Chapter 1 Exercise Solutions

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1 Exercise 24

1.1 (a)

If you got promoted, then you washed the boss's car.

1.2 (b)

If there are winds from the south, then there will be a spring thaw.

1.3 (c)

If you bought the computer less than a year ago, then the warranty is good.

1.4 (d)

If Willy cheats, then he gets caught.

1.5 (e)

If you can access the website, then you paid a subscription fee.

1.6 (f)

If you know the right people, then you'll get elected.

1.7 (g)

If Carol is on a boat, then she gets seasick.

2 Exercise 25

2.1 (a)

If the wind blows from the northeast, then it snows.

2.2 (b)

If it stays warm for a week, then the apple trees will bloom.

2.3 (c)

If the Pistons win the championship, then they beat the Lakers.

2.4 (d)

If you got to the top of Long's Peak, then you walked eight miles.

2.5 (e)

If you are world famous, then you will get tenure as a professor.

2.6 (f)

If you drive more than 400 miles, then you will need to buy gasoline.

2.7 (g)

If your guarantee is good, then you bought your CD player less than 90 days ago.

2.8 (h)

If the water isn't too cold, then Jan will go swimming.

2.9 (i)

If people believe in science, then we will have a future.

3 Exercise 26

3.1 (a)

If I remembered to send you the address, then you sent me an e-mail message.

3.2 (b)

If you were born in the United States, then you are a citizen of this country.

3.3 (c)

If you keep your textbook, then it will be a useful reference in your future courses.

3.4 (d)

If their goalie plays well, then the Red Wings will win the Stanley Cup.

3.5 (e)

If you get the job, then you had the best credentials.

3.6 (f)

If there is a storm, then the beach erodes.

3.7 (g)

If you log on to the server, then you have a valid password.

3.8 (h)

If you don't begin your climb too late, then you will reach the summit.

3.9 (i)

If you are among the first 100 customers tomorrow, then you will get a free ice cream cone.

4 Exercise 27

4.1 (a)

It is hot outside if and only if you buy an ice cream cone.

4.2 (b)

You win the contest if and only if you have the only winning ticket.

4.3 (c)

You get promoted if and only if you have connections.

4.4 (d)

You watch television if and only if your mind will decay.

4.5 (e)

The trains run late if and only if it is a day when I take the train.

5 Exercise 28

5.1 (a)

You get an A in this course if and only if you learn how to solve discrete mathematics problems.

5.2 (b)

You will be informed if and only if you read the newspaper every day.

5.3 (c)

It rains if and only if it is a weekend day.

5.4 (d)

The wizard is not in if and only if you can see him.

5.5 (e)

My airplane flight is late if and only if I have to catch a connecting flight.

6 Exercise 47

6.1 (a)

```
101 1110
010 0001
111 1111              (bitwise OR)
000 0000              (bitwise AND)
111 1111              (bitwise XOR)
```

6.2 (b)

```
1111 0000
1010 1010
1111 1010              (bitwise OR)
1010 0000              (bitwise AND)
0101 1010              (bitwise XOR)
```

6.3 (c)

```
00 0111 0001
10 0100 1000
10 0111 1001              (bitwise OR)
00 0100 0000              (bitwise AND)
10 0011 1001              (bitwise XOR)
```

6.4 (d)

```
11 1111 1111
00 0000 0000
11 1111 1111          (bitwise OR)
00 0000 0000          (bitwise AND)
11 1111 1111          (bitwise XOR)
```

7 Exercise 48

7.1 (a)

```
    0 1011
∨ 1 1011
    1 1011

    1 1000
∧ 1 1011
    1 1000  ← answer
```

7.2 (b)

```
    0 1111
∧ 1 0101
    0 0101

    0 0101
∨ 0 1000
    0 1101  ← answer
```

7.3 (c)

$$
\begin{array}{r}
0\ 1010 \\
\oplus\ \underline{1\ 1011} \\
1\ 0001
\end{array}
$$

$$
\begin{array}{r}
1\ 0001 \\
\oplus\ \underline{0\ 1000} \\
1\ 1001 \leftarrow \text{answer}
\end{array}
$$

7.4 (d)

$$
\begin{array}{r}
1\ 1011 \\
\vee\ \underline{0\ 1010} \\
1\ 1011
\end{array}
$$

$$
\begin{array}{r}
1\ 0001 \\
\vee\ \underline{1\ 1011} \\
1\ 1011
\end{array}
$$

$$
\begin{array}{r}
1\ 1011 \\
\wedge\ \underline{1\ 1011} \\
1\ 1011 \leftarrow \text{answer}
\end{array}
$$