

SOLUTION NOTES

Optimising Compilers 2003 Paper 8 Question 7 (AM)

(a)–(c) bookwork.

(d) Early means first instruction, late means just after the mul.

program	position of		no of regs	sample colouring					
	add	r1,a,b		t1	t2	t3	t4	t5	t6
left	early		3	r1	r2	r3	r2	–	–
left	late		4	r1	r4	r3	r4	–	–
right	early		5	r4	r5	r3	r5	r5	r5
right	late		4	r4	r4	r3	r4	r4	r4

(e) Well, scheduling never affects instruction time in this special case, but if we do register allocation first we may not notice the gains to be got by deciding whether to schedule the `add t1,a,b` instruction. Note that after colouring we are likely to have fixed on an allocation which uses more registers than necessary (and so cannot be fixed up by pure scheduling).