

1.13

Both can solve the same problems.

B can perform subtract instruction by producing the negative of the second number and then performing add instruction. Otherwise, A and B are identical, so they are able to solve the same problems.

1.15

Advantage: Higher-level languages are usually more user-friendly. High level language programs are easier to write and read.

Disadvantage: High level languages are at a distance from the underlying computer, which means that high level language programs usually execute less efficiently.

1.16

Address mode

Address ability

Set of instructions

Data types

Mechanisms

1.17

The ISA is the complete specification of the interface between programs and the underlying computer hardware, which does not

specify the implementation.

The detailed organization of an actual implementation of an ISA is its microarchitecture. An ISA can be implemented by many different microarchitectures.

1.18

Only one ISA is implemented by a single microarchitecture.

Usually several microarchitectures could exist for a single ISA.

2.8

a. binary: 01111111 decimal: 127

b. binary: 10000000 decimal: -128

c. $2^{n-1}-1$

d. -2^{n-1}

2.10

a. -6

b. 90

c. -2

d. 14803

2.11

a. 01100110

b. 01000000

c. 00100001

d. 10000000

e. 01111111

2.13

a. 11111010

b. 00011001

c. 11111000

d. 00000001

2.14

a. 1100

b. 1010

c. 1111

d. 1011

e. 10000

2.17

a. binary: 1100 decimal: -4

b. binary: 01010100 decimal: 84

c. binary: 0011 decimal: 3

d. binary: 11 decimal: -1

2.22

0111 1111 1111 1111 + 0111 0000 0000 0000

2.24

1111 1111 1111 1111 + 1111 0000 0000 0000

2.27

Yes, there is a problem. The result has overflowed the capacity of the representation. The result of adding two positive numbers cannot be negative.