FAST- National University of Computer & Emerging Sciences, Karachi.
Department of Computer Science,
Final Examinations, Spring 2020.
Wednesday June 24, 2020, 9:00 am – 12:00 pm

Course Code: EE 213	**Course Name:** Computer Organization and Assembly Language
Instructors: Mr. Shoaib Rauf	

Instructions:

- Start of Exam: 9:00 am; End of Exam: 12:30 pm including submission time
- Read each question completely before answering it. There is **7 question and 3 pages**.
- In case of any ambiguity, you may make assumptions. But your assumption should not contradict any statement in the question paper.
- You will attempt this paper **offline**, in your **hand writing**.
- During **1st hour** of your examination I will be available at: https://meet.google.com/tce-vsyq-iud
- You may use **cam-scanner**, **MS lens** or any equivalent application to scan and convert your hand-written answer sheets in **a single PDF file**
- Your Pdf File should be named as **GR1_K19_XXXX** or **GR2_K19_XXXX**
- The paper should be submitted using Google Classroom. You are given 30 minutes for this purpose, which is already included in the exam time mentioned above. Additionally, after submitting, you should email it to your instructor (Shoaib.rauf@nu.edu.pk) which should be exactly same pdf as uploaded earlier only with you NU Mail account otherwise it will not be acceptable.
- **WRITE YOUR ID ON TOP OF EVERY PAGE by your hand.** Write also **page # on every page. You should also sign on every page.**
- Where asked for values, only provide the hex-decimal values.
- Problems needing iterations should be coded using iterative instructions. No points will be awarded otherwise.

Time Allowed: 180 minutes (Paper Solution)
+ 30 minutes (scan & upload pdf). **Maximum Points:** 90 points

==========

Qus 01: Conceptual Reasoning (Max. 2 – 3 lines)

[Points: 8x2.5 = 20]

a. What are the two ways of passing arguments to a procedure?
b. When does a divide overflow occur at machine level? Give an example to illustrate.
c. Illustrates the steps taken by the CPU when the INT instruction is invoked by a program:
d. How CLD and STD instructions are used with the string primitive instruction?
e. Is it possible for a NEG instruction to set the Overflow flag? Explain in one sentence.
f. If, immediately upon entering a subroutine, you execute a "POP EAX" instruction, what value will you have in the EAX register?
g. Differentiate between RET and RET 8 instructions.
h. How do you declare a two-dimensional 4x4 array of bytes in assembly language? Give the code.

Qus 02: Re-write the code in the answer sheet and compute the result. Also show the rough work how you compute it? **[Points: 5*2 = 10]**

a.	**b.**

signedVal SWORD -16
mov ecx,0
mov cx, signedVal ; ECX = ?
	mov bx, 0A69Bh
	movzx eax, bx ; EAX = ?
	movzx edx, bl ; EDX = ?
	movzx cx, bl ; CX = ?

c.	**d.**

mov ax, -128 ; EAX = ?
shl eax, 16 ; EAX = ?
sar eax, 16 ; EAX = ?
	mov ax, 234Bh
	mov dx, 7654h
	shrd ax, dx, 4 ;AX = ?

e.	

mov al, 0D4h
rcl al, 1 ; al = ?
stc
mov bl, 0D4h
rcr bl, 3 ; bl = ?	

Qus 03: Declare and initialize an array with your (Actual) Id and Name stored in it. Use a loop with indexed addressing to swap the elements of array by half. Do not copy the elements to any other array. In the end display the elements from the array. **[Points: 15]**

Hint: Use the SIZEOF, TYPE, and LENGTHOF operators to make the program flexible
Example: (Use your own Id & Name)

1	9	k	-	1	2	3	4		A	Z	A	M		K	H	A	N

Expected Output

N	A	H	K		M	A	Z	A		1	2	3	4	-	k	9	1

Qus 04: Assume you have an array of characters of 50 elements. You need to capitalize the first character of word after the space also count the number of words in the string. Write a procedure to pass this array by-reference and implement the logic. **[Points: 10]**

Qus 05: Assume a dice is rolled 10 times. Dice have the range from [-10, +10].

```
intArray SWORD 0,0,0,0,1,20,35,-12,66,0
```

a. Calculate the frequency of positive no (> 0) and negative no (< 0). If the frequency of positive is higher than negative. Display message “the dice is biased towards positive” otherwise display “the dice is biased towards positive”
b. Considering Zero as an error. We need to find out the error rate of the numbers generated by the dice as well. **[Points: 10]**

Qus 06: Consider you have two 16-bit memory spaces. First memory space is used to mark the attendance and other is used to mark participation of a student in the class. Use loop and shift operation take 16-times input from the user for both (attendance and participation). Calculate and display the participation of student out of 16 classes. **[Points: 10]**

Qus 07: Suppose you have a dataset of Corona cases reported in Pakistan, which includes total no of infected people, no of deaths, people recovered, inf_male, inf_female, rec_male, rec_female for the last 30days. Each day records only that day information. **[Points: 15]**

Write macro/ Procedure to find:

a. Calculate the no cases recovered in terms of male & female of a day.

Male_recovered = rec_male/people recovered,

Female_recovered = rec_female/people recovered

b. Calculate the no of infected cases in terms of male & female of a day.

Male_infected = inf_male/ infected people

Female_infected = inf_female/ infected people

c. Accumulate the total no of infected cases, no. of deaths, people recovered in the last 30 days

---

Good Luck…