

# OS Lab Quiz 3 Grading Rubrics

OS TAs

March 2024

## 1 Q1

**Total Marks: 5**

- Testcase-1: 1 Marks
- Testcase-2: 2 Marks
- Testcase-3: 2 Marks

### **General Instructions:**

- Testcase 1 and Testcase 2, the kernel pt count could be either 64 or 56, both are acceptable.
- For Testcase 3, the modified `memlayout.h` provided in the grading script folder must be copied to `xv6` folder after copying the student's files. The kernel pt count could either be 68 or 60, both are acceptable.
- If `kernel_pt_count` is always printed as 0 and the printed value of `user_pt_count` is equal to `user_pt_count + kernel_pt_count` as per the expected answer(s) for **all** testcases, then award 3/5 for the entire question.
- Across **all** testcases, if exactly one of `user_pt_count` or `kernel_pt_count` are matching with the expected output, then award 3/5 for the entire question.
- The output is deterministic. No extra statements must appear and no statement should be missing.

```
user pt count = 2
kernel pt count = 64
Allocating 29360128 bytes of memory
user pt count = 9
kernel pt count = 64
Deallocating 16777216 bytes of memory
user pt count = 5
kernel pt count = 64
```

Figure 1: Q1 t1

```
$ t1
user pt count = 2
kernel pt count = 56
Allocating 29360128 bytes of memory
user pt count = 9
kernel pt count = 56
Deallocating 16777216 bytes of memory
user pt count = 5
kernel pt count = 56
```

Figure 2: Q1 t1 (alternate acceptable output)

```
user pt count = 2
kernel pt count = 64
Allocating 1048576 bytes of memory
user pt count = 2
kernel pt count = 64
Allocating 1048576 bytes of memory
user pt count = 2
kernel pt count = 64
Allocating 18874368 bytes of memory
user pt count = 7
kernel pt count = 64
Deallocating 4096 bytes of memory
user pt count = 7
kernel pt count = 64
Deallocating 2097160 bytes of memory
user pt count = 6
kernel pt count = 64
Deallocating 6307840 bytes of memory
user pt count = 4
kernel pt count = 64
```

Figure 3: Q1 t2

```
$ t2
user pt count = 2
kernel pt count = 56
Allocating 1048576 bytes of memory
user pt count = 2
kernel pt count = 56
Allocating 1048576 bytes of memory
user pt count = 2
kernel pt count = 56
Allocating 18874368 bytes of memory
user pt count = 7
kernel pt count = 56
Deallocating 4096 bytes of memory
user pt count = 7
kernel pt count = 56
Deallocating 2097160 bytes of memory
user pt count = 6
kernel pt count = 56
Deallocating 6307840 bytes of memory
user pt count = 4
kernel pt count = 56
```

Figure 4: Q1 t2 (alternate acceptable output)

```
$ t3
Allocating 46137344 bytes of memory
user pt count = 13
kernel pt count = 68
```

Figure 5: Q1 t3

```
$ t3
Allocating 46137344 bytes of memory
user pt count = 13
kernel pt count = 60
```

Figure 6: Q1 t3 (alternate acceptable output)

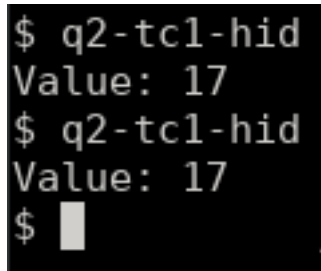
## 2 Q2

Total Marks: 7

- Testcase-1: 2 Marks
- Testcase-2: 2 Marks
- Testcase-3: 3 Marks

**General Instructions:**

- Output of all testcases should match exactly
- Every testcase must be run twice and in both runs output should match exactly. To emphasize on this, sample output shows testcases being run twice.
- Run the 3 tests in 3 different terminal sessions (the script already does this for you), however, within each test, the corresponding testcase must be run twice in the same terminal session. For eg: You will first open an xv6 shell, run `q2-tc1-hid` twice, note the outputs and then open another xv6 shell, run `q2-tc2-hid` twice, note the outputs and so on.
- The **value** has to match exactly and there should be an **error** message printed in testcase 2
- If the output matches only for the first run and not second, award 50% of the total marks.



```
$ q2-tc1-hid
Value: 17
$ q2-tc1-hid
Value: 17
$
```

Figure 7: Q2-TC1

```
$ q2-tc2-hid
Error: shm_attach failed
Value: 17
$ q2-tc2-hid
Error: shm_attach failed
Value: 17
$
```

Figure 8: Q2-TC2

```
$ q2-tc3-hid
Value at ptr1: 17
Value at ptr2: 18
$ q2-tc3-hid
Value at ptr1: 17
Value at ptr2: 18
$
```

Figure 9: Q2-TC3

### 3 Q3

**Total Marks: 8**

- Testcase-1: 2 Marks
- Testcase-2: 2 Marks
- Testcase-3: 2 Marks
- Testcase-4: 2 Marks

**General Instructions:**

- Output of all testcases should match exactly
- Every testcase must be run twice and in both runs output should match exactly. To emphasize on this, sample output shows testcases being run twice.

- Run the 4 tests in 4 different terminal sessions (the script already does this for you), however, within each test, the corresponding testcase must be run twice in the same terminal session. For eg: You will first open an xv6 shell, run `q3-tc1-hid` twice, note the outputs and then open another xv6 shell, run `q3-tc2-hid` twice, note the outputs and so on.
- In testcase-3, a page fault occurs! Technically students must not be handling this page fault and the default page-fault message is expected as shown in the expected output. **However, some students might have made a generic page fault handler so they might be printing a custom page-fault message or they might have put a panic statement inside the page fault handler which would get triggered due to an unhandleable page fault, award full marks for this testcase if the rest of the output is matching**
- In some testcases, students might be getting an extra page fault due to not attaching the physical page when it is available at the time of the syscall but only attaching it when an access to it occurs, **award full marks in this case if the rest of the output matches; this clause is to be used in conjunction with the above clause wherever applicable**
- The **value** printed must match exactly in any case
- Exact values of number of free pages might differ, but the relative offset between them **must** be same as in sample output provide.
- If the output matches only for the first run and not second, award 50% of the total marks.

Note that the following lists might not be exhaustive, if you have any other doubts regarding grading, please post on MS Teams.

**What is completely wrong:**

- Having different number after **Value:** (except in testcase3 where any number instead of -1913765888 is also correct)
- Having **va** as 0x0
- Having different 'offsets' in pagecounts than in sample output - here **offset** denotes the difference between pagecounts as displayed by the process

**What *might* be correct but doesn't match output:**

- Few extra print statements
- Page fault not being displayed
- An extra pagefault

```

$ q3-tc1-hid
Number of free pages: 56790
page attached to 0x3000
Number of free pages: 56790
page fault at va 0x3000
value written
Value: 17
Number of free pages: 56789
page detached
Number of free pages: 56790
$ q3-tc1-hid
Number of free pages: 56790
page attached to 0x3000
Number of free pages: 56790
page fault at va 0x3000
value written
Value: 17
Number of free pages: 56789
page detached
Number of free pages: 56790
$ █

```

Figure 10: Q3-TC1

```

$ q3-tc2-hid
[PARENT] Number of free pages: 56720
[PARENT] page attached to 0x3000
page fault at va 0x3000
[PARENT] value written
[PARENT] Number of free pages: 56719
[CHILD] Number of free pages: 56719
[CHILD] page attached to 0x3000
[CHILD] Value: 17
[CHILD] Number of free pages: 56719
$ q3-tc2-hid
[PARENT] Number of free pages: 56720
[PARENT] page attached to 0x3000
page fault at va 0x3000
[PARENT] value written
[PARENT] Number of free pages: 56719
[CHILD] Number of free pages: 56719
[CHILD] page attached to 0x3000
[CHILD] Value: 17
[CHILD] Number of free pages: 56719
$ █

```

Figure 11: Q3-TC2



```

$ q3-tc3-hid
[PARENT] Number of free pages: 56720
[PARENT] page attached to 0x3000
page fault at va 0x3000
[PARENT] value written
[PARENT] Number of free pages: 56719
[CHILD] Number of free pages: 56720
[CHILD] page attached to 0x3000
page fault at va 0x3000
[CHILD] Value: -1913765888
[CHILD] Number of free pages: 56719
[CHILD] page detached
page fault at va 0x3000
pid 8 q3-tc3-hid: trap 14 err 4 on cpu 0 eip 0x9d addr 0x3000--kill proc
[PARENT] page detached
$ █

```

Figure 12: Q3-TC3

```

$ q3-tc4-hid
[PARENT] Number of free pages: 56720
[PARENT] page attached to 0x3000
[PARENT] Number of free pages: 56720
[CHILD] Number of free pages: 56720
[CHILD] page attached to 0x3000
[CHILD] Number of free pages: 56720
page fault at va 0x3000
[PARENT] value written
[PARENT] Number of free pages: 56719
page fault at va 0x3000
[CHILD] Value: 17
[CHILD] Number of free pages: 56719

```

Figure 13: Q3-TC4

## 4 Q4

**Total Marks: 5**

- Testcase-1: 2 Marks
- Testcase-2: 3 Marks

**General Instructions:**

- Output of both testcases must match exactly.
- The output is deterministic. No extra statements must appear and no statement should be missing.

- The actual output is given in the form of two txt files, the diff of these files with the generated output should be 0 for a successful test.
- The sufficient condition to award full marks in testcase-1 is the **diff** of outputs being 0. The student need not have implemented buddy allocator to receive these marks
- However, in testcase-2 the student must have implemented buddy allocator to receive full marks for this testcase. This is being checked in the testcase but also have a quick glance over the code to find out if buddy allocator is indeed being used