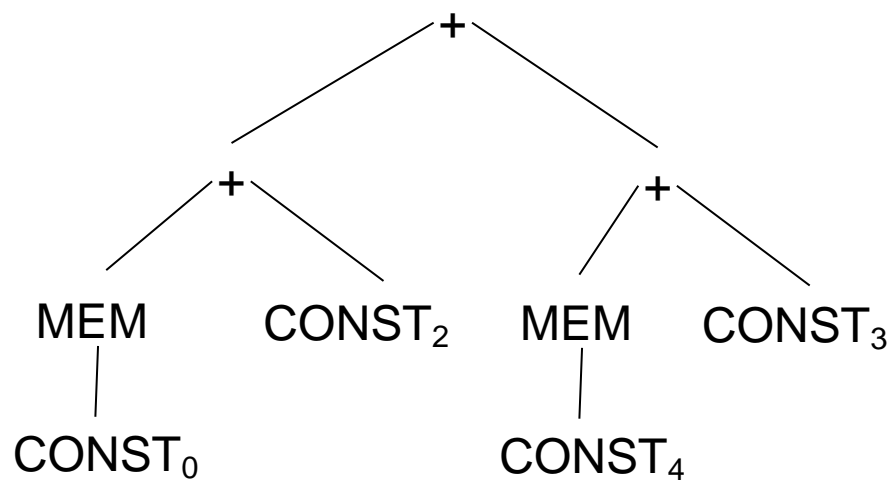# Problems 3: Code generation

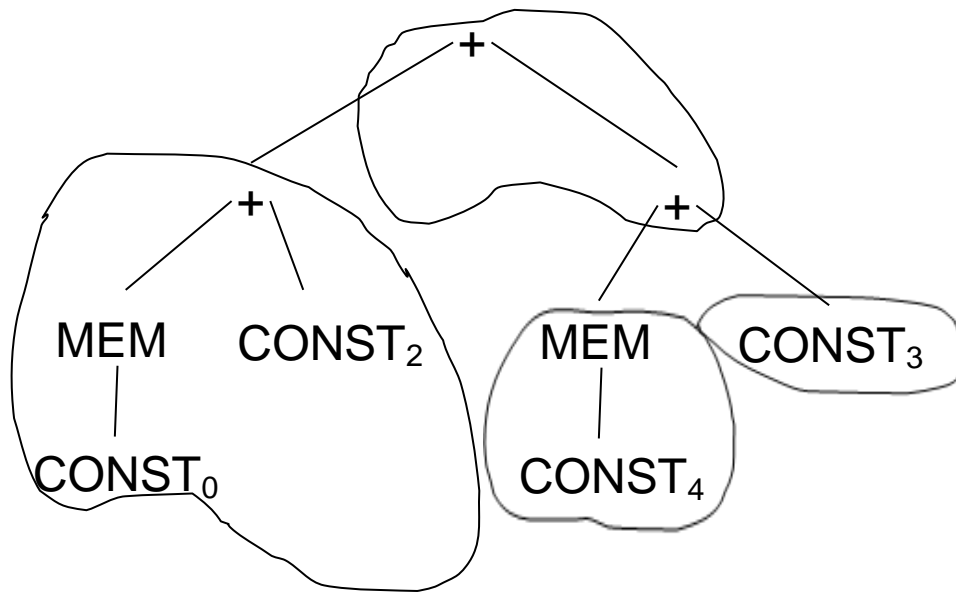Suppose that the instruction set in the lecture notes (pp 171-172) is extended by the following two instructions:

Instruction	Meaning	Tile
ADD3 Ri Rj Rk Rm	$Ri \leftarrow Rj + Rk + Rm$	
ADDM Ri a c	$Ri \leftarrow M[a] + c$	

1. Show the IR tree corresponding to the expression (x+2)+(y+3), where x and y are variables stored in memory at locations 0 and 4, respectively.

2. Use the maximal munch (greedy) algorithm to generate code for this IR tree.

$$+$$

$$+$$

MEM $CONST_2$

$CONST_0$

MEM $CONST_3$

$CONST_4$

3. Does this result in the shortest sequence of instructions?

No.

4. If not, what is the shortest sequence of instructions?

$$+$$

$$+$$

MEM $CONST_2$

$CONST_0$

$$+$$

MEM $CONST_3$

$CONST_4$