CS444/544
Operating Systems II

Lecture 7
4/24/2024
Quiz 1 Review + Lab 2 Tips

Acknowledgement: Slides drawn heavily from Yeongjin Jiang
Due Reminder

- Lab 2 due Monday 4/29 11:59 PM
  - Read document thoroughly and carefully
  - Read lab slides and watch lab tutorial videos!!!
  - Don’t forget to submit written questions (name it: answers-lab2.txt)
  - Don’t forget to update the student.info and tag!!!
    - Make sure your tag includes your code/implementation
    - Run check_submission.sh
    - To check: git checkout tags/<tag_name>
      - i.e., git checkout tags/lab2-final
Quiz 1...
Lab 1 Extra Credit

Hello, World!
I have extra credit lol

Hello
Nice to meet you
How are you
Fine Thank you
My Name

Hello World!

CCC000LLL000RRR
CCC000LLL000RRR
CCC000LLL000RRR
CCC000LLL000RRR

RED
BLUE
PURPLE
YELLOW
ORANGE

Yellow Purple Cyan Red Green Blue
Lab 1 Extra Credit
Recap: struct PageInfo

<table>
<thead>
<tr>
<th>idx</th>
<th>pp_ref</th>
<th>pp_link</th>
</tr>
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<tbody>
<tr>
<td>N</td>
<td>0</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Physical memory:
- Page 0
- Page 1
- Page 2
- Page 3
- ...
Recap: struct PageInfo

• struct PageInfo *pp
  • The variable typed as struct PageInfo* will point to a struct PageInfo object in pages array

• You can access
  • pp->pp_ref
  • pp->pp_link

• But you cannot access
  • Physical page via pp
Recap: struct PageInfo

• How to get the physical address that
  • is represented by a struct PageInfo *pp?

• page2pa(pp)

• page2kva(pp)
  • Take a look at the implementation of those functions!!!
  • e.g., (pp – pages) << PGSHTF ← why is this the physical address??
  • Physical page number = (pp-pages)

• memset(page2kva(pp), 0, PGSIZE)
  • This will zero out the corresponding physical page of pp.
CAVEAT for Lab 2

• Boot_map_region()

```c
static void
boot_map_region(pde_t *pgdir, uintptr_t va, size_t size, physaddr_t pa, int perm)
```

• Make sure that va + size do not overflow the 32-bit limit

• E.g.,
  • va = 0xf0000000, size = 0x10000001

• Then, va + size = 1

```python
>>> va = 0xf0000000  # KERNBASE
>>> size = 0x10000001
>>> hex(va + size)
'0x100000001'
>>> hex((va + size) % 2**32)  # in 32-bit machine, we only store 32 bits..
'0x1'
```