CMSC 311 Midterm #2 (Fall 1995)
Solutions

1.)

a) Register transfer language

A language to describe micro-operations on registers and the conditions variables that guard their execution

b) circular shift

A permutation of the bits in such that the bits are moved one position to the left (right) and the most (least) significant bit is shifted into the least (most) significant position.

c) program counter

A register the records the address of the next instruction to execute in a stored program computer.

d) micro sequencer (SC)

A counter to record the steps (micro-operations) required to execute a machine instruction.

e) Instruction Fetch

The process of reading the next instruction to execute from memory and storing it in the instruction register.

2.)

FALSE:

Subtraction can be performed using complement and add (A - B → A + B' + 1)
Multiplication can be done by repeated addition (in a loop) so 3 * 4 = 3 + 3 + 3 + 3

3.)

a)

Number	8 bit Signed-magnitude	8 bit 1's complement	8 bit 2's complement
-0	**1000 0000**	**1111 1111**	**0000 0000**
-1	**1000 0001**	**1111 1110**	**1111 1111**
-15	**1000 1111**	**1111 0000**	**1111 0001**
100	**0110 0100**	**0110 0100**	**0110 0100**

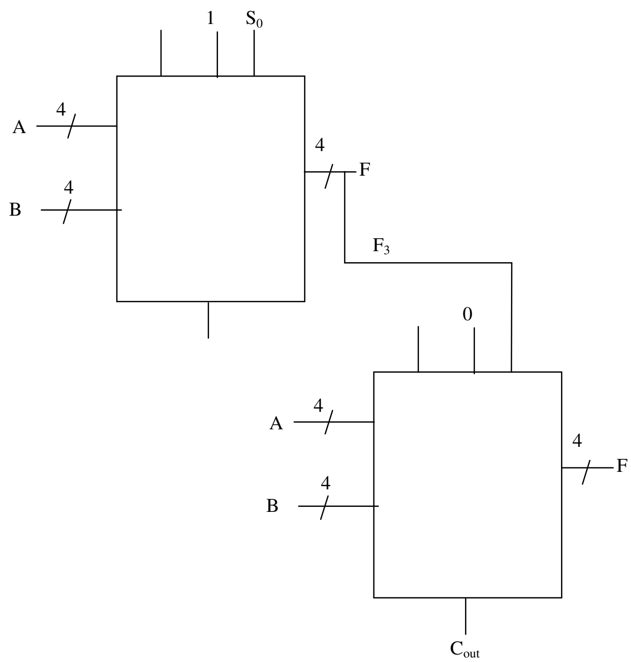
b)

Mantissa 0101 0000 1000 0000
Exponent 0000 0110

4.)

$qT_3B_1' + qT_4B_1B_0' + qT_5$:	$SC \leftarrow 0$
$qT_3(B_0 + B_1)$:	$AC \leftarrow shl(AC),\ AC(0) \leftarrow 0$
qT_4:	$AC \leftarrow shl(AC),\ AC(0) \leftarrow 0$
qT_5:	$AC \leftarrow shl(AC),\ AC(0) \leftarrow 0$

5.)



6.)