

abstract machine instructions

Stack Manipulation

| | |
|-----------------|--|
| push c | Pushes c onto the stack |
| rvalue l | Pushes contents of data location l onto the stack |
| lvalue l | Pushes address of data location l onto the stack |
| pop | Throws away value on top of the stack |
| := | Stack top is placed by the lvalue below it and both are popped |
| copy | Pushes a copy of the top value on stack |

Control Flow

| | |
|------------------|--|
| label l | Targets of jumps to l |
| goto l | Next instruction is taken from statement with label l |
| gofalse l | Pops the top value of the stack and jumps if it is zero |
| gotrue l | Pops the top value of the stack and jumps if it is nonzero |
| halt | Stops execution |

Arithmetic Operators

| | |
|------------|---|
| + | Adds top two values on stack and places result on stack |
| - | Similar to +, but subtraction is performed |
| * | Similar to +, but multiplication is performed |
| / | Similar to +, but integer division is performed |
| div | Similar to +, but remainder of division is performed |

Logical Operators

| | |
|--------------|--|
| & | Logical AND the top two values on stack and places result on stack |
| ! | Negates the top of the stack |
| | Similar to &, but logical OR is performed |

Relational Operators

| | |
|-----------------|--|
| <> | Returns 0 if top two values on stack are equal otherwise returns 1 |
| <= | Similar to <>, but tests if top minus one is less or equal top |
| >= | Similar to <>, but tests if top minus one is greater or equal top |
| < | Similar to <=, but tests if top minus one is less than top |
| > | Similar to >=, but tests if top minus one is greater than top |
| = | Similar to <>, but tests if top minus one is equal to top of stack |

Output

| | |
|--------------|---|
| print | Writes top of the stack contents to output device |
| show | Writes a literal string to output device |

Subprogram Control

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|---------------|--|
| begin | Marks the beginning of parameter passing and subroutine call |
| end | Marks the end of parameter passing and subroutine call |
| return | Returns from subroutine |
| call | Subroutine call |