

[10 pts] Data Flow Quiz (see slides 1.12 from Ch. 9) Lastname: KEY BB id: _____

Compare 0-3 address coding (AC) machines by writing programs to compute

$$g = (a * b - c) / (d * e - f)$$

$$r7 = (r1 * r2 - r3) / (r4 * r5 - r6)$$

for the following instruction sets:

0-AC (Stack): PUSH Op1, POP Op1, ADD, SUB, MUL, DIV

1-AC (Accumulator): LA Op1, STA Op1, ADD Op1, SUB Op1, MUL Op1, DIV Op1

2-AC: LT Op1, M; ST Op1, M; ADD Op1, Op2; SUB Op1, Op2; MUL Op1, Op2; DIV Op1, Op2.

3-AC: LT Op1, M; ST Op1, M; ADD Op1, Op2, Op3; SUB Op1, Op2, Op3; MUL Op1, Op2, Op3; DIV Op1, Op2, Op3.

Stack	Accumulator	2AC	3AC (r1=a;r2=b;...)
PUSH a	LA d	MUL sA, sB	MUL r1,r1,r2
PUSH b	MUL e	SUB sA, sC	SUB r1,r1,r3
MUL	SUB f	MUL sD, sE	MUL r4,r4,r5
PUSH c	STA t	SUB sD, sF	SUB r4,r4,r6
SUB	LA a	LT sG, sA	DIV r7,r1,r4
PUSH d	MUL b	DIV sG, sD	
PUSH e	SUB c		
MUL	DIV t		
PUSH f	STA g		
SUB			
DIV			
POP g			
TIP: first Numerator	TIP: Denominator first	TIP: do not preserve values if not required	TIP: write the register number over each variable