# Instruction Set

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| **Instruction** | **Operands** | **Description** | **Operation (Stack and PC)** |
| **Arithmetic Instructions** | | | |
| LITERAL | c | Push Constant to Stack. | ..., →  ..., c |
| ADD |  | Push Sum of Values. | ..., L, R →  ..., L+R |
| SUB |  | Push Difference of Values. | ..., L, R →  ..., L–R |
| DIV |  | Push Quotient of Values. | ..., L, R →  ..., L/R |
| MUL |  | Push Product of Values. | ..., L, R →  ..., L\*R |
| MOD |  | Push Remainder of Values. | ..., L, R →  ..., L%R |
| **Control Flow Instructions** | | | |
| CMP |  | Compare Top Values in Stack. | ..., L, R →  ..., L-R |
| JMP | c | Unconditional Jump. | PC ← c |
| JMPGT | c | Jump if Greater Than Zero. | ..., val →  ...,  if(val > 0) PC ← c |
| JMPLT | c | Jump if Less Than Zero. | ..., val →  ...,  if(val < 0) PC ← c |
| JMPEQ | c | Jump if Zero. | ..., val →  ...,  if(val = 0) PC ← c |
| JMPNE | c | Jump if Not Zero. | ..., val →  ...,  if(val != 0) PC ← c |
| CALL | c | Subroutine Call. | ..., →  ..., PC  PC ← c |
| BREAK |  | Return from Subroutine. | ..., ptr →  ...,  PC ← ptr |
| RETURN |  | Return from Subroutine with Value. | ..., ptr, val →  ..., val  PC ← ptr |
| **Data Transfer Instructions** | | | |
| DUP |  | Duplicates Top of Stack. | ..., val →  ..., val, val |
| SWAP |  | Swaps Top Values of Stack. | ..., L, R →  ..., R, L |
| LOAD | c | Loads Variable to Top of Stack. The operand ***c*** must be an unsigned integer. | ..., →  ..., val |
| STORE | c | Stores Top of Stack to Variable. The operand ***c*** must be an unsigned integer. | ..., val →  ..., |
| **Meta Control Instructions** | | | |
| MALLOC | c | Increases the Stack Size by ***c***. |  |
| FREE | c | Reduces the Stack Size by ***c***. |  |
| SIZETO | c | Sets the Stack Size to ***c***. All values outside of the new Stack size is **lost forever**. |  |

# Macro Set

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| **Form** | **Operands** | **Description** |
| #define {id} = {val} | id: String  val: Integer | Defines **{id}** as **{val}**. Useful for naming variables etc. |