Chapter 11: Instruction Sets: Characteristics and Functions

Question 11.3

11.3 An address field in an instruction contains decimal value 14. Where is the corresponding operand located for?

a. immediate addressing?

b. direct addressing?

c. indirect addressing?

d. register addressing?

e. register indirect addressing?

Solution:

Instruction

a) 14 (The address field).

b) Memory location 14.

c) The memory location whose address is in memory location 14.

d) Register 14.

e) The memory location whose address is in register 14.

Question 11.4

Consider a 16-bit processor in which the following appears in main memory, starting at location 200:

200	Load to AC	Mode
201	500	
202	Next instruction	

The first part of the first word indicates that this instruction loads a value into an accumulator. The Mode field specifies an addressing mode and, if appropriate, indicates a source register; assume that when used, the source register is R1, which has a value of 400. There is also a base register that contains the value 100. The value of 500 in location 201 may be part of the address calculation. Assume that location 399 contains the value 999, location 400 contains the value 1000, and so on. Determine the effective address and the operand to be loaded for the following addressing modes.

a. Immediate
b. Direct
c. Indirect
d. PC relative
e. Displacement
f. Register
g. Register indirect
h. Autoindexing with increment, using R1

No.	EA	Operand
A	201	500
B	500	1100
C	1100	1700
d	702	1302
e	600	1200
f	R1	400
g	400	1000
h	400	1000

Question 11.13

Assume a stack-oriented processor that indicates the stack operations PUSH and POP. Arithmetic operations automatically involve the top one or two stack elements. Begin

with an empty stack. What stack elements remain after the following instructions are executed?

PUSH 4
PUSH 7
PUSH 8
ADD
PUSH 10
SUB
MUL

Instruction	Stack (top on left)
PUSH 4	4
PUSH 7	7, 4
PUSH 8	8, 7, 4
ADD	15, 4
PUSH 10	10, 15, 4
SUB	5, 4
MUL	20