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CS401 Computer Architecture and Assembly Language Programming

Final Term Examination - February 2005

Time Allowed: 150 Minutes

Instructions

Please read the following instructions carefully before attempting any question:

1. The duration of this examination is 120 minutes.
2. This examination is open Handouts.
3. Answer all questions.
   a. There is no choice.
   b. You will have to answer correctly all questions in this examination to get the maximum possible marks.
4. Do not ask any questions about the contents of this examination from anyone.
   a. If you think that there is something wrong with any of the questions, attempt it to the best of your understanding.
   b. If you believe that some essential piece of information is missing, make an appropriate assumption and use it to solve the problem.
5. You have been provided with all assembly tools so you can use assembly tools also.
6. Your paper contains 4 questions.

All Coding questions should be answered using the Assembly language syntax.

Total Marks: 60 **Total Questions: 4**

Question No. 1 **Marks : 10**

Answer the following Questions briefly.

a. What is the change in the stack after int instructions is executed?
b. Why procedures are used and what must be the last executable instruction in a procedure?
c. Why cli and sti instructions are used during hooking an interrupt?
d. What is multitasking?
e. What are minimum numbers of pins required for serial communication? Also write their names?

Question No. 2 **Marks : 10**

Write valid instruction(s) to perform each function specified below.

a. Provide instruction(s) to read a value from port number 0x312.
b. Provide instruction(s) to move the value at the top of stack in ip register.
c. Provide instruction(s) to move value of flag register in ax.
d. Provide instruction(s) to divide value of ax by 8.
e. Provide instruction(s) to write value of al at the port 0x12.

Question No. 3 Marks : 10

Write a function "ConvertBinaryToDecimal" that takes the address of a string containing binary of any decimal number via the stack. The function should print its equivalent decimal number. For example, if the string is "11011" then after the execution of this function, the program should print 27 and if the string is "1001" then after the execution of this function, the program should print 9 on the screen.
(Well commented and well indented program will be given extra mark)

Question No. 4 Marks : 10

Answer the following regarding Protected Mode descriptors

a. Write the following descriptors in the format

```
dd      0x0000FFFF, 0x00CF9A00
```

Assume following values for attributes

1 A bit = 0
2 P bit = 1
3 G bit = 0
4 AVL bit = 1
5 r bit = 0

i. 32 bit, non conforming, execute-only code segment at level 2, with base at 0x00403333 and a limit of 0x0FFFF.

ii. 32-bit Read only data segment at level 0, with base at 0x00A0BBBB and limit of 0x1CCCC.

b. Write 32 bit physical addresses for the following accesses where Base = 0x00A00000 and Limit = 0x30000, EBX contains 0x00001000, and ESI contains 0x00003000

i. [bx+si]

ii. [ebx+esi-0x0012FD]