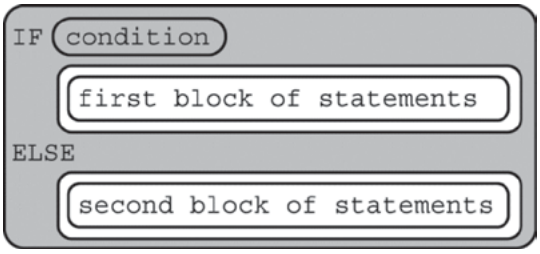
Instruction	Explanation
Assignment, Display, and Input	
Text: a ← expression Block: 	Evaluates expression and assigns the result to the variable a.
Text: DISPLAY (expression) Block: 	Displays the value of expression, followed by a space.
Text: INPUT () Block: 	Accepts a value from the user and returns it.
Arithmetic Operators and Numeric Procedures	
Text and Block: a + b a - b a * b a / b	The arithmetic operators +, -, *, and / are used to perform arithmetic on a and b. For example, 3 / 2 evaluates to 1.5.
Text and Block: a MOD b	Evaluates to the remainder when a is divided by b. Assume that a and b are positive integers. For example, 17 MOD 5 evaluates to 2.
Text: RANDOM (a, b) Block: 	Evaluates to a random integer from a to b, including a and b. For example, RANDOM (1, 3) could evaluate to 1, 2, or 3.
Relational and Boolean Operators	
Text and Block: a = b a ≠ b a > b a < b a ≥ b a ≤ b	The relational operators =, ≠, >, <, ≥, and ≤ are used to test the relationship between two variables, expressions, or values. For example, a = b evaluates to true if a and b are equal; otherwise, it evaluates to false.

Instruction	Explanation
Relational and Boolean Operators (continued)	
Text: NOT condition Block: NOT (condition)	Evaluates to true if condition is false; otherwise evaluates to false.
Text: condition1 AND condition2 Block: (condition1) AND (condition2)	Evaluates to true if both condition1 and condition2 are true; otherwise, evaluates to false.
Text: condition1 OR condition2 Block: (condition1) OR (condition2)	Evaluates to true if condition1 is true or if condition2 is true or if both condition1 and condition2 are true; otherwise, evaluates to false.
Selection	

Text:
IF (condition)
{
  <block of statements>
}
 	
Block:
 	
	The code in block of statements is executed if the Boolean expression condition evaluates to true; no action is taken if condition evaluates to false.

Instruction	Explanation
Selection (continued)	

Text:
IF (condition)
{
<first block of statements>
}
ELSE
{
<second block of statements>
}
Block:
 
	The code in first block of statements is executed if the Boolean expression condition evaluates to true; otherwise, the code in second block of statements is executed.

Iteration	

Text:
REPEAT n TIMES
{
<block of statements>
}
Block:
 	
	The code in block of statements is executed n times.

Text:
REPEAT UNTIL (condition)
{
<block of statements>
}
Block:
 	
	The code in block of statements is repeated until the Boolean expression condition evaluates to true.

Instruction	Explanation
List Operations	
For all list operations, if a list index is less than 1 or greater than the length of the list, an error message is produced and the program terminates.	

Text:
`list[i]`
Block:
`list [i]`
	Refers to the element of `list` at index `i`. The first element of `list` is at index `1`.

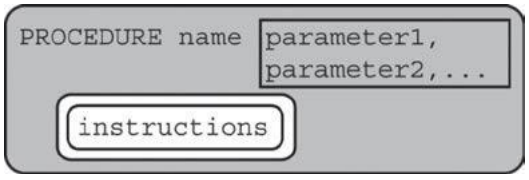
Text:
`list[i] ← list[j]`
Block:
`list [i] ← list [j]`
	Assigns the value of `list[j]` to `list[i]`.

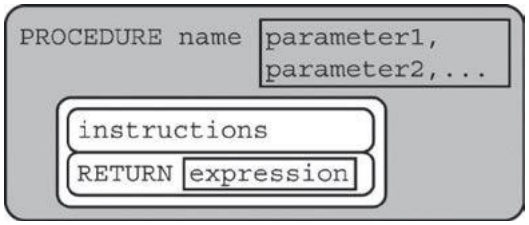
Text:
`list ← [value1, value2, value3]`
Block:
`list ← value1, value2, value3`
	Assigns `value1`, `value2`, and `value3` to `list[1]`, `list[2]`, and `list[3]`, respectively.

Text:
FOR EACH `item` IN `list`
{
`<block of statements>`
}
Block:
`FOR EACH item IN list`
`block of statements`
	The variable `item` is assigned the value of each element of `list` sequentially, in order from the first element to the last element. The code in `block of statements` is executed once for each assignment of `item`.

Text: INSERT `(list, i, value)` Block: `INSERT list, i, value`	Any values in `list` at indices greater than or equal to `i` are shifted to the right. The length of list is increased by 1, and `value` is placed at index `i` in `list`.
Text: APPEND `(list, value)` Block: `APPEND list, value`	The length of `list` is increased by 1, and `value` is placed at the end of `list`.

Instruction	Explanation
List Operations (continued)	
Text: REMOVE (list, i) Block: 	Removes the item at index i in list and shifts to the left any values at indices greater than i. The length of list is decreased by 1.
Text: LENGTH (list) Block: 	Evaluates to the number of elements in list.
Procedures	

Text:
PROCEDURE name (parameter1, parameter2, ...)
{
<instructions>
}
Block:
 
	A procedure, name, takes zero or more parameters. The procedure contains programming instructions.

Text:
PROCEDURE name (parameter1, parameter2, ...)
{
<instructions>
RETURN (expression)
}
Block:
 
	A procedure, name, takes zero or more parameters. The procedure contains programming instructions and returns the value of expression. The RETURN statement may appear at any point inside the procedure and causes an immediate return from the procedure back to the calling program.

Instruction	Explanation
Robot	
If the robot attempts to move to a square that is not open or is beyond the edge of the grid, the robot will stay in its current location and the program will terminate.	

Text:
`MOVE_FORWARD ()`
Block:
`MOVE_FORWARD`
	The robot moves one square forward in the direction it is facing.

Text:
`ROTATE_LEFT ()`
Block:
`ROTATE_LEFT`
	The robot rotates in place 90 degrees counterclockwise (i.e., makes an in-place left turn).

Text:
`ROTATE_RIGHT ()`
Block:
`ROTATE_RIGHT`
	The robot rotates in place 90 degrees clockwise (i.e., makes an in-place right turn).

Text:
`CAN_MOVE (direction)`
Block:
`CAN_MOVE direction`
	Evaluates to `true` if there is an open square one square in the direction relative to where the robot is facing; otherwise evaluates to `false`. The value of direction can be `left`, `right`, `forward`, or `backward`.

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