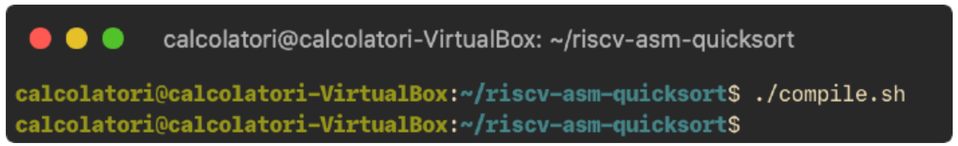
partition()

```
partition:
    # save stuff in the stack
    addi sp, sp, -24
    sd ra, 0(sp)
    sd s10, 8(sp)
    sd s11, 16(sp)

    # init pivot to high (a3)
    add t0, a1, a3
    lbu t0, 0(t0)

    addi t2, a2, -1     # (i) index of the smaller element => t2 = low - 1
    mv t6, a2           # t6 = j = low
    addi t5, a3, -1     # t5 = high-1

    partition_forloop:
    bgt t6, t5, partition_forloop_end    # if t6 > t5 then partition_forloop_end
        add s11, a1, t6         # s11 = *arr[j]
        lbu t1, 0(s11)           # t1 = *(arr[j])

        bgtu t1, t0, partition_forloop_inner_skip    # if t1>t0 skip (if arr[j]>pivot)
            addi t2, t2, 1      # i++
            add s10, a1, t2     # s10 = *arr[t2] = *arr[i]
            lbu t3, 0(s10)       # t3 = *(arr[i])
            sb t3, 0(s11)       # arr[j] = t3
            sb t1, 0(s10)       # arr[i] = t1
        partition_forloop_inner_skip:

        addi t6, t6, 1  # j++
    j partition_forloop
    partition_forloop_end:

    addi a0, t2, 1      # write return value as i+1

    # swap(&arr[i+1], &arr[high])
    add s10, a1, a0         # s10 = *arr[i+1]
    add s11, a1, a3         # s11 = *arr[high]
    lbu t2, 0(s10)           # t2 = *s10
    lbu t3, 0(s11)           # t3 = *s11
    sb t2, 0(s11)
    sb t3, 0(s10)

    # load stuff back from the stack
    ld ra, 0(sp)
    ld s10, 8(sp)
    ld s11, 16(sp)
    addi sp, sp, 24
partition_bail:
    ret
```

```
def partition(arr,low,high):
    i = (low-1)          # index of smaller element
    pivot = arr[high]      # pivot

    for j in range(low, high):
        # If current element is smaller than or
        # equal to pivot
        if arr[j] <= pivot:

            # increment index of smaller element
            i = i+1
            arr[i],arr[j] = arr[j],arr[i]

    arr[i+1],arr[high] = arr[high],arr[i+1]
    return(i+1)
```

Debug e verifica delle funzionalità

- **Compilazione**
  È necessario eseguire **`./compile.sh`**



- **Esecuzione**
  È obbligatorio eseguirlo con il debugger attivo (altrimenti non sarà possibile vedere il risultato) scrivendo **`qemu-riscv64 -g 2323 ./quicksort`**

- **Debug**
  Per debuggare basterà avviare **`./debug.sh`**;
  Basterà poi scrivere **`display/7b &nomevar`**; per visualizzare **`&nomevar`** a ogni step.
  Ad esempio: **`display/7b &testarray`**

```
1: x/7xb &testarray
0x11285:        0x01    0x03    0x05    0x06    0x07    0x08    0x0a
(gdb)
[Inferior 1 (Remote target) exited with code 06]
(gdb)
```