i>values</i>
e	$::=$	$v \mid x \mid \text{def } x(x, \dots) = \{S\} \mid x(x, \dots) \mid [x, \dots] \mid (x, \dots)$	<i>expressions</i>
P	$::=$	$m \mapsto m$	<i>parental map</i>
\dot{m}	$::=$	$m \mid \eta \mid *$	<i>memory locations</i>
F	$::=$	$\langle m, \text{def } (x) \rightarrow S \rangle \mid \mathfrak{F}$	<i>general functions</i>
M	$::=$	$\langle m, m, \text{def } (x) \rightarrow S \rangle \mid \langle m, \mathfrak{M} \rangle$	<i>general methods</i>
\mathfrak{F}			<i>magic functions</i>
\mathfrak{M}			<i>magic methods</i>

Figure 1: Operational Semantics