ARM ASSEMBLY PROGRAMMING

- Exercise 4 (ARM Machine Language, Disassembly)
  - Modify the ML instructions below so that register r0 gets multiplied by 8
    - 00000000 <xyz>:
      - 0: e0820101
      - 4: e12fff1e

ARM ASSEMBLY PROGRAMMING

- Exercise 5 (ARM Assembly, Simulation)
  - Write an assembly program that computes the sum of a statically allocated array containing values {1,2,3,4}
    - This deals with basic ARM assembly syntax, the flexible second operand, and arrays

ARM ASSEMBLY PROGRAMMING

- Exercise 5 (ARM Assembly, Simulation)
  - Solution 1

```
Chute dip$ cat ex5-1.s
     ldr  r0, =data
     ldr  r1, =data_size
     mov  r2, r0
     mov  r0, #0
loop teq  r1, #0
     beq  end_loop
     ldr  r3, [r2], #4
     add  r0, r0,r3
     sub  r1, r1, #4
     b    loop
end_loop
     end

data      DCD  1,2,3,4 ; int data[]={1,2,3,4};
data_end  FILL 0
data_size EQU  data_end-data
```

ARM ASSEMBLY PROGRAMMING

- Exercise 5 (ARM Assembly, Simulation)
  - Solution 2

```
Chute dip$ cat ex5-2.s
     ldr  r0, =data
     ldr  r1, =data_size
     mov  r2, r0
     mov  r0, #0
     teq  r1, #0
     beq  end_loop
loop ldr  r3, [r2], #4
     add  r0, r0,r3
     subs r1, r1, #4
     bne  loop
end_loop
     end

data      DCD  1,2,3,4 ; int data[]={1,2,3,4};
data_end  FILL 0
data_size EQU  data_end-data
```

ARM ASSEMBLY PROGRAMMING

- Exercise 5 (ARM Assembly, Simulation)
  - Solution 3

```
Chute dip$ cat ex5-3.s
      ldr   r0, =data
      ldr   r1, =data_end
      mov   r2, r0
      mov   r0, #0
loop  cmp   r1, r2
      beq   end_loop
      ldr   r3, [r2], #4
      add   r0, r0,r3
      b     loop
end_loop
      end

data    DCD   1,2,3,4 ; int data[]={1,2,3,4};
data_end   FILL 0
```

ARM ASSEMBLY PROGRAMMING

- Exercise 5 (ARM Assembly, Simulation)
  - Solution 4

```
Chute dip$ cat ex5-4.s
     ldr     r0, =data
     ldr     r1, =data_end
     mov     r2, r0
     mov     r0, #0
loop cmp     r1, r2
     ldrne   r3, [r2], #4
     addne   r0, r0,r3
     bne     loop
end_loop
     end

data    DCD   1,2,3,4 ; int data[]={1,2,3,4};
data_end  FILL 0
```