Name: KEY Id#

COE 205, Term 092

Computer Organization & Assembly Programming

Quiz# 4

Date: Monday, April 26, 2010

# 

# **Q1.**

# Write a procedure, **SwapRows,** that receives the address of an array of integers (i.e. Dword), two row numbers to be exchanged, the number of elements in a row and swaps the content of the two rows in the array. Assume that all parameters will be passed on the stack and that the procedure will preserve the content of all registers. Note that to multiply two operands you can use the imul instruction e.g. eax=eax\*4 is implemented as imul eax, 4 while eax=eax\*ebx is implemented as imul eax, ebx.

SwapRows Proc

PUSH EBP

MOV EBP, ESP

; save registers

PUSH EAX

PUSH EBX

PUSH ECX

PUSH EDX

PUSH ESI

PUSH EDI

; get arguments from teh stack

MOV EBX, [EBP+8] ; address of the array

MOV ESI, [EBP+12] ; first row to be echanged

MOV EDI, [EBP+16] ; second row to be exchanged

MOV ECX, [EBP+20] ; number of elements in a row

MOV EDX, ECX

; compute first row starting address

IMUL EDX, 4

IMUL ESI, EDX

ADD ESI, EBX

; compute second row starting address

IMUL EDI, EDX

ADD EDI, EBX

XOR EDX, EDX

; swap the two rows

Next:

MOV EAX, [ESI+EDX\*4]

XCHG EAX, [EDI+EDX\*4]

MOV [ESI+EDX\*4], EAX

INC EDX

LOOP Next

; restores registers

POP EDI

POP ESI

POP EDX

POP ECX

POP EBX

POP EAX

RET 16

SwapRows Endp

# Use the procedure **SwapRows** to swap row 0 and row 3 of the following array:

Array Dword 1, 2, 3, 4

Dword 5, 6, 7, 8

Dword 9, 10, 11, 12

Dword 13, 14, 15, 16

push 4

push 0

push 2

push offset Array

Call SwapRows