The Hmmm Instruction Set

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There are 24 different instructions in Hmmm assembly language, each of which accepts between 0 to 3 arguments. Numerical arguments are represented by N. Two of the instructions, setn and addn, accept a signed numerical argument between -128 and 127. The load, store and jump instructions accept an unsigned numerical argument between 0 and 255, i.e., a memory address. In the table below, register arguments are represented by rX, rY or rZ which may be any one of the 16 general purpose registers r0 to r15.

Assembly	Binary	Description
	System instructions	
halt	0000 0000 0000 0000	Halt program
read rX	0000 xxxx 0000 0001	Place user input in register rX
write rX	0000 xxxx 0000 0010	Print the contents of register rX
nop	0110 0000 0000 0000	Do nothing
	Setting register data	
setn rX, N	0001 xxxx nnnn nnnn	Set register rX to the integer N (-128 to 127)
addn rX, N	0101 xxxx nnnn nnnn	Add integer N (-128 to 127) to register rX
copy rX, rY	0110 xxxx yyyy 0000	Set rX = rY
	Arithmetic	
add rX, rY, rZ	0110 xxxx yyyy zzzz	Set rX = rY + rZ
sub rX, rY, rZ	0111 xxxx yyyy zzzz	Set rX = rY - rZ
neg rX, rY	0111 xxxx 0000 yyyy	Set rX = -rY
mul rX, rY, rZ	1000 xxxx yyyy zzzz	Set rX = rY * rZ
div rX, rY, rZ	1001 xxxx yyyy zzzz	Set rX = rY / rZ
mod rX, rY, rZ	1010 xxxx yyyy zzzz	Set rX = rY % rZ
	Jumps	
jumpn N	1011 0000 nnnn nnnn	Set program counter to address N
jumpr rX	0000 xxxx 0000 0011	Set program counter to address in rX
jeqzn rX, N	1100 xxxx nnnn nnnn	If rX == 0 then set program counter to address N
jnezn rX, N	1101 xxxx nnnn nnnn	If rX != 0 then set program counter to address N
jgtzn rX, N	1110 xxxx nnnn nnnn	If rX > 0 then set program counter to address N
jltzn rX, N	1111 xxxx nnnn nnnn	If rX < 0 then set program counter to address N
calln rX, N	1011 xxxx nnnn nnnn	Set rX to program counter + 1, then set program counter to address N
	Interacting with Memory (RAM)	
loadn rX, N	0010 xxxx nnnn nnnn	Load register rX with contents of memory address N
storen rX, N	0011 xxxx nnnn nnnn	Store contents of register rX into memory address N
loadr rX, rY	0100 xxxx yyyy 0000	Load register rX with data from the address location held in register rY
storer rX, rY	0100 xxxx yyyy 0001	Store contents of register rX into memory address held in register rY