

swap:

```
Mem[0] -> $t30
Mem[$t30, 0] -> $t29
$t29 -> Mem[$fp, 8]
Mem[0] -> $t32
Mem[$t32, 0] -> $t31
Mem[4] -> $t34
Mem[$t34, 0] -> $t33
$t33 -> $t31
Mem[0] -> $t35
$t31 -> Mem[$t35, 0]
Mem[4] -> $t37
Mem[$t37, 0] -> $t36
Mem[8] -> $t38
$t38 -> $t36
Mem[4] -> $t39
$t36 -> Mem[$t39, 0]
```

l1:

partition:

```
Mem[0] -> $t41
Mem[8] -> $t42
$t42 MUL #4 -> $t43
$t41 ADD $t43 -> $t44
$t44 -> $t40
$t40 -> Mem[$fp, 12]
Mem[4] -> $t45
#1 -> $t46
$t45 SUB $t46 -> $t47
$t47 -> Mem[$fp, 16]
Mem[4] -> $t48
$t48 -> Mem[$fp, 20]
```

l5:

```
Mem[20] -> $t49
Mem[8] -> $t50
#1 -> $t51
$t50 SUB $t51 -> $t52
$t49 LE $t52 -> $t53
if not $t53 ? goto l6
Mem[0] -> $t55
Mem[20] -> $t56
$t56 MUL #4 -> $t57
$t55 ADD $t57 -> $t58
$t58 -> $t54
Mem[12] -> $t59
$t54 LE $t59 -> $t60
if not $t60 ? goto l7
Mem[16] -> $t62
$t62 ADD #1 -> $t61
$t61 -> Mem[$fp, 16]
Mem[0] -> $t64
Mem[0] -> $t67
Mem[16] -> $t68
$t68 MUL #4 -> $t69
$t67 ADD $t69 -> $t70
```

```

$t70 -> $t66
$fp ADD #0 -> $t71
Mem[16] -> $t72
#4 MUL $t72 -> $t73
$t71 ADD $t73 -> $t71
$t71 -> $t65
Mem[0] -> $t76
Mem[20] -> $t77
$t77 MUL #4 -> $t78
$t76 ADD $t78 -> $t79
$t79 -> $t75
$fp ADD #0 -> $t80
Mem[20] -> $t81
#4 MUL $t81 -> $t82
$t80 ADD $t82 -> $t80
$t80 -> $t74
call swap $t65 $t74
$ra -> $t63

```

l7:

```

Mem[20] -> $t84
$t84 -> $t83
$t84 ADD #1 -> $t84
goto l5

```

l6:

```

Mem[16] -> $t86
$t86 ADD #1 -> $t85
$t85 -> Mem[$fp, 16]
Mem[0] -> $t88
Mem[0] -> $t91
Mem[16] -> $t92
$t92 MUL #4 -> $t93
$t91 ADD $t93 -> $t94
$t94 -> $t90
$fp ADD #0 -> $t95
Mem[16] -> $t96
#4 MUL $t96 -> $t97
$t95 ADD $t97 -> $t95
$t95 -> $t89
Mem[0] -> $t100
Mem[8] -> $t101
$t101 MUL #4 -> $t102
$t100 ADD $t102 -> $t103
$t103 -> $t99
$fp ADD #0 -> $t104
Mem[8] -> $t105
#4 MUL $t105 -> $t106
$t104 ADD $t106 -> $t104
$t104 -> $t98
call swap $t89 $t98
$ra -> $t87
Mem[16] -> $t107
return $t107
goto l3

```

l3:

qsort:

```
#-1 -> $t108
$t108 -> Mem[$fp, 12]
Mem[4] -> $t109
Mem[8] -> $t110
$t109 LT $t110 -> $t111
if not $t111 ? goto l12
Mem[12] -> $t112
Mem[12] -> $t114
Mem[0] -> $t115
Mem[4] -> $t116
Mem[8] -> $t117
call partition $t115 $t116 $t117
$ra -> $t113
$t113 -> $t112
$t112 -> Mem[$fp, 12]
Mem[36] -> $t119
Mem[0] -> $t120
Mem[4] -> $t121
Mem[12] -> $t122
#1 -> $t123
$t122 SUB $t123 -> $t124
call qsort $t120 $t121 $t124
$ra -> $t118
Mem[36] -> $t126
Mem[0] -> $t127
Mem[12] -> $t128
#1 -> $t129
$t128 ADD $t129 -> $t130
Mem[8] -> $t131
call qsort $t127 $t130 $t131
$ra -> $t125
```

l12:

l10:

main:

```
#0 -> $t132
$t132 -> Mem[$fp, 8]
#9 -> $t133
#8 -> $t134
#7 -> $t135
#6 -> $t136
#5 -> $t137
#4 -> $t138
#3 -> $t139
#2 -> $t140
#1 -> $t141
#0 -> $t142
$t142 -> Mem[$fp, 12]
Mem[36] -> $t144
Mem[12] -> $t145
#0 -> $t146
#9 -> $t147
call qsort $t145 $t146 $t147
$ra -> $t143
```

```

l19:
    Mem[8] -> $t148
    #10 -> $t149
    $t148 LT $t149 -> $t150
    if not $t150 ? goto l20
    Mem[0] -> $t152

%d\n:
    Mem[12] -> $t155
    Mem[8] -> $t156
    $t156 MUL #4 -> $t157
    $t155 ADD $t157 -> $t158
    $t158 -> $t154
    call printf $t153 $t154
    $ra -> $t151
    Mem[8] -> $t160
    $t160 -> $t159
    $t160 ADD #1 -> $t160
    goto l19

l20:
    #0 -> $t161
    return $t161
    goto l16

l16:

```