

Karam Hussain 27857

q1)

```
G karamhussain@DESKTOP-RPQLKS: ~/xv6-labs-2025
hart 2 starting
hart 1 starting
init: starting sh
$ pgtbltest
print_pgtbl starting
va 0x0 pte 0x21FC885B pa 0x87F22000 perm 0x5B
va 0x1000 pte 0x21FC7C5B pa 0x87F1F000 perm 0x5B
va 0x2000 pte 0x21FC7817 pa 0x87F1E000 perm 0x17
va 0x3000 pte 0x21FC7407 pa 0x87F1D000 perm 0x7
va 0x4000 pte 0x21FC70D7 pa 0x87F1C000 perm 0xD7
va 0x5000 pte 0x0 pa 0x0 perm 0x0
va 0x6000 pte 0x0 pa 0x0 perm 0x0
va 0x7000 pte 0x0 pa 0x0 perm 0x0
va 0x8000 pte 0x0 pa 0x0 perm 0x0
va 0x9000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFF6000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFF7000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFF8000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFF9000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFFA000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFFB000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFFC000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFFD000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFFE000 pte 0x21FD08C7 pa 0x87F42000 perm 0xC7
va 0x3FFFFFFF000 pte 0x20000184B pa 0x80006000 perm 0x4B
print_pgtbl: OK
ugetpid_test starting
usertrap(): unexpected scause 0xd pid=3
    sepc=0x79e stval=0x3fffffd000
$
```

q2)

```
G karamhussain@DESKTOP-RPQLKS: ~/xv6-labs-2025
hart 1 starting
hart 2 starting
init: starting sh
$ pgtbltest
print_pgtbl starting
va 0x0 pte 0x21FC7C5B pa 0x87F1F000 perm 0x5B
va 0x1000 pte 0x21FC705B pa 0x87F1C000 perm 0x5B
va 0x2000 pte 0x21FC6C17 pa 0x87F1B000 perm 0x17
va 0x3000 pte 0x21FC6807 pa 0x87F1A000 perm 0x7
va 0x4000 pte 0x21FC64D7 pa 0x87F19000 perm 0xD7
va 0x5000 pte 0x0 pa 0x0 perm 0x0
va 0x6000 pte 0x0 pa 0x0 perm 0x0
va 0x7000 pte 0x0 pa 0x0 perm 0x0
va 0x8000 pte 0x0 pa 0x0 perm 0x0
va 0x9000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFF6000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFF7000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFF8000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFF9000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFFA000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFFB000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFFC000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFFD000 pte 0x0 pa 0x0 perm 0x0
va 0x3FFFFFFE000 pte 0x21FD4813 pa 0x87F52000 perm 0x13
va 0x3FFFFFFF000 pte 0x21FD00C7 pa 0x87F40000 perm 0xC7
va 0x3FFFFFFF000 pte 0x20000184B pa 0x80006000 perm 0x4B
print_pgtbl: OK
ugetpid_test starting
ugetpid_test: OK
print_kpgtbl starting
print_kpgtbl: OK
```

```
karamhussain@DESKTOP-RPQLKS: ~/xv6-labs-2025
oline.o kernel/trap.o kernel/syscall.o kernel/sysproc.o kernel/
nel/sleeplock.o kernel/file.o kernel/pipe.o kernel/exec.o kerne
nel/plic.o kernel/virtio_disk.o kernel/start.o kernel/console.o
nel/spinlock.o
riscv64-linux-gnu-ld: warning: kernel/kernel has a LOAD segment
riscv64-linux-gnu-objdump -S kernel/kernel > kernel/kernel.asm
riscv64-linux-gnu-objdump -t kernel/kernel | sed '1,/SYMBOL TAB
ernel.sym
make[1]: Leaving directory '/home/karamhussain/xv6-labs-2025'
== Test pgtbltest ==
$ make qemu-gdb
(6.7s)
== Test pgtbltest: ugetpid ==
pgtbltest: ugetpid: OK
```

q3)

```
karamhussain@DESKTOP-RPQLKS: ~/xv6-labs-2025
va 0x3FFFFFFD000 pte 0x21FD4813 pa 0x87F52000 perm 0x13
va 0x3FFFFFFE000 pte 0x21FD00C7 pa 0x87F40000 perm 0xC7
va 0x3FFFFFFF000 pte 0x2000184B pa 0x80006000 perm 0x4B
print_kpgtbl: OK
ugetpid_test starting
ugetpid_test: OK
print_kpgtbl starting
page table 0x0000000087f22000
... 0x0000000000000000: pte 0x0000000021fc7801 pa 0x0000000087f1e000
... 0x0000000000000000: pte 0x0000000021fc7401 pa 0x0000000087f1d000
... 0x0000000000000000: pte 0x0000000021fc7c5b pa 0x0000000087f1f000
... 0x0000000000001000: pte 0x0000000021fc705b pa 0x0000000087f1c000
... 0x0000000000002000: pte 0x0000000021fc6cd7 pa 0x0000000087f1b000
... 0x0000000000003000: pte 0x0000000021fc6807 pa 0x0000000087f1a000
... 0x0000000000004000: pte 0x0000000021fc64d7 pa 0x0000000087f19000
.0x0000003fc00000: pte 0x0000000021fc8401 pa 0x0000000087f21000
... 0x0000003ffffe0000: pte 0x0000000021fc8001 pa 0x0000000087f20000
... 0x0000003fffffd000: pte 0x0000000021fd4853 pa 0x0000000087f52000
... 0x0000003fffffe000: pte 0x0000000021fd00c7 pa 0x0000000087f40000
... 0x0000003ffffff000: pte 0x000000002000184b pa 0x0000000080006000
print_kpgtbl: OK
superpg_fork starting
pgtbltest: superpg_fork failed: pte different, pid=3
$ -
```

```
karamhussain@DESKTOP-RPQLKS: ~/xv6-labs-2025
riscv64-linux-gnu-objdump -S kernel/kernel > kernel/kernel.asm
riscv64-linux-gnu-objdump -t kernel/kernel | sed '1,/SYMBOL TABLE
ernel.sym
make[1]: Leaving directory '/home/karamhussain/xv6-labs-2025'
== Test pgtbltest ==
$ make qemu-gdb
(8.4s)
== Test pgtbltest: ugetpid ==
pgtbltest: ugetpid: OK
== Test pgtbltest: print_kpgtbl ==
pgtbltest: print_kpgtbl: OK
```

q4)

```
karamhussain@DESKTOP-RPQLKS: ~/xv6-labs-2025
... . . . 0x0000003fffffe000: pte 0x000000000021
... . . . 0x0000003fffffff000: pte 0x000000000020
print_kpgtbl: OK
superpg_fork starting
usertrap(): unexpected scause 0xf pid=69
    sepc=0x2ec stval=0x5001
superpg_fork: OK
superpg_free starting
usertrap(): unexpected scause 0xd pid=70
    sepc=0x40a stval=0xffff001
superpg_free: OK
pgtbltest: all tests succeeded
$ -
```

Totalgrade:

```
karamhussain@DESKTOP-RPQLKS: ~/xv6-labs-2025
make[1]: Leaving directory '/home/karamhussain/xv6-labs-2025'
== Test pgtbltest ==
$ make qemu-gdb
(11.3s)
== Test pgtbltest: ugetpid ==
    pgtbltest: ugetpid: OK
== Test pgtbltest: print_kpgtbl ==
    pgtbltest: print_kpgtbl: OK
== Test pgtbltest: superpg ==
    pgtbltest: superpg: OK
== Test answers-pgtbl.txt ==
answers-pgtbl.txt: OK
== Test usertests ==
$ make qemu-gdb
(140.0s)
== Test time ==
time: OK
Score: 41/41
karamhussain@DESKTOP-RPQLKS:~/xv6-labs-2025$
```