CSC 369 Worksheet 8 Solution

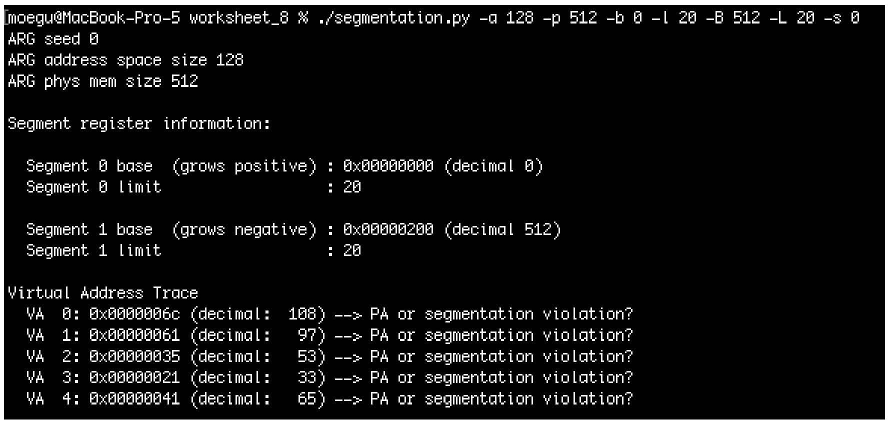
August 25, 2020

1. I need to translate the addresses in the following sets of parameters

   - `./segmentation.py -a 128 -p 512 -b 0 -l 20 -B 512 -L 20 -s 0`
   - `./segmentation.py -a 128 -p 512 -b 0 -l 20 -B 512 -L 20 -s 1`
   - `./segmentation.py -a 128 -p 512 -b 0 -l 20 -B 512 -L 20 -s 2`

   Running each command results as follows, with the following sets of valid and invalid addresses

   - `./segmentation.py -a 128 -p 512 -b 0 -l 20 -B 512 -L 20 -s 0`



```
moegu@MacBook-Pro-5 worksheet_8 % ./segmentation.py -a 128 -p 512 -b 0 -l 20 -B 512 -L 20 -s 0
ARG seed 0
ARG address space size 128
ARG phys mem size 512

Segment register information:

  Segment 0 base  (grows positive) : 0x00000000 (decimal 0)
  Segment 0 limit                  : 20

  Segment 1 base  (grows negative) : 0x00000200 (decimal 512)
  Segment 1 limit                  : 20

Virtual Address Trace
  VA  0: 0x0000006c (decimal:  108) --> PA or segmentation violation?
  VA  1: 0x00000061 (decimal:   97) --> PA or segmentation violation?
  VA  2: 0x00000035 (decimal:   53) --> PA or segmentation violation?
  VA  3: 0x00000021 (decimal:   33) --> PA or segmentation violation?
  VA  4: 0x00000041 (decimal:   65) --> PA or segmentation violation?
```

     - `VA 0: 0x0000006c (decimal: 108)` → Segment violation
     - `VA 1: 0x00000061 (decimal: 97)` → Segment violation
     - `VA 2: 0x00000035 (decimal: 53)` → Segment violation
     - `VA 3: 0x00000021 (decimal: 33)` → Segment violation
     - `VA 4: 0x00000041 (decimal: 65)` → Segment violation

   - `./segmentation.py -a 128 -p 512 -b 0 -l 20 -B 512 -L 20 -s 1`

- `./segmentation.py -a 128 -p 512 -b 0 -l 20 -B 512 -L 20 -s 2`

Notes

- I need help on this question
- How do we know tell which VA goes to which segmentation?
- How could VA 0 (decimal 108) be valid at SEG 1 (decimal 492) when limit is 20?
- **Segmentation**
  - **Segment** is a contigous portion of the address space of a particular length
  - Is about the big chunk of space in the middle

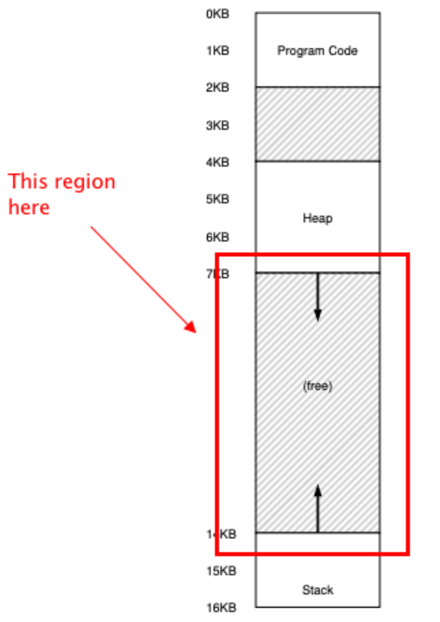
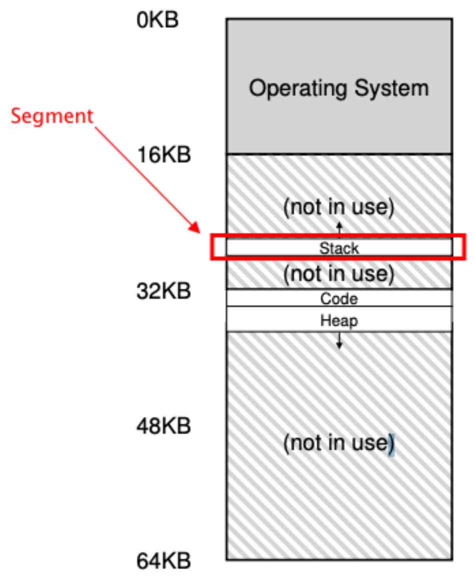


Figure 16.1: **An Address Space (Again)**

  - **Segmentation** allows the OS to place each one of the logical segments (i.e. stack, heap, program code) in different parts of physical memory, and avoid filling physical memory with unused virtual address space



- **Which Segment Are We Referring To?**
  - **Explicit Approach**
  - **Implicit Approach**