MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO209: MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

DATE: 7/5/2019   **TIME: 2.00-4.00 PM**

INSTRUCTIONS

Answer **question ONE and any other TWO questions.**

QUESTION ONE   (30 MARKS)

a) Explain the significance of Assembly Language programming.   (3 marks)

b) Describe three sections that assembly program can be divided into.   (3 marks)

c) Explain three statements used in assembly language programming.   (3 marks)

d) Write assembly language program to display the "Welcome to Machakos University".

(2 marks)

e) Explain REP MOVSB instruction with example.   (2 marks)

f) Explain three memory segments as used in assembly language programming.   (3 marks)

g) Discuss the three categories of 32-bit and 16-bit processor registers in IA-32 architecture.

(3 marks)

h) Explain three basic modes of addressing in assembly language programming.   (3 marks)

i) Write assembly language program to prints the number 1 to 9 on the screen.   (3 marks)

j) Write 8086 assembly instruction which will perform the following operations: (5 marks)

    i.   Multiply AL times BL.

    ii.   Load the number F3H into AL register.

    iii.   Copy BP registers contents to SP register.

    iv.   Divide the AL register contents by 2 bu using a shift instruction.

v.   Multiply the AL register contents by 4 using shift instruction.

QUESTION TWO (20 MARKS)

a)   With a neat diagram, explain the architecture of 8086 microprocessor along with functions of each block and registers.   (8 marks)

b)   Explain five forms of directive in assembly language programming language.   (5 marks)

c)   Explain the following: (3 marks)

    i.   EQU

    ii.   %assign

    iii.   %define

d)   Write assembly language program in simple procedure named *sum* that adds the variables stored in the ECX and EDX register and returns the sum in the EAX register.   (4 marks)

QUESTION THREE (20 MARKS)

a)   Explain the addressing modes used in 8086 with an example for each.   (8 marks)

b)   Write assembly language program to create and opens a file named *myfile.txt*, and writes a text 'Welcome to Machakos University ' in this file. Next, the program reads from the file and stores the data into a buffer named *info*. Lastly, it displays the text as stored in *info*.

(4 marks)

c)   Describe the difference between the instructions MOV AX, 2347H and MOV AX, (2347H).   (3 marks)

d)   At any given time the 8086 works with 4 segments in this address space. How many bytes are contained in each segment?   (4 marks)

QUESTION FOUR (20 MARKS)

a)   Explain the flags of 8086 processor using suitable examples.   (6 marks)

b)   Write assembly language program to shows how factorial n is implemented in assembly language.   (4 marks)

c)   What is flag register? Explain the flag register format, in detail.   (6 marks)

d)   Write and explain instruction template for MOV instruction. Also generate opcode for following instructions: the opcode for MOV is.   (4 marks)

1	0	0	0	1	0

i. MOV CL,(BX)

ii. MOV CS,(BX),DL

iii. MOV 43H(SI(,DH

iv. MOV CX,(437A)H

QUESTION FIVE (20 MARKS)

a) What is an assembler directive? Explain the following assembler directive with example:

    i. PUBLIC

    ii. PROC

    iii. MACRO

    iv. DB   (4 marks)

b) Discuss the following addressing modes with examples: (5 marks)

    i. Direct

    ii. Register indirect

    iii. Base plus index

    iv. Immediate

    v. Scaled indexed.

c) Describe the following instruction with suitable examples: (4 marks)

    i. PUSH

    ii. MUL

    iii. IN

    iv. AAA.

d) explain the following instructions with an example: (5 marks)

    i. DAA

    ii. AAM

    iii. LOOP

    iv. SUB

    v. XLAT

e) Explain the types of program execution transfer instruction (branch instructions) with examples.   (2 marks)