Ch.15 Simulation hw
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1. Seed 1. -

   Base : 0x0000363c (decimal 13884)
   Limit : 290

   VA 0: 0x0000030e (decimal: 782) --> segmentation violation
   VA 1: 0x00000105 (decimal: 261) --> Valid - 14145
   VA 2: 0x000001fb (decimal: 507) --> segmentation violation
   VA 3: 0x000001cc (decimal: 460) --> segmentation violation
   VA 4: 0x0000029b (decimal: 667) --> segmentation violation

   Seed 2 -

   Base : 0x00003ca9 (decimal 15529)
   Limit : 500

   VA 0: 0x00000039 (decimal: 57) --> Valid - 15586
   VA 1: 0x00000056 (decimal: 86) --> Valid - 15615
   VA 2: 0x00000357 (decimal: 855) --> segmentation violation
   VA 3: 0x000002f1 (decimal: 753) --> segmentation violation
   VA 4: 0x000002ad (decimal: 685) --> segmentation violation

   Seed 3 -

   Base : 0x000022d4 (decimal 8916)
   Limit : 316

   VA 0: 0x0000017a (decimal: 378) --> segmentation violation
   VA 1: 0x0000026a (decimal: 618) --> segmentation violation
   VA 2: 0x00000280 (decimal: 640) --> segmentation violation
   VA 3: 0x00000043 (decimal: 67) --> Valid - 8983
   VA 4: 0x0000000d (decimal: 13) --> Valid - 8929

2.

```
tholmquist@tholmquist:~/Downloads/OS_ch15_hw$ ./relocation.py -s 0 -n 10 -l 930

ARG seed 0
ARG address space size 1k
ARG phys mem size 16k

Base-and-Bounds register information:

  Base   : 0x0000360b (decimal 13835)
  Limit  : 930

Virtual Address Trace
  VA  0: 0x00000308 (decimal:  776) --> PA or segmentation violation?
  VA  1: 0x000001ae (decimal:  430) --> PA or segmentation violation?
  VA  2: 0x00000109 (decimal:  265) --> PA or segmentation violation?
  VA  3: 0x0000020b (decimal:  523) --> PA or segmentation violation?
  VA  4: 0x0000019e (decimal:  414) --> PA or segmentation violation?
  VA  5: 0x00000322 (decimal:  802) --> PA or segmentation violation?
  VA  6: 0x00000136 (decimal:  310) --> PA or segmentation violation?
  VA  7: 0x000001e8 (decimal:  488) --> PA or segmentation violation?
  VA  8: 0x00000255 (decimal:  597) --> PA or segmentation violation?
  VA  9: 0x000003a1 (decimal:  929) --> PA or segmentation violation?

For each virtual address, either write down the physical address it translates to
OR write down that it is an out-of-bounds address (a segmentation violation). For
this problem, you should assume a simple virtual address space of a given size.

tholmquist@tholmquist:~/Downloads/OS_ch15_hw$
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I needed to set -l to 930 in order for all of the virtual addresses to fit within the bounds since the largest VA was 930.

3.

```
tholmquist@tholmquist:~/Downloads/OS_ch15_hw$ ./relocation.py -s 1 -n 10 -l 100 -b 16284 -c

ARG seed 1
ARG address space size 1k
ARG phys mem size 16k

Base-and-Bounds register information:

  Base   : 0x00003f9c (decimal 16284)
  Limit  : 100

Virtual Address Trace
  VA  0: 0x00000089 (decimal:  137) --> SEGMENTATION VIOLATION
  VA  1: 0x00000363 (decimal:  867) --> SEGMENTATION VIOLATION
  VA  2: 0x0000030e (decimal:  782) --> SEGMENTATION VIOLATION
  VA  3: 0x00000105 (decimal:  261) --> SEGMENTATION VIOLATION
  VA  4: 0x000001fb (decimal:  507) --> SEGMENTATION VIOLATION
  VA  5: 0x000001cc (decimal:  460) --> SEGMENTATION VIOLATION
  VA  6: 0x0000029b (decimal:  667) --> SEGMENTATION VIOLATION
  VA  7: 0x00000327 (decimal:  807) --> SEGMENTATION VIOLATION
  VA  8: 0x00000060 (decimal:   96) --> VALID: 0x00003ffc (decimal: 16380)
  VA  9: 0x0000001d (decimal:   29) --> VALID: 0x00003fb9 (decimal: 16313)

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```

The max base you could set would be 16284 because the physical memory size is 16kb and 16*1024-100 = 16284.

4.

```
tholmquist@tholmquist:~/Downloads/OS_ch15_hw$ ./relocation.py -s 1 -n 10 -l 100 -a 64k -p 32m -c

ARG seed 1
ARG address space size 64k
ARG phys mem size 32m

Base-and-Bounds register information:

  Base   : 0x0044cb63 (decimal 4508515)
  Limit  : 100

Virtual Address Trace
  VA  0: 0x0000d8f1 (decimal: 55537) --> SEGMENTATION VIOLATION
  VA  1: 0x0000c386 (decimal: 50054) --> SEGMENTATION VIOLATION
  VA  2: 0x0000414c (decimal: 16716) --> SEGMENTATION VIOLATION
  VA  3: 0x00007ed4 (decimal: 32468) --> SEGMENTATION VIOLATION
  VA  4: 0x00007311 (decimal: 29457) --> SEGMENTATION VIOLATION
  VA  5: 0x0000a6ce (decimal: 42702) --> SEGMENTATION VIOLATION
  VA  6: 0x0000c9e9 (decimal: 51689) --> SEGMENTATION VIOLATION
  VA  7: 0x00001807 (decimal: 6151) --> SEGMENTATION VIOLATION
  VA  8: 0x00000741 (decimal: 1857) --> SEGMENTATION VIOLATION
  VA  9: 0x0000d5f4 (decimal: 54772) --> SEGMENTATION VIOLATION

tholmquist@tholmquist:~/Downloads/OS_ch15_hw$
```

```
tholmquist@tholmquist:~/Downloads/OS_ch15_hw$ ./relocation.py -s 0 -n 10 -a 64k -p 32m -c

ARG seed 0
ARG address space size 64k
ARG phys mem size 32m

Base-and-Bounds register information:

  Base   : 0x01841299 (decimal 25432729)
  Limit  : 30219

Virtual Address Trace
  VA  0: 0x00006baa (decimal: 27562) --> VALID: 0x01847e43 (decimal: 25460291)
  VA  1: 0x00004248 (decimal: 16968) --> VALID: 0x018454e1 (decimal: 25449697)
  VA  2: 0x000082e2 (decimal: 33506) --> SEGMENTATION VIOLATION
  VA  3: 0x000067a9 (decimal: 26537) --> VALID: 0x01847a42 (decimal: 25459266)
  VA  4: 0x0000c8a7 (decimal: 51367) --> SEGMENTATION VIOLATION
  VA  5: 0x00004da5 (decimal: 19877) --> VALID: 0x0184603e (decimal: 25452606)
  VA  6: 0x00007a02 (decimal: 31234) --> SEGMENTATION VIOLATION
  VA  7: 0x00009558 (decimal: 38232) --> SEGMENTATION VIOLATION
  VA  8: 0x0000e87a (decimal: 59514) --> SEGMENTATION VIOLATION
  VA  9: 0x00008133 (decimal: 33075) --> SEGMENTATION VIOLATION

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```

```
tholmquist@tholmquist:~/Downloads/OS_ch15_hw$ ./relocation.py -s 0 -n 10 -l 59515 -a 64k -p 32m -c

ARG seed 0
ARG address space size 64k
ARG phys mem size 32m

Base-and-Bounds register information:

  Base   : 0x01b0580f (decimal 28334095)
  Limit  : 59515

Virtual Address Trace
  VA  0: 0x0000c209 (decimal: 49673) --> VALID: 0x01b11a18 (decimal: 28383768)
  VA  1: 0x00006baa (decimal: 27562) --> VALID: 0x01b0c3b9 (decimal: 28361657)
  VA  2: 0x00004248 (decimal: 16968) --> VALID: 0x01b09a57 (decimal: 28351063)
  VA  3: 0x000082e2 (decimal: 33506) --> VALID: 0x01b0daf1 (decimal: 28367601)
  VA  4: 0x000067a9 (decimal: 26537) --> VALID: 0x01b0bfb8 (decimal: 28360632)
  VA  5: 0x0000c8a7 (decimal: 51367) --> VALID: 0x01b120b6 (decimal: 28385462)
  VA  6: 0x00004da5 (decimal: 19877) --> VALID: 0x01b0a5b4 (decimal: 28353972)
  VA  7: 0x00007a02 (decimal: 31234) --> VALID: 0x01b0d211 (decimal: 28365329)
  VA  8: 0x00009558 (decimal: 38232) --> VALID: 0x01b0ed67 (decimal: 28372327)
  VA  9: 0x0000e87a (decimal: 59514) --> VALID: 0x01b14089 (decimal: 28393609)

tholmquist@tholmquist:~/Downloads/OS_ch15_hw$
```

5.

```
tholmquist@tholmquist:~/Downloads/OS_ch15_hw$ python relocation.py -s 1 -a 1k -p 4k -n 10 -l 0 -c

ARG seed 1
ARG address space size 1k
ARG phys mem size 4k

Base-and-Bounds register information:

  Base   : 0x00000226 (decimal 550)
  Limit  : 0

Virtual Address Trace
  VA  0: 0x00000363 (decimal:  867) --> SEGMENTATION VIOLATION
  VA  1: 0x0000030e (decimal:  782) --> SEGMENTATION VIOLATION
  VA  2: 0x00000105 (decimal:  261) --> SEGMENTATION VIOLATION
  VA  3: 0x000001fb (decimal:  507) --> SEGMENTATION VIOLATION
  VA  4: 0x000001cc (decimal:  460) --> SEGMENTATION VIOLATION
  VA  5: 0x0000029b (decimal:  667) --> SEGMENTATION VIOLATION
  VA  6: 0x00000327 (decimal:  807) --> SEGMENTATION VIOLATION
  VA  7: 0x00000060 (decimal:   96) --> SEGMENTATION VIOLATION
  VA  8: 0x0000001d (decimal:   29) --> SEGMENTATION VIOLATION
  VA  9: 0x00000357 (decimal:  855) --> SEGMENTATION VIOLATION
```

```
tholmquist@tholmquist:~/Downloads/OS_ch15_hw$ python relocation.py -s 1 -a 1k -p 4k -n 10 -l 128 -c

ARG seed 1
ARG address space size 1k
ARG phys mem size 4k

Base-and-Bounds register information:

  Base   : 0x00000226 (decimal 550)
  Limit  : 128

Virtual Address Trace
  VA  0: 0x00000363 (decimal:  867) --> SEGMENTATION VIOLATION
  VA  1: 0x0000030e (decimal:  782) --> SEGMENTATION VIOLATION
  VA  2: 0x00000105 (decimal:  261) --> SEGMENTATION VIOLATION
  VA  3: 0x000001fb (decimal:  507) --> SEGMENTATION VIOLATION
  VA  4: 0x000001cc (decimal:  460) --> SEGMENTATION VIOLATION
  VA  5: 0x0000029b (decimal:  667) --> SEGMENTATION VIOLATION
  VA  6: 0x00000327 (decimal:  807) --> SEGMENTATION VIOLATION
  VA  7: 0x00000060 (decimal:   96) --> VALID: 0x00000286 (decimal:  646)
  VA  8: 0x0000001d (decimal:   29) --> VALID: 0x00000243 (decimal:  579)
  VA  9: 0x00000357 (decimal:  855) --> SEGMENTATION VIOLATION
```

```
tholmquist@tholmquist:~/Downloads/OS_ch15_hw$ python relocation.py -s 1 -a 1k -p 4k -n 10 -l 256 -c

ARG seed 1
ARG address space size 1k
ARG phys mem size 4k

Base-and-Bounds register information:

  Base   : 0x00000226 (decimal 550)
  Limit  : 256

Virtual Address Trace
  VA  0: 0x00000363 (decimal:  867) --> SEGMENTATION VIOLATION
  VA  1: 0x0000030e (decimal:  782) --> SEGMENTATION VIOLATION
  VA  2: 0x00000105 (decimal:  261) --> SEGMENTATION VIOLATION
  VA  3: 0x000001fb (decimal:  507) --> SEGMENTATION VIOLATION
  VA  4: 0x000001cc (decimal:  460) --> SEGMENTATION VIOLATION
  VA  5: 0x0000029b (decimal:  667) --> SEGMENTATION VIOLATION
  VA  6: 0x00000327 (decimal:  807) --> SEGMENTATION VIOLATION
  VA  7: 0x00000060 (decimal:   96) --> VALID: 0x00000286 (decimal:  646)
  VA  8: 0x0000001d (decimal:   29) --> VALID: 0x00000243 (decimal:  579)
  VA  9: 0x00000357 (decimal:  855) --> SEGMENTATION VIOLATION
```

```
tholmquist@tholmquist:~/Downloads/OS_ch15_hw$ python relocation.py -s 1 -a 1k -p 4k -n 10 -l 512 -c

ARG seed 1
ARG address space size 1k
ARG phys mem size 4k

Base-and-Bounds register information:

  Base   : 0x00000226 (decimal 550)
  Limit  : 512

Virtual Address Trace
  VA  0: 0x00000363 (decimal:  867) --> SEGMENTATION VIOLATION
  VA  1: 0x0000030e (decimal:  782) --> SEGMENTATION VIOLATION
  VA  2: 0x00000105 (decimal:  261) --> VALID: 0x0000032b (decimal:  811)
  VA  3: 0x000001fb (decimal:  507) --> VALID: 0x00000421 (decimal: 1057)
  VA  4: 0x000001cc (decimal:  460) --> VALID: 0x000003f2 (decimal: 1010)
  VA  5: 0x0000029b (decimal:  667) --> SEGMENTATION VIOLATION
  VA  6: 0x00000327 (decimal:  807) --> SEGMENTATION VIOLATION
  VA  7: 0x00000060 (decimal:   96) --> VALID: 0x00000286 (decimal:  646)
  VA  8: 0x0000001d (decimal:   29) --> VALID: 0x00000243 (decimal:  579)
  VA  9: 0x00000357 (decimal:  855) --> SEGMENTATION VIOLATION
```

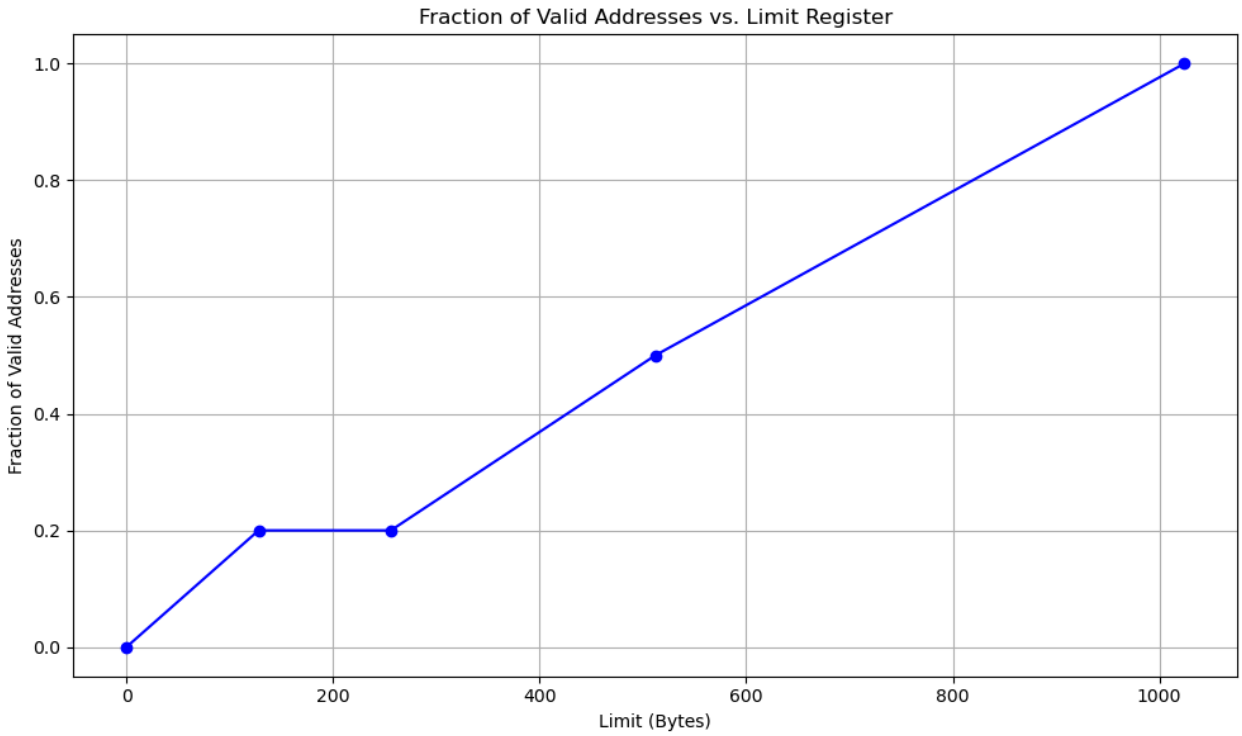
```
tholmquist@tholmquist:~/Downloads/OS_ch15_hw$ python relocation.py -s 1 -a 1k -p 4k -n 10 -l 1024 -c

ARG seed 1
ARG address space size 1k
ARG phys mem size 4k

Base-and-Bounds register information:

  Base   : 0x00000226 (decimal 550)
  Limit  : 1024

Virtual Address Trace
  VA  0: 0x00000363 (decimal:  867) --> VALID: 0x00000589 (decimal: 1417)
  VA  1: 0x0000030e (decimal:  782) --> VALID: 0x00000534 (decimal: 1332)
  VA  2: 0x00000105 (decimal:  261) --> VALID: 0x0000032b (decimal:  811)
  VA  3: 0x000001fb (decimal:  507) --> VALID: 0x00000421 (decimal: 1057)
  VA  4: 0x000001cc (decimal:  460) --> VALID: 0x000003f2 (decimal: 1010)
  VA  5: 0x0000029b (decimal:  667) --> VALID: 0x000004c1 (decimal: 1217)
  VA  6: 0x00000327 (decimal:  807) --> VALID: 0x0000054d (decimal: 1357)
  VA  7: 0x00000060 (decimal:   96) --> VALID: 0x00000286 (decimal:  646)
  VA  8: 0x0000001d (decimal:   29) --> VALID: 0x00000243 (decimal:  579)
  VA  9: 0x00000357 (decimal:  855) --> VALID: 0x0000057d (decimal: 1405)
```



As the bounds get closer to the limit a higher percentage of VA's are within bounds.