# Theme 02: Number Systems

## Worksheet 7– Binary Addition and Subtraction

*Perform all calculations manually and include your working.*

1. For each question add the binary numbers:
   a. $1_2 + 0_2$
   b. $0_2 + 0_2$
   c. $1_2 + 1_2$
   d. $10_2 + 01_2$
   e. $11_2 + 01_2$
   f. $1101_2 + 11_2$

2. Assuming an 8 bit word length explain what problem can occur when adding 2 numbers together, each greater or equal to $128_{10}$

3. For each question follow convert (A) and (B) to binary and subtract (A) from (B):
   a. (A) $10_{10}$  (B) $15_{10}$          word length of 8 bits
   b. (A) $68_{10}$  (B) $69_{10}$          word length of 8 bits
   c. (A) $15_{10}$  (B) $125_{10}$          word length of 8 bits

4. For each answer to question 1, convert the binary back to decimal to check your answer.

5. Convert (A) and (B) to binary and subtract (A) from (B):
   i. (A) $67_{10}$  (B) $25_{10}$          word length of 8 bits
   b. Convert your answer to decimal. Is it what you expected?  If not, why not?