# **Solution for Exercise page 18**

# **Chapter 4- Arithmetic working with integers**

1. Write down the following numbers in binary using 2’s complement representation for signed numbers in 8 bits.
   1. -58

**Step 1:** 5810 = 0011 10102

**Step 2:** take the complement: 1100 0101

**Step 3:** Add 1: 1100 0101 + 1 = 1100 0110

Thus, the 2’s complement for -58 is 1100 01102. It begins on the left with a 1, therefore we know it is negative.

* 1. +58

**Step 1:** 5810 = 0011 10102

Thus, the 2’s complement for 58 is 0011 10102. It begins on the left with a 0, therefore we know it is positive.

* 1. -102

**Step 1:** 10210 = 0110 01102

**Step 2:** take the complement: 1001 1001

**Step 3:** Add 1: 1001 1001+ 1 = 1001 1010

Thus, the 2’s complement for -102 is 1001 10102. It begins on the left with a 1, therefore we know it is negative.

1. Figure out the decimal numbers (including sign) from the following binary numbers represented using 2’s complement.
   1. 0010 0010

**Step 1:** Sign bit is 0 ⇒ positive

**Step 2:** Absolute value is 010 0010 = 34

Hence, the integer is +34

* 1. 1011 1001

**Step 1:** Sign bit is 1 ⇒ negative

**Step 2:** Absolute value is the complement of 011 1001 plus 1= 100 0110 +1 = 100 0111 =

Hence, the integer is -71

* 1. 1100 0110

**Step 1:** Sign bit is 1 ⇒ negative

1. **Step 2:** Absolute value is the complement of 100 0110 plus 1 = 011 1001 + 1= 011 1010 = 58

Hence, the integer is -58