

# LiveWeb

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$id \in \mathcal{T}$  set of identifiers

$label \in \mathcal{L}$  set of labels

$S$	$::= \overline{M}$	(Systems)
$M$	$::= \textbf{def module } id \{ \overline{Def} \}$	(Modules)
$Def$	$::=$	(Definitions)
	$\textbf{def entity } id \{ label : \mathbf{Id}, \overline{label} : \overline{BT} \} P$	(Entities)
	$\textbf{def action } id ( \overline{id} : \overline{T} ) : T \{ \overline{E} \}$	(Actions)
	$\textbf{def screen } id ( \overline{id} : \overline{T} ) \{ \overline{B} \}$	(Screens)
	$\textbf{def type } id = T$	(Types)
$BT$	$::=$	(Basic types)
	$String$	()
	$Int$	()
	$Bool$	()
	$id.\mathbf{Id}$	(Entity Key)
	$\{ id : T \mid Pr \}$	(Refinement Type)
$T$	$::=$	(Types)
	$BT$	(Basic type)
	$\{ \overline{label} : \overline{T} \}$	(Structure)
	$id$	(Type Identifier)
	$\mathbf{List} < T >$	(List)
$P$	$::=$	(Permissions)
	$\textbf{read } \overline{id} \textbf{ where } Pr$	(Read)
	$\textbf{write } \overline{id} \textbf{ where } Pr$	(Write)
$Pr$	$::= Pr \textbf{ and } Pr \mid id(Pv) \mid Pv = Pv$	(Predicates)
$Pv$	$::= id.id \mid string \mid int \mid \textbf{false} \mid \textbf{true} \mid id$	(Predicate Values)
$B$	$::=$	(Screen Blocks)
	$\textbf{br}$	(Break Line)
	$\textbf{label } E$	(Label)
	$\textbf{div } string \{ \overline{B} \}$	(Div)
	$\textbf{image } E$	(Image)
	$\textbf{link } \{ \overline{B} \} \textbf{ to } E$	(Link)
	$\textbf{iterator } ( id \textbf{ in } E ) \{ \overline{B} \}$	(Iterator)
	$\textbf{textfield } label \textbf{ with } E$	(Text field)
	$\textbf{button } E \textbf{ to } E$	(Button)
	$\textbf{option } label \textbf{ fill } label \Rightarrow label \textbf{ with } E$	(Option Select)

$Op ::= \mathbf{and} \mid \mathbf{or} \mid + \mid - \mid * \mid / \mid < \mid > \mid \leq \mid \geq \mid == \mid !=$  (Binary Operators)

$Up ::= \mathbf{not} \mid -$  (Unary Operators)

$V ::= \text{string} \mid \text{int} \mid \mathbf{false} \mid \mathbf{true} \mid id$  (Values)

$E ::=$  (Expressions)

$E Op E$	(Operation)
$Up E$	(Unary Operation)
$V$	(Value)
$\{ \overline{E} \}$	(Expression Sequence)
$\mathbf{let} id = E \mathbf{in} E$	(Variable definition)
$id := E$	(Assign)
$\mathbf{if} E \mathbf{then} E \mathbf{else} E$	(Condition)
$\mathbf{insert} E \mathbf{in} id$	(Query insert)
$\mathbf{update} id \mathbf{in} id \mathbf{with} E \mathbf{where} E$	(Query update)
$\mathbf{from} ( \overline{id \mathbf{in} id} ) \mathbf{where} E \mathbf{select} E$	(Query select)
$id ( \overline{E} )$	(Action/Screen call)
$[ \overline{E} ]$	(List)
$\mathbf{foreach} id \mathbf{in} E \mathbf{do} E$	(List Iterator)
$\{ \overline{label = E} \}$	(Structure)
$E.label$	(Field access)
$\mathbf{count} ( E ) \mid \mathbf{max} ( E ) \mid \mathbf{min} ( E )$	(Aggregation functions)
$\mathbf{str2int} ( E )$	(String to Int Conversion)
$\mathbf{assume} Pr$	(Assume Predicate)
$\mathbf{assert} Pr$	(Assert Predicate)