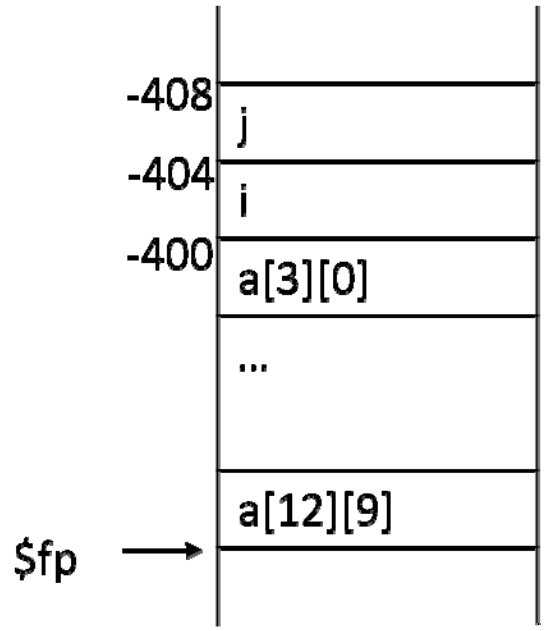
//local variables
VAR a:ARRAY[3..12][0..9] OF INTEGER
    i, j: INTEGER

In row- or column-major order,
    base of array a has offset -400
    offset of i is: -404
    offset of j is: -408

The layout is illustrated below.



To load a[i][j] in row-major order, its address is

&a[3][0]+((i-3)*(9-0+1) + (j-0))*sizeOfElement
=($fp-400) +((i-3)*10+j)*4

```
add $s0, $fp, -400  // base of a
lw $s1, -404($fp)  // load i
sub $s1, $s1, 3      // i-3
mul $s1, $s1, 10   // (i-3)*10
lw $s2, -408($fp)  //load j
add $s1, $s1, $s2   // (i-3)*10+j
mul $s1, $s1, 4      // *4
add $s0, $s0, $s1  // add base
lw $s1, ($s0)        // load a[i][j]
```

To load a[i][j] in column-major order, its address is

&a[3][0]+((j-0)*(12-3+1) + (i-3))*sizeOfElement
=($fp-400) +(j*10+(i-3))*4

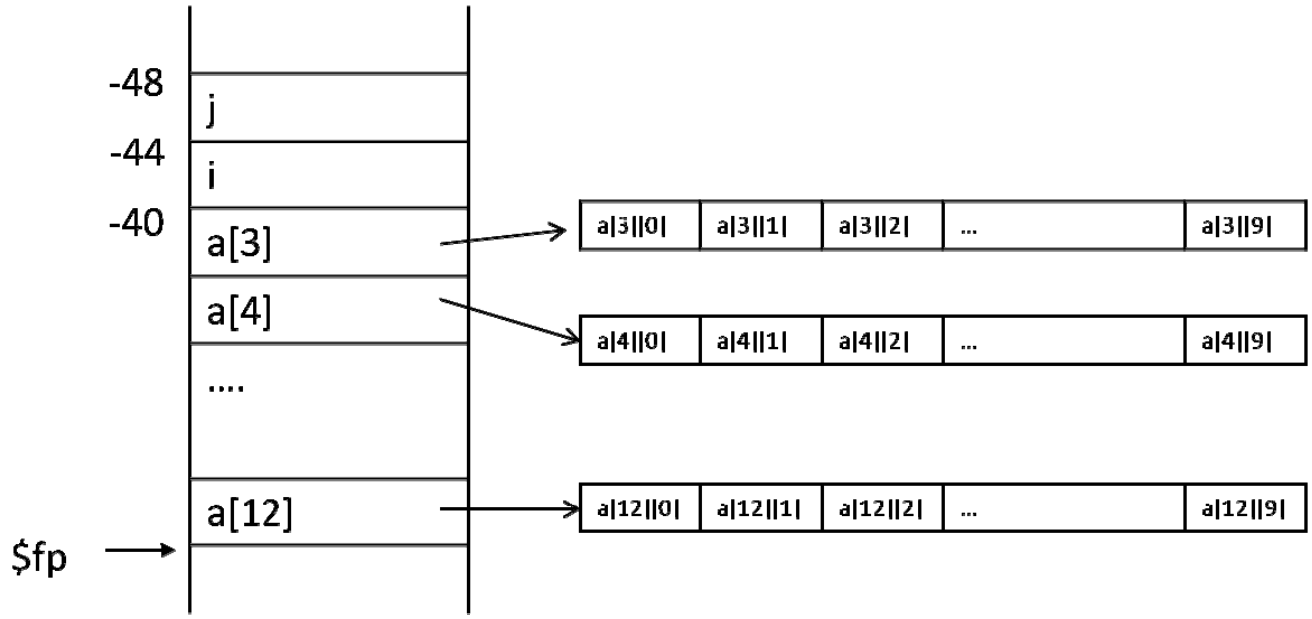
```
add $s0, $fp, -400  // base of a
lw $s1, -408($fp)  // load j
mul $s1, $s1, 10   // j*10
lw $s2, -404($fp)  //load i
sub $s2, $s2, 3       // i-3
add $s1, $s1, $s2   // j*10+(i-3)
mul $s1, $s1, 4      // *4
add $s0, $s0, $s1  // add base
lw $s1, ($s0)        // load a[i][j]
```

In row-pointer layout (see the picture below),

base of a has offset -40

i: -44

j: -48



The address of a[i][j] is

a[i] + (j-0)*sizeOfElement

= *(base a + (i-3)*4) + j*4

=*(($fp-40)+(i-3)*4)) + j*4

```
add $s0, $fp, -40       // base of a
lw $s1, -44($fp)        // load i
sub $s1, $s1, 3         // i-3
mul $s1, $s1, 4         // (i-3)*4
add $s0, $s0, $s1       //base a+ (i-3)*4 -> &a[i]
lw  $s1, ($s0)          // load a[i]
lw $s0, -48($fp)        //load j
mul $s0, $s0, 4         // *4
add $s1, $s1, $s0       // add base (*a[i])
lw $s0, ($s1)           // load a[i][j]
```