Binary Arithmetic - Tutorial Sheet

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Binary Arithmetic : addition, multiplication and bit-borrowing

1. Perform the following binary additions.

   a) $(110101)_2 + (1010111)_2$
   b) $(1010101)_2 + (101010)_2$
   c) $(11001010)_2 + (10110101)_2$
   d) $(1011001)_2 + (111010)_2$

2. Perform the following binary multiplications.

   a) $(1001)_2 \times (1000)_2$
   b) $(101)_2 \times (1101)_2$
   c) $(111)_2 \times (1111)_2$
   d) $(10000)_2 \times (11001)_2$

3. Perform the following binary subtractions (using bit-borrowing).

   a) $(110101)_2$ - $(1010111)_2$
   b) $(1010101)_2$ - $(101010)_2$
   c) $(11001010)_2$ - $(10110101)_2$
   d) $(1011001)_2$ - $(111010)_2$

4. Perform the following binary multiplications.

   (a) Which of the following binary numbers is the result of this binary division: $(10)_2 \times (1101)_2$.

   a) $(11010)_2$ c) $(10101)_2$
   b) $(11100)_2$ d) $(11011)_2$

   (b) Which of the following binary numbers is the result of this binary division: $(101010)_2 \times (111)_2$.

   a) $(11000)_2$ c) $(10101)_2$
   b) $(11001)_2$ d) $(11011)_2$

   (c) Which of the following binary numbers is the result of this binary division: $(1001110)_2 \times (1101)_2$.

   a) $(11000)_2$ c) $(10101)_2$
   b) $(11001)_2$ d) $(11011)_2$

5. Perform the following binary division exercises.

   (a) Which of the following binary numbers is the result of this binary division: $(111001)_2 \div (10011)_2$.

   a) $(10)_2$ c) $(100)_2$
   b) $(11)_2$ d) $(101)_2$

   (b) Which of the following binary numbers is the result of this binary division: $(101010)_2 \div (111)_2$.

   a) $(11)_2$ c) $(101)_2$
   b) $(100)_2$ d) $(110)_2$

   (c) Which of the following binary numbers is the result of this binary division: $(1001110)_2 \div (1101)_2$.

   a) $(100)_2$ c) $(111)_2$
   b) $(110)_2$ d) $(1001)_2$