[Exams] Past Exams 2017 Q&A
Discuss all questions pertaining to exams which took place in 2017 here.

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When posting questions, you **MUST** reference the semester, exam, **AND** question so we can help you.
Please put this at the beginning of your post in this format: [[Semester]-{Exam}]:Q{Question Number}
For example: [SP-MT1]:Q1, or [SU-MT2]:Q3

{Semester} is one of these: SP, SU, FA
{Exam} is of of these: Q, MT, MT1, MT2, F
Please separate out parts with periods: 1.2.i.a.b.3.a

If you follow this format, it will make it very easy to search for similar questions!

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**midterm1**  **midterm2**  **final**

~ An instructor (Jerry Xu) thinks this is a good note ~

Updated 27 days ago by Stephan Kaminsky

**followup discussions**  *for lingering questions and comments*

<table>
<thead>
<tr>
<th>Resolved</th>
<th>Unresolved</th>
</tr>
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**Anonymous Atom**  2 months ago  
[FA-MT1]:Q4.2 I am wondering why the solution is 20. I thought there is 1 byte for self, 4 bytes for word pointer, 4 bytes each for left, right, and sub pointers in a 32-bit computer architecture.

helpful!  0

<table>
<thead>
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**Xxxxxxx**  2 months ago  
On a 32-bit word-aligned architecture, the number of bytes to allocate should be multiples of 4.
The struct takes 17 bytes in total, so it should be padded to 20 bytes.

~ An instructor (Caroline Liu) thinks this is a good comment ~

helpful!  2

<table>
<thead>
<tr>
<th>Resolved</th>
<th>Unresolved</th>
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**Anonymous Calc**  2 months ago  
Rendering markdown...

helpful!  0
The address of the head pointer is passed in to `reversed()` . Thus if you
dereference and modify `head_ptr` , the change would be permanent to the original linked list. The line
`*head_ptr = (*head_ptr)->next` basically removed the first node from the original link list,
reassigning and losing the original head pointer. The condition for termination of the while loop is that
`*head_ptr == NULL` , at that point you’ve lost the entire original linked list.

The proper way to do this is to set a temporary pointer `struct list_node* current =
*head_ptr` . Then use that pointer to traverse the linked list within the loop: `current = current->
next` . That way you’re changing `current` but not `*head_ptr` itself. When the loop ends
`current == NULL` but the original `*head_ptr` is still intact.

Anonymous Poet 2 months ago
For 1,b could you please explain what is the
three-digit base-7 number? I guess it is like 666 666. But in this case, why we need 9 bits to represent
unsigned 7^5? Thx

Anonymous Poet 2 months ago
"GO" is a string literal, and string literals are created in static memory.

Anonymous Poet 2 months ago
What type of address does word1 evaluate to? -- answer is static . But word is a variable in function, why is it
not in stack?

Anonymous Poet 2 months ago
For 2. 5, char "word1 = "GO"

Anonymous Poet 2 months ago
[FA-MT2] 4.c Just to clarify, in general, is the PC resolved in the EX stage (right after ALU)?

Anonymous Poet 1 month ago
Do you mean the PC for next instruction? I think so.
Anonymous Poet 1 month ago

[FA-MT2]: Q4.2  Q1. e-f-g.
I am a little confused about these questions. How to consider "How many passes would the conventional assembler make" and what does the "assembler now started backwards from the last line of the program" mean?

Could you give some explanation about these questions? Thanks

Anonymous Poet 1 month ago  Sorry, it should be Q1, not Q4.2

Xxxxxxx 1 month ago  It just means how the assembler reads the entire assembly file and convert it to an object file for the program. Normally the assembler reads every line from top to bottom. The labels in branch/jump instructions will be replaced by relative offset. But one issue is, it cannot figure out the offset if it's not seen yet in the first pass (for example, TRIX is referenced by jal on line 4 but the code start at line 6). In order to resolve this, it reads the file for second time, and it should figure out all offsets since it already knows where all the labels are in the first pass.

Now, if the assembler reads backwards, in this case it actually solves this issue because both TRIX and JOAK are below where they are referenced. So the assembler can figure out the offsets for bne and jal. But in general, some labels appear before they are referenced while others are opposite so there's no guarantee unless the assembler always takes two passes.

For g, those are the tasks for assembler. I'll suggest you review the lecture.
Anonymous Poet  1 month ago
[FA-MT2]: Q3.3

Why RegWEn in 3.3 is write disabled?

helpful!  0

Xxxxxxx  1 month ago  RegWEn needs to be write disabled. Think about the case when the given instruction is cse and R[rs1] == R[rs2]. If you set RegWEn to W, then it will write to both memory and rd. It’s a little confusing here because cse is an R-type instruction. The logic for generating RegWEn should be updated accordingly too.

helpful!  0

Anonymous Beaker  1 month ago

Rendering markdown...

helpful!  0

Xxxxxxx  1 month ago  jal is the one being expanded. jal offset is a pseudo-instruction for jal rd, offset. Multiple object files are linked together during linking stage (by linker).

helpful!  1

Anonymous Beaker  1 month ago

Resolved  Unresolved

Anonymous Atom  29 days ago

[FA-Final]: Q13.4d Why is it that small random reads have higher throughput on RAID5 than on RAID1?

helpful!  0

Sunay Poole  27 days ago  We can parallelize the reading across the disks instead of only reading from one disk at a time!

helpful!  0

Anonymous Scale  27 days ago

Resolved  Unresolved

Anonymous Scale  27 days ago

[FA-FINAL] Q.10

2. Assume cache loading/reloading is slower than thread switching. Which is the slowest correct function if:
   a. the size of the cache block is equal to 4 * sizeof(int)?
   b. the size of the cache block is equal to sizeof(int)?

I don't really understand how to solve the problem, hope to get some advice.

helpful!  0