

## Practice Problems 1 - Solutions

a)  $10_2 + 3_2 = 1010_2 + 11_2$

$$\begin{array}{r}
 1010 \\
 + 11 \\
 \hline
 1101
 \end{array}$$

$1 \cdot 2^3 + 1 \cdot 2^2 + 0 \cdot 2^1 + 1 \cdot 2^0 = 8 + 4 + 0 + 1 = 13$

$10 + 3 = 13 \quad \checkmark$

b)  $10_{10} - 3_{10} = 1010_2 - 11_2$

$$\begin{array}{r}
 1010 \\
 - 0011 \\
 \hline
 1100
 \end{array}$$

$1's \text{ complement}$

$$\begin{array}{r}
 1010 \\
 + 1100 \\
 \hline
 0110
 \end{array}$$

$1 \cdot 2^3 + 1 \cdot 2^2 + 1 \cdot 2^1 = 8 + 4 + 2 = 14$

$10 - 3 = 7 \quad \checkmark$

c)  $150_2 : 5 = 30_2 \quad R\ O\ A$

$$\begin{array}{r}
 30 \\
 = 6 \quad R\ O \\
 6 \\
 = 1 \quad R\ I \\
 1 \\
 = 0 \quad R\ I
 \end{array}$$

$1 : 5 = 0 \quad R\ I$

$$\begin{array}{r}
 1100 \\
 + 12 \\
 \hline
 1010
 \end{array}$$

$1 \cdot 5^3 + 0 \cdot 5^2 + 1 \cdot 5^1 + 0 \cdot 5^0 = 125 + 25 + 5 + 0 = 157$

$150 + 7 = 157 \quad \checkmark$

d)  $150_{10} - 7_{10} = 1100_5 - 125 = 1100_5 - 00125$

$4+4$

$4's \text{ complement}$

$$\begin{array}{r}
 1100 \\
 + 4432 \\
 \hline
 1032
 \end{array}$$

$1 \cdot 5^3 + 0 \cdot 5^2 + 3 \cdot 5^1 + 3 \cdot 5^0 = 125 + 15 + 3 = 143$

$150 - 7 = 143 \quad \checkmark$

```

2. /*
 * Book.h
 */
class Book{ // class implementing a book
private:
    int m_nIsbn;
public:
    // The title of the book is declared public only for
    // the purpose of this exercise. It is better to keep
    // it private.
    string m_strTitle; // title of the book;
    Book(int isbn, const string& title);

    void printIsbn(); // prints out the isbn of the book
};

/*
 * Book.cpp
 */
#include "Book.h"

Book::Book(int isbn, const string& title){
    // implementation of constructor
}

void Book::printIsbn(){
    // implementation of method
}

/*
 * Somewhere else in the program
 */
Book *ptrSomeBook = new Book(123, "a title");

```

### 3. Conflict graphs

