

# VonSim Instruction Set

Data Transfer Instructions							
Instruction	Description	Flags					Obs.
		CF	ZF	SF	IF	OF	
MOV dest, source	Copies source to dest	—	—	—	—	—	1
PUSH source	Pushes source onto the stack	—	—	—	—	—	2
POP dest	Pops the top of the stack and loads it into dest	—	—	—	—	—	2
PUSHF	Pushes FLAGS	X	X	X	X	X	
POPF	Pops FLAGS	X	X	X	X	X	
IN dest, source	Loads the value from port source into dest	—	—	—	—	—	3
OUT dest, source	Loads the value from source into port dest	—	—	—	—	—	4

Arithmetic Instructions							
Instruction	Description	Flags					Obs.
		CF	ZF	SF	IF	OF	
ADD dest, source	Adds source to dest	X	X	X	—	X	1
ADC dest, source	Adds source and CF to dest	X	X	X	—	X	1
SUB dest, source	Subtracts source from dest	X	X	X	—	X	1
SBB dest, source	Subtracts source and CF from dest	X	X	X	—	X	1
CMP dest, source	Compares source with dest	X	X	X	—	X	1
NEG dest	Negates dest	X	X	X	—	X	5
INC dest	Increments dest	X	X	X	—	X	5
DEC dest	Decrements dest	X	X	X	—	X	5

Logical Instructions							
Instruction	Description	Flags					Obs.
		CF	ZF	SF	IF	OF	
AND dest, source	Operation dest AND source bit-wise	0	X	X	—	0	1
OR dest, source	Operation dest OR source bit-wise	0	X	X	—	0	1
XOR dest, source	Operation dest XOR source bit-wise	0	X	X	—	0	1
TEST dest, source	Operation dest AND source bit-wise, flags only	0	X	X	—	0	1
NOT dest	Operation NOT dest bit-wise	0	X	X	—	0	5

Interrupt Handling Instructions							
Instruction	Description	Flags					Obs.
		CF	ZF	SF	IF	OF	
INT N	Executes software interrupt N	—	—	—	0	—	
IRET	Returns from the interrupt routine	X	X	X	X	X	
CLI	Disables maskable interrupts	X	X	X	0	X	
STI	Enables maskable interrupts	X	X	X	1	X	

Control Transfer Instructions							
Instruction	Description	Flags					Obs.
		CF	ZF	SF	IF	OF	
CALL label	Calls a subroutine starting at label	—	—	—	—	—	
RET	Returns from the subroutine	—	—	—	—	—	
JC label	Jumps to label if CF = 1	—	—	—	—	—	
JNC label	Jumps to label if CF = 0	—	—	—	—	—	
JZ label	Jumps to label if ZF = 1	—	—	—	—	—	
JNZ label	Jumps to label if ZF = 0	—	—	—	—	—	
JS label	Jumps to label if SF = 1	—	—	—	—	—	
JNS label	Jumps to label if SF = 0	—	—	—	—	—	
JO label	Jumps to label if OF = 1	—	—	—	—	—	
JNO label	Jumps to label if OF = 0	—	—	—	—	—	
JMP label	Unconditionally jumps to label	—	—	—	—	—	

Control Instructions							
Instruction	Description	Flags					Obs.
		CF	ZF	SF	IF	OF	
NOP	Does nothing	—	—	—	—	—	
HLT	Halts execution	—	—	—	—	—	

- The possibilities for dest, source are:  
*register, register; register, memory address; register, immediate; memory address, register; memory address, immediate.*  
 The memory address can be a label (direct addressing) or [BX], which is a memory address (indirect addressing). It can also be an indirect addressing with offset in the form [BX+disp].
- dest and source can only be 16-bit registers.
- The possibilities for dest, source are:
  - AL, port;
  - AX, port;
  - AL, DX;
  - AX, DX.

port must be an immediate operand between 0 and 255.
- The possibilities for dest, source are:
  - port, AL;
  - port, AX;
  - DX, AL;
  - DX, AX.

port must be an immediate operand between 0 and 255.
- dest can only be a memory address or a register. The memory address can be a label (direct addressing) or [BX], which is a memory address (indirect addressing). It can also be an indirect addressing with offset in the form [BX+disp].