

National Sun Yat-Sen University
ASSEMBLY LANGUAGE AND MICROCOMPUTER
Homework #2
Tested in 10/30/2014

1. Specify one ARM real instruction for each of the following statements:
 - a) $r0 = 16$
 - b) $r1 = r0 * 9$
 - c) $r0 = r1 / 16$ ($r1$ signed 2's comp.)
 - d) $r1 = r2 * 15$
2. Recite the general procedure of the ARM processor to handle an exception as discussed in pp.43 of the textbook.
3. Assume $r1 = \#00201080$ and $r2 = \#0000FFAB$, find out the values of $r0$ in binary format for the following instructions:
 - (a) ADD $r0, r1, r2$
 - (b) SUB $r0, r2, r1$
 - (c) BIC $r0, r1, r2$
 - (d) AND $r0, r2, \#12$
 - (e) ADD $r0, r1, r2, ASR \#2$
4. Suppose $r1 = 0xF0000000$, $r2 = 0xF0000001$, $C=1$, $N=0$, $Z=0$, $V=0$, please find out the corresponding resulting $r0$ value of the following instructions. You should also provide the resulting conditional code value (C N Z V).
 - (a) ADDS $r0, r1, r2$.
 - (b) ADC $r0, r1, r2$.
 - (c) SUBS $r0, r1, r2$.
 - (d) SBC $r0, r1, r2$.
 - (e) RSB $r0, r1, r2$.
 - (f) BIC $r0, r1, r2$.
 - (g) XOR $r0, r1, r2$.
 - (h) ADD $r0, r1, r2, LSL \#1$
5. For each of the following multiple register store instructions, write a short code to restore these register values by loading the data back from the memory.
 - i. STMIA $r9!, \{r0, r5, r1\}$
 - ii. STMIB $r9, \{r5, r1, r0\}$
 - iii. STMDA $r9!, \{r0, r1, r5\}$
 - iv. STMDB $r9, \{r5, r0, r1\}$
6. Do Exercise 3.1 in pp72 of the textbook.