

Little Man Computer: Programming Challenges

Writing machine code programs isn't easy! That is one of the reasons that 'high level' programming languages began to be developed very early in the history of Computing. Even the early computer experts found it hard to work out the tiny steps required to do simple things, using a 'low level' instruction set.

LMC INSTRUCTION SET		
Opcode	Description	Mnemonic
1	LOAD contents of mailbox into calculator	LDA XX
2	STORE contents of calculator into mailbox	STA XX
3	ADD contents of mailbox to calculator	ADD XX
4	SUBtract mailbox contents from calculator	SUB XX
500	INPUT value from inbox to calculator	IN
600	OUTOUT value from calculator to outbox	OUT
700	HALT – LMC stops for coffee break	HLT
	SKIP	
800	SKN – skip next line if calculator is negative	SKN XX
801	SKZ – skip next line if calculator is zero	SKZ XX
802	SKP – skip next line if calculator is positive	SKP XX
9	JUMP – goto address	JMP XX

To get the idea of what it was like, using the Instruction Set, have a go at the following challenges.

Challenge 1:

Write a program to add 3 numbers and output the result.

Challenge 2:

Write a program to input two numbers, subtract the second from the first and output the result.

Challenge 3:

Write a program to input 2 numbers and output the largest.

Challenge 4:

Write a program to output a countdown 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, Halt.

Challenge 5:

Write a program to multiply one number by a second number and output the result.

Challenge 6:

Finally, for those who still want a challenge, write a program to calculate a sequence of five numbers input as follows: $x + y + z - a - b$ (for example $1 + 2 + 3 - 4 - 5 = -3$). If that is straightforward, try writing the same program using just two memory locations to store numbers.