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19CSE303 Embedded Systems
Lab Worksheet - 2
Binary Manipulations

Exercise Problems

1. Write a ARM assembly language program to find a given number is multiple of 4. Assume the number to be in r1. If the number is a multiple then move 0xFF to r2 else move 0xAA to r2.

```
AREA exp1, CODE, READONLY

 mov r1, #0x04          ; Data (Change this for different test
case)
 ands r1, r1, #0x03     ; AND masing with setting condition codes. Mask value is 0x03
 moveq r2, #0xFF
 movne r2, #0xAA
e b e
 end
```

2. Write a ARM assembly program to find the number of 1's in a byte data stored in r5. Store the final count in r1.

```
 AREA exp2, CODE, READONLY

 mov r5, #0x03      ;data (Change this for different test case)
 mov r2, #0x08                ;shift counter
 mov r1, #0x00                ; intialiazing result register
shift movs r5, r5, lsr #1     ; shifting
 addcs r1, r1, #0x01
 sub r2, r2, #0x01            ; decrementing shift counter
 cmp r2, #0                   ; checking counter to be ZERO
 bne shift
e b e
 end
```

Assignment Problems

1. Write ARM assembly language program to find the number in r1 is odd or even number. If the number is a ODD then move 0x01 to r2 else move 0x02 to r2.
2. Write a ARM assembly program to find the number of 0's in a byte data stored in r5. Store the final count in r1.