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/*****
/* Introduction to Compiler Construction */
/*                                     */
/* Christoph Kirsch                   */
/* University of Salzburg             */
/*                                     */
/* access to array elements           */
*****/

#include <stdlib.h>
#include <stdio.h>

int i;
int j;

typedef int *array_t;
array_t a;

typedef array_t *array_of_arrays_t;
array_of_arrays_t b;

main() {
    i = 0;
    // ADDI 1, 0, 0 or MOVI 1, 0, 0
    // STW 1, 28, -4

    j = 0;
    // ADDI 1, 0, 0 or MOVI 1, 0, 0
    // STW 1, 28, -8

    a = malloc(4 * sizeof(int));
    b = malloc(3 * sizeof(array_t));
    b[0] = malloc(5 * sizeof(int));
    b[1] = malloc(5 * sizeof(int));
    b[2] = malloc(5 * sizeof(int));

    i = a[j];
    // LDW 1, 28, -8
    // MULI 1, 1, 4
    // LDW 2, 28, -12: deref from VAR_MODE into REG_MODE
    // ADD 2, 2, 1: index from REG_MODE into REF_MODE
    // LDW 2, 2, 0: load from REF_MODE into REG_MODE: unlike LDW 2, 1, -24
    // STW 2, 28, -4

    i = a[2];
    // LDW 1, 28, -12: deref from VAR_MODE into REF_MODE (via REG_MODE)
    // LDW 1, 1, 2*4: load from REF_MODE into REG_MODE: unlike LDW 1, 0, -16
    // STW 1, 28, -4

    i = a[i+j];
    // LDW 1, 28, -4
    // LDW 2, 28, -8
    // ADD 1, 1, 2
    // MULI 1, 1, 4
    // LDW 2, 28, -12: deref from VAR_MODE into REG_MODE
    // ADD 2, 2, 1: index from REG_MODE into REF_MODE
    // LDW 2, 2, 0: load from REF_MODE into REG_MODE: unlike LDW 2, 1, -24
    // STW 2, 28, -4

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i = b[i][j];
// LDW 1, 28, -4
// MULI 1, 1, 4: unlike MULI 1, 1, 20
// LDW 2, 28, -16: deref from VAR_MODE into REG_MODE
// ADD 2, 2, 1: index from REG_MODE into REF_MODE
// LDW 1, 28, -8
// MULI 1, 1, 4
// LDW 2, 2, 0: deref from REF_MODE into REG_MODE
// ADD 2, 2, 1: index from REG_MODE into REF_MODE
// LDW 2, 2, 0: load from REF_MODE into REG_MODE: unlike LDW 1, 2, -84
// STW 2, 28, -4

i = b[2][4];
// LDW 1, 28, -16: deref from VAR_MODE into REF_MODE (via REG_MODE)
// LDW 1, 1, 2*4: deref from REF_MODE into REF_MODE (via REG_MODE)
// LDW 1, 1, 4*4: load from REF_MODE into REG_MODE: unlike LDW 1, 0, -28
// STW 1, 28, -4
}
```