Lecture 09 (ARM Architecture cotd)

1 Immediate Value

1. We use 8 bits to store immediate value
2. They can be rotated
3. To store other values, data manipulation is needed
4. mov instruction helps with this

2 Multiplication using Shift Register

1. Can multiply $2^n \pm 1$ in one cycle
2. This is done using addition and shift operation

3 Regular Multiplication

1. Uses Booth's algorithm
2. $Rd = Rm \times Rs$
3. This operates on 2 bits of Rs at a time
4. Multiplication terminates when there are no more 1's left in Rs
5. Algorithm complexity is not commutative wrt Rm and Rs

4 Loading 32-bit Constants

1. ARM can't directly move data between memory locations
2. It needs to load before store

4.1 Single Register Data Transfer

1. Typical load store that was done in COL216
2. ARM has support for halfwords (and sign extend on loading)
3. Addressing can be done using register value as well
4. This allows offsets as well