

1) (5 pts) Add these two **unsigned** bytes. Either convert to decimal or explain the error in the addition.

$$\begin{array}{r}
 \begin{array}{cccccccc}
 & 1 & & 1 & & 1 & & 1 \\
 1 & 0 & 1 & 0 & 1 & 1 & 1 & 0 \\
 + & 0 & 0 & 1 & 1 & 1 & 1 & 0 & 1
 \end{array} \\
 \hline
 \begin{array}{cccccccc}
 1 & 1 & 1 & 0 & 1 & 0 & 1 & 1 \\
 256 & 128 & 64 & 32 & 16 & 8 & 4 & 2
 \end{array} \\
 \hline
 \begin{array}{cccccccc}
 128 & 64 & 32 & 16 & 8 & 4 & 2 & 1
 \end{array} \\
 \hline
 \boxed{235}
 \end{array}$$

2) (5 pts) Add these two **signed** bytes. Either convert to decimal or explain the error in the addition.

$$\begin{array}{r}
 \begin{array}{cccccccc}
 & 1 & & 1 & & 1 & & 1 \\
 1 & 1 & 1 & 0 & 1 & 1 & 1 & 0 \\
 + & 0 & 1 & 0 & 1 & 1 & 1 & 0 & 0
 \end{array} \\
 \hline
 \begin{array}{cccccccc}
 0 & 1 & 0 & 0 & 1 & 0 & 1 & 0 \\
 64 & 32 & 16 & 8 & 4 & 2 & 1
 \end{array} \\
 \hline
 \boxed{74}
 \end{array}$$

3) (10 pts) The following is a four byte Single Precision Real Number as stored in computer memory. What is the number in decimal?

$1 \ 10000000 \ 010000000000000000000000$
 ↑ 128 64 32 16 8 4 2 1
 negative $128 - 127 = 1$

1.01
 $2^0 + 2^{-2} = 1.25$

$\boxed{-1.25}$

4) (5 pts) Write down a Fortran line that updates the variable 'Average' for computing the average of numbers you are reading in. Just one line, correct Fortran syntax.

$$\text{Average} = \text{Average} + \frac{x_k - \text{Average}}{k}$$

$$\text{Average} = \text{Average} + ((x - \text{Average}) / k)$$