Reviewing
Final Exam

• **Covered Contents**
  – Chapter 1 Introduction
  – Chapter 2
  – Chapter 5 Instruction Set
  – Chapter 7 Assembly Language Programming
  – Appendix A-C

• **Questions**
  – PART I. False and True (10 x 1pts=10pts)
  – PART II. Multiple Choices (15 x 2pts=30 pts)
  – PART III. Short Answers (4 x 3pts=12pts)
  – PART IV. Computation & Coding (8 x 6pts=48pts)

• **Distribution**
Final Exam

• **Covered Contents**
  – Chapter 1 Introduction
  – Chapter 2
  – Chapter 5 Instruction Set
  – Chapter 7 Assembly Language Programming
  – Appendix A, B, C

• **Questions**
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  – PART III. Short Answers ( 4 x 3pts=12pts)
  – PART IV. Computation & Coding ( 8 x 6pts=48pts)
How to review

• Questions
  – 80% of questions come from the questions in Homework Assignments, Programming Assignments, Quiz and the Midterm Exam,

• How
  – Quiz and Assignments
  – Lectures
  – Textbooks
Practices

• True and False
  – Program Counter (PC) is a special register and counts on how many instructions have been executed F
  – When designing instructions, how long an instruction actually took mattered more than how many could be started per second F
  – Both the magnetic disk and CD has the constant angular velocity. F
  – The heads of the magnetic disk actually touch the diskettes F
  – Both of RAID 0 and RAID 4 work with strips. T
  – If the program is rerun a million times with the same input, the traps will reoccur in the same place each time but the interrupts may vary. T
  – Speculative LOADs make it possible to fetch operands in advance, without penalty if it turns out later that they are not needed after all. T
Practices

- **True and False**
  - The computer can only deal only with numbers that can be represented in a fixed number of digits. **T**
  - The algebra of finite-precision numbers is different from normal algebra. **T**
  - The floating number 01000101.000011 is a normalized floating number. **F**
  - \((1011)_2*(110)_2 = (1000010)_2\) **T**
  - The assembler is a translator while the compiler is not. **F**
  - Macros can call other macros, but cannot call themselves. **F**
  - Macro expansion occurs during the execution of the program. **F**
  - If the program counter has value 0, then it refers to the absolute memory address zero. **F**
Multiple Choices

• Which of following is true 
  – (a) In both of them, the computer carried out instructions in L1 by executing equivalent sequences of instructions in L0 
  – (b) In translation, the entire L1 program is converted to a L0 program. 
  – (c) In interpretation, after each L1 instruction is examined and decoded, it is carried out immediately. 
  – (d) Interpretation is more efficient than Translation 

• What are the design principles for modern computers? 
  – (a) Instructions directly executed by hardware 
  – (b) Minimize rate at which instructions are issued 
  – (c) Instructions should be easy to decode 
  – (d) Only loads, stores should reference memory 
  – (e) Provide plenty of registers
## Multiple Choices

- **Which** Level 5 Problem-oriented language level
  - (a) Instruction Set Architecture Level lay between Digital Logic Level and Microarchitecture Level.
  - (b) Assembly Language Level lay between Instruction Set Architecture Level and Operating System Level.
  - (c) Operating System Level lay between Assembly Language Level and Instruction Set Architecture Level.
  - (d) Microarchitecture Level lay between Digital Logic Level and Instruction Set Architecture Level.

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Problem-oriented language level</td>
<td>Translate (compiler)</td>
</tr>
<tr>
<td>4</td>
<td>Assembly language level</td>
<td>Translated language</td>
</tr>
<tr>
<td>3</td>
<td>Operating system machine level</td>
<td>Partial interpretation (operating system)</td>
</tr>
<tr>
<td>2</td>
<td>Instruction set architecture level</td>
<td>Interpretation (microprogram) or direct execution</td>
</tr>
<tr>
<td>1</td>
<td>Microarchitecture level</td>
<td>Hardware</td>
</tr>
<tr>
<td>0</td>
<td>Digital logic level</td>
<td></td>
</tr>
</tbody>
</table>
Multiple Choices

• Which of following is true
  – (a) CD has constant linear velocity
  – (b) CD has constant angular velocity
  – (c) Magnetic Disk has constant linear velocity
  – (d) Magnetic Disk has constant angular velocity

• Which of following is the problem of Pentium 4?
  – (a) The CISC-ISA with variable-length instructions and different formats.
  – (b) The IA-32 is a two-address memory-oriented ISA.
  – (c) The IA-32 has a small and irregular register set.
  – (d) Deep pipeline is needed for complex tasks
Multiple Choices

• For a decimal number 9. Which of the following is true?
  – (a) Its binary version is 00001001
  – (b) The signed version of decimal number -9 is 10001001
  – (c) The 1’s complement version of decimal number -9 is 11110110
  – (d) The 2’s complement version of decimal number -9 is 11110111

• Which of following is true?
  – (a) The Assembly Language layer is implemented by interpretation rather than by translation
  – (b) Translator is the programs that convert a user’s program written in some language to another language
  – (c) Translation is used when a processor (either hardware or an interpreter) is available for the target language but not for the source language.
  – (d) Correct translation will give precisely the same results as the execution of the source program
Short Answers

• How many bits are sufficient for an address to reference the memory of Figure (a), (b), (c) ?

– Solution: 4, 3, 3
Computations

- Compute the hash code for the following symbols by adding up the letters and taking the result module the hash table size.
  - els, jan, jelle, maaike
  - Here, a=1, e = 5, j=10, l=12, m=13, n=14, s=19
  - The hash table has 19 slots, numbered 0 to 18.
  - Does each of them generate unique hash code?
  - If not, how to deal with the collision?

- Solution
  - els = (5 + 12 + 19) mod 19 = 17
  - jan = (10 + 1 + 14) mod 19 = 6
  - jelle = (10 + 5 + 12 + 12 + 5) mod 19 = 6
  - maaike = (13 + 1 + 1 + 9 + 11 + 5) mod 19 = 2
  - jan and jelle hash to the same value.
  - We can maintain a linked list in the slots that contain all the elements. (e.g. 6 will contain both jan and jelle).
Computations

• Please fill the following symbol table after the following Pentium 4 statements have been encountered. The first statement is assigned to address 1000.

<table>
<thead>
<tr>
<th>Label</th>
<th>Instruction</th>
<th>Length</th>
<th>Instruction Location Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everest:</td>
<td>POP BX</td>
<td>1 byte</td>
<td>1000</td>
</tr>
<tr>
<td>K2:</td>
<td>PUSH BP</td>
<td>1 byte</td>
<td>1001</td>
</tr>
<tr>
<td>WHITNEY:</td>
<td>MOV BP, SP</td>
<td>2 byte</td>
<td>1002</td>
</tr>
<tr>
<td>MCKINLEY:</td>
<td>PUSH X</td>
<td>3 byte</td>
<td>1004</td>
</tr>
<tr>
<td>FUJI:</td>
<td>PUSH SI</td>
<td>1 byte</td>
<td>1007</td>
</tr>
<tr>
<td>KIBO:</td>
<td>SUB SI, 300</td>
<td>3 byte</td>
<td>1008</td>
</tr>
</tbody>
</table>
Official Feedback Surveys

• Official Feedback Surveys for This Course
  – Beginning with the fall semester 2011, end-of-term Student Feedback Surveys (SFSs) will be conducted online in MyMav.
  – Each student enrolled in the course will be issued an e-mail message inviting him/her to complete an online Student Feedback Survey for the class.
  – These e-mail messages will be sent to the student’s official UT Arlington e-mail account (“mavs.uta.edu”) from the following sender: UT Arlington Student Feedback System.
  – Each invitation will direct students to the SFS link for the course’s survey, a password to access the survey, and a deadline by which the survey must be completed. Students who have not responded to the initial invitation after one week will receive a reminder.

Thanks for providing feedback!
Thank you!!!