Jump Instructions

Type		Instruction		Meaning (jump if)	Condition
			Equivalent		
Unconditional		JMP		Unconditional	None
Comparisons	**Unsigned**	JA	JNBE	Above (not below or equal)	CF = 0 and ZF = 0
		JAE	JNB	Above or equal (not below)	CF = 0
		JB	JNAE	Below (not above or equal)	CF = 1
		JBE	JNA	Below or equal (not above)	CF = 1 or ZF = 1
		JE	JZ	Equal (zero)	ZF = 1
		JNE	JNZ	Not equal (not zero)	ZF = 0
	Signed	JG	JNLE	Greater (not lower or equal)	ZF = 0 and SF = OF
		JGE	JNL	Greater or equal (not lower)	SF = OF
		JL	JNGE	Lower (not greater or equal)	(SF xor OF) = 1 i.e. SF ? OF
		JLE	JNG	Lower or equal (not greater)	(SF xor OF or ZF) = 1
		JCXZ	LOOP	CX register is zero	(CF or ZF) = 0
Carry		JC		Carry	CF = 1
		JNC		No carry	CF = 0
Overflow		JNO		No overflow	OF = 0
		JO		Overflow	OF =1
Parity Test		JNP	JPO	No parity (parity odd)	PF = 0
		JP	JPE	Parity (parity even)	PF = 1
Sign Bit		JNS		No sign	SF = 0
		JS		Sign	SF = 1
Zero Flag		JZ		Zero	ZF = 1
		JNZ		Non-zero	ZF = 0

Table 12. 1: Jump Instructions

Label Pointer	Range	Addressing Mode	Specified By	Encoded As	Directive
Short	+127/-128 bytes IP ⇙ IP + Offset	Immediate	Word	Differentially*	SHORT
Near	Intra-segment IP ⇙ Address	Immediate	Word	Differentially*	NEAR PTR
		Register	Word	Absolute address	
		Memory	Word	Absolute address	
Far	Inter-segment IP ⇙ Address CS ⇙ Segment	Immediate	Double Word	Absolute address	FAR PTR
		Memory	Double Word	Absolute address	

*Differentially = Difference between current and next address.

Table 12. 2: Jump Instructions and Addressing Modes

Instruction	Example	Meaning
JMP	JMP FAR PTR [BX]	IP ✍ [BX], CS ✍ [BX+2]
JNZ	JNZ END	If (ZF=0) Then IP ✍ Offset of END
JE	JE FIRST	If (ZF=1) Then IP ✍ Offset of FIRST
JC	JC SECOND	If (CF=1) Then IP ✍ Offset of SECOND

Table 12. 3: Examples of Jump Instructions

The LOOP Instructions:
The LOOP instruction is a combination of a DEC and JNZ instructions. It causes execution to branch to the address associated with the LOOP instruction. The branching occurs a number of times equal to the number stored in the CX register.

Instruction	Example	Meaning
LOOP	LOOP Label1	If (CX? 0) then IP ✍ Offset Label1
LOOPE **LOOPZ**	LOOPE Label1	If (CX? 0 and ZF = 0) then IP ✍ Offset Label1
LOOPNE **LOOPNZ**	LOOPNZ Label1	If (CX? 0 and ZF = 0) then IP ✍ Offset Label1

Table 12. 4: Summary of the LOOP Instructions.

The Loop Program Structure, Repeat-Until and While-Do:
Like the conditional and the unconditional jump instructions that can be used to simulate the IF-Then-Else structure of any programming language, the Loop instructions can be used to simulate the Repeat-Until and While-Do loops. These are used as shown in the following (Table 12. 5).

Structure	Repeat-Until	While-Do
Code	; Repeat until CX = 0 - MOV CX, COUNT Again: - - - - - - LOOP Again - -	; While (CX ? 0) Do - MOV CX, COUNT Again: JZ Next - - - - - LOOP Again Next: - -

Table 12. 5: The Loop Program Structure**.**