

# Ch6 ARM Control Flow Quiz

## Q1

Which condition flag is set to 1 when the result of an operation is zero?

- A) N (Negative flag)
- B) Z (Zero flag)
- C) C (Carry flag)
- D) V (Overflow flag)

Q1 ANS:

## Q2

For unsigned subtraction, when is the Carry flag (C) set to 0?

- A) When no borrow occurs
- B) When a borrow occurs
- C) When the result is negative
- D) When overflow occurs

Q2 ANS;

## Q3

The Overflow flag (V) is set to 1 when:

- A) Adding two different-signed numbers
- B) Adding two same-signed numbers produces opposite sign result
- C) Performing any multiplication
- D) Using MOV instruction

Q3 ANS:

## Q4

What does the CMP R1, R2 instruction do?

- A) Saves the result of  $R1 - R2$
- B) Performs  $R1 - R2$  and discards the result
- C) Performs  $R1 + R2$  and sets flags
- D) Moves R2 to R1

Q4 ANS:

## Q5

The TST instruction performs which operation?

- A)  $R1 + R2$
- B)  $R1 - R2$
- C)  $R1 \& R2$  (bitwise AND)
- D)  $R1 \wedge R2$  (bitwise XOR)

Q5 ANS:

## Q6

When using TEQ instruction, the Z flag is set to 1 when:

- A) R1 is greater than R2
- B) R1 and R2 are equal
- C) R1 is less than R2

D) An overflow occurs

Q6 ANS:

Q7

Which instruction branches to a label and saves the return address in the link register (r14)?

- A) B label
- B) BX Rm
- C) BL label
- D) BLX Rm

Q7 ANS:

Q8

For signed comparison, which branch instruction is used for 'greater than'?

- A) BHI
- B) BGT
- C) BHS
- D) BLO

Q8 ANS:

Q9

The BGE (Branch if signed Greater or Equal) instruction tests which condition?

- A)  $N = 1$
- B)  $Z = 1$
- C)  $N = V$
- D)  $C = 1$

Q9 ANS:

Q10

Which values represent 0xFFFFFFFF and 0x00000001 when interpreted as unsigned numbers?

- A) -1 and 1
- B)  $2^{32} - 1$  and 1
- C) 1 and -1
- D) 255 and 1

Q10 ANS:

Q11

In the instruction 'ADDLT r3, r2, r1', when is the ADD operation executed?

- A) When  $N = V$
- B) When  $N \neq V$
- C) When  $Z = 1$
- D) When  $C = 1$

Q11 ANS:

Q12

In a for loop implementation using 'SUBS r1, r1, #1' followed by 'BNE loop', what does this accomplish?

- A) Increments counter and loops if zero
- B) Decrements counter and loops if not zero
- C) Sets flags without changing register

D) Unconditional branch

Q12 ANS:

Q13

The CBZ instruction is equivalent to which sequence?

A) CMP R1, #0; BNE label

B) CMP R1, #0; BEQ label

C) ADD R1, #0; BEQ label

D) SUB R1, #0; BNE label

Q13 ANS:

Q14

For signed comparison after 'CMP r0, r1', if N=0 and V=0, what can be concluded?

A)  $r0 < r1$

B)  $r0 \geq r1$

C)  $r0 = r1$

D) Overflow occurred

Q14 ANS:

Q15

In ARM Thumb-2, what does 'ITE' stand for in IT blocks?

A) If-Then-Else with 2 instructions

B) If-Then-End

C) Iterate-Then-Exit

D) If-Test-Execute

Q15 ANS:

Q16

Which condition code tests for 'unsigned higher'?

A) HS

B) HI

C) GT

D) GE

Q16 ANS:

Q17

In the assembly sequence 'TEQ r0, #!'; TEQNE r0, #'?', what programming concept is being implemented?

A) Logical AND

B) Logical OR with short-circuit evaluation

C) Nested if statements

D) Switch statement

Q17 ANS:

Q18

The BLS (Branch if unsigned Lower or Same) instruction tests which condition?

A)  $C=0$  or  $Z=1$

B)  $C=1$  and  $Z=0$

C)  $N=V$

D)  $N \neq V$

Q18 ANS:

Q19

Which method is used to update condition flags with arithmetic operations?

- A) Always automatic
- B) Append 'S' to instruction or use compare instructions
- C) Use special flag register
- D) Only with branch instructions

Q19 ANS:

Q20

In break and continue statements, what is the key difference in assembly implementation?

- A) Break uses BEQ, continue uses BNE
- B) Break branches out of loop, continue branches to loop increment/test
- C) Break sets flags, continue doesn't
- D) No difference in assembly

Q20 ANS:

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### Quick Reference Summary

#### Key Condition Codes:

- **EQ/NE:**  $Z=1$  /  $Z=0$  (Equal/Not Equal)
- **LT/GE:**  $N \neq V$  /  $N=V$  (Signed Less Than/Greater Equal)
- **GT/LE:**  $Z=0$  &  $N=V$  /  $Z=1$  or  $N \neq V$  (Signed Greater/Less Equal)
- **LO/HS:**  $C=0$  /  $C=1$  (Unsigned Lower/Higher Same)
- **HI/LS:**  $C=1$  &  $Z=0$  /  $C=0$  or  $Z=1$  (Unsigned Higher/Lower Same)

#### Flag Setting Instructions:

- **CMP:**  $R1 - R2$  (result discarded)
- **TST:**  $R1 \& R2$  (result discarded)
- **TEQ:**  $R1 \oplus R2$  (result discarded)
- **CMN:**  $R1 + R2$  (result discarded)