

Tolby Lam  
Project 2

① a)  $ab \rightarrow 1010 \ 1011$

$$\begin{array}{r} \cancel{1616} \cancel{1616} \\ \cancel{1919} \cancel{1919} \\ + \quad 0101 \ 0100 \\ \hline 0101 \ 0101 \end{array} = \boxed{-85}$$

b)  $8f \rightarrow 1060 \ 1111$

$$\begin{array}{r} + 0111 \ 0000 \\ \hline 0111 \ 0001 \end{array} = \boxed{-113}$$

② a)  $-10 \rightarrow 0000 \ 0000 \ 0000 \ 1010$

$$\begin{array}{r} + 1111 \ 1111 \ 1111 \ 0101 \\ \hline 1111 \ 1111 \ 1111 \ 0110 \end{array} = \boxed{FFF6}$$

b)  $4096 \rightarrow 0001 \ 0000 \ 0000 \ 0000$

$$\begin{array}{r} + 1110 \ 1111 \ 1111 \ 1111 \\ \hline 1111 \ 0000 \ 0000 \ 0000 \end{array} = \boxed{F000}$$

③ a)  $ABCD \rightarrow$

For unsigned:  $1011 \ 1100 \ 1101 \ 1110$  , is correct ,

For signed:  $1111 \rightarrow$   $1110 \ 1110 \ 1110 \ 1110$  CF is 0

$$\begin{array}{r} ABCD \rightarrow + 0101 \ 0100 \ 0011 \ 0010 \\ \hline 0101 \ 0100 \ 0011 \ 0011 \end{array}$$

$$\begin{array}{r}
 1111 \quad 1110 \quad 1110 \quad 1111 \\
 + 1110 \quad 1110 \quad 1110 \quad 1111 \\
 \hline
 0101 \quad 0100 \quad 0011 \quad 0011 \\
 \hline
 0100 \quad 0011 \quad 0010 \quad 0010
 \end{array}
 \begin{array}{l}
 CF: 1 \\
 SC: 1 \\
 OF: 0
 \end{array}$$

correct because OF is 0.

$$\begin{array}{r}
 b) \quad 0101 \rightarrow 0000 \quad 0001 \quad 0000 \quad 0001 \quad CF: 0 \\
 + 8080 \rightarrow 1000 \quad 0000 \quad 1000 \quad 0000 \\
 \hline
 1000 \quad 0001 \quad 1000 \quad 0001
 \end{array}$$

For unsigned, correct because CF is 0.

$$\begin{array}{r}
 \text{For signed, } 0101 \rightarrow 1111 \quad 1110 \quad 1111 \quad 1110 \\
 + 1111 \quad 1110 \quad 1111 \quad 1110 \\
 \hline
 1111 \quad 1110 \quad 1111 \quad 1110
 \end{array}$$

$$\begin{array}{r}
 8080 \rightarrow 0111 \quad 1111 \quad 0111 \quad 1111 \\
 + 0111 \quad 1111 \quad 0111 \quad 1111 \\
 \hline
 0111 \quad 1111 \quad 1000 \quad 0000
 \end{array}$$

$$\begin{array}{r}
 1111 \quad 1110 \quad 1111 \quad 1111 \quad CF: 1 \\
 + 0111 \quad 1111 \quad 1000 \quad 0000 \quad SC: 1 \\
 \hline
 0111 \quad 1110 \quad 0111 \quad 1111 \quad OF: 0
 \end{array}$$

Correct because OF is 0

$$\begin{array}{rcl}
 c) & + \text{OFOF} & \rightarrow \begin{array}{cccc} 0000 & 1111 & 0000 & 1111 \end{array} & \text{CF} : 0 \\
 & + \text{048B} & \rightarrow \begin{array}{cccc} 0000 & 0100 & 1000 & 1011 \end{array} \\
 & & \hline
 & & \begin{array}{cccc} 0001 & 0011 & 1001 & 0100 \end{array}
 \end{array}$$

For unsigned, correct since  $CF = 0$

$$\begin{array}{rcl}
 \text{For signed: OFOF} & \rightarrow \begin{array}{cccc} 1111 & 0000 & 1111 & 0000 \end{array} \\
 & + & \begin{array}{cccc} & & & 1 \end{array} \\
 & & \hline
 & & \begin{array}{cccc} 1111 & 0000 & 1111 & 0001 \end{array}
 \end{array}$$

$$\begin{array}{rcl}
 \text{048B} & \rightarrow \begin{array}{cccc} 1111 & 1011 & 0111 & 0100 \end{array} \\
 & + & \begin{array}{cccc} & & & 1 \end{array} \\
 & & \hline
 & & \begin{array}{cccc} 1111 & 1011 & 0111 & 0101 \end{array}
 \end{array}$$

$$\begin{array}{rcl}
 & + \begin{array}{cccc} 1111 & 0000 & 1111 & 0001 \end{array} & \text{CF} : 1 \\
 & + \begin{array}{cccc} 1111 & 1011 & 0111 & 0101 \end{array} & \text{SC} : 1 \\
 & \hline
 & \begin{array}{cccc} 1110 & 1100 & 0110 & 0110 \end{array} & \text{OF} : 0
 \end{array}$$

Correct for unsigned since  $OF = 0$

