Lecture 08 (ARM Architecture)

hehe

1 Some More ARM Instructions

1. Compare and update flag but not register
2. Data movement instructions

2 Barrel Shifter

1. ARM doesn't have actual shift instructions
2. $\exists$ barrel shifter which provides shifts as part of other instructions

2.1 Left Shift

Multiply by 2^i

2.2 Logical Right Shift

Moves to the right and inserts 0's

2.3 Arithmetic Right Shift

Division (preserves sign)

2.4 Rotate Right

Bits wrap around

2.5 Rotate Right Extended

C flag is used as 33^{rd} bit, rotates by 1 bit

2.6 Using Barrel Shifter

1. Present between operand 2 and ALU
2. Can shift register value
3. Can encode immediate value easily
4. Delay depends on where the shift value is stored
    - immediate 5-bit field of instruction: no delay
    - bottom byte of register: 1 cycle (since ARM can't read 3 registers at once)