National University of Computer and Emerging Sciences

FAST School of Computing **Fall-2020** **Islamabad Campus**

EE-229: Computer Organization and Assembly Language

Serial No:

Sessional Exam 1

Total Time: 1 Hour

Total Marks: 35

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Signature of Invigilator

Wednesday, 14th October, 2020

Course Instructors

Ameen Chilwan, Shams Farooq, Farwa Batool,
Rohail Gulbaz.

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Student Name Roll No Section Signature

DO NOT OPEN THE QUESTION BOOK OR START UNTIL INSTRUCTED.

Instructions:

1. Attempt on question paper. Attempt all of them. Read the question carefully, understand the question, and then attempt it.
2. No additional sheet will be provided for rough work. Use the back of the last page for rough work.
3. If you need more space write on the back side of the paper and clearly mark question and part number etc.
4. After asked to commence the exam, please verify that you have SIX (6) different printed pages including this title page. There are a total of 5 questions.
5. Calculator sharing is strictly prohibited.
6. Use permanent ink pens only. Any part done using soft pencil will not be marked and cannot be claimed for rechecking.

	Q-1	Q-2	Q-3	Q-4	Q-5	Total
Marks Obtained						
Total Marks	**8**	**5**	**8**	**6**	**8**	**35**

Question 1 [8 Marks]

Given that we have a 16-bit architecture with FLAGS register given as follows:

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
0	NT	IOPL		OF	DF	IF	TF	SF	ZF	0	AF	0	PF	1	CF

Assuming that all system and control flags are set to zero after each arithmetic operation, find the values (in hexadecimal) saved in the FLAGS register after the following operations. It should be noted that the numbers are presented as signed 2's compliment integers.

a. 8102h + FFFEh [2 Marks]

FLAGS =

b. 15A0h + 8547h [2 Marks]

FLAGS =

c. Write an assembly code that finds even parity for the most significant BYTE of si register, where si register is a 16-bit register. Write code after given lines that will update parity bit in the FLAGS register. [**4 Marks**]

```
mov si,0F798H
add si,01234h
```

Question 2 [5 Marks]

List the basic components of a computer system and describe their functions and interconnection. Suppose the system is 32-bits. Briefly describe the effect of 32 bits architecture on the functionality of basic components. **[5 marks]**

Question 3 [8 Marks]

Implement following C++ code using LOOP statement in Assembly. Update the final value of SI after execution of the program.

```
int si=0;

for(int a=4;a>0;a--)
{
     for(int b=10;b>0;b=b-2)
     {
          for(int d=3;d>0;d--)
          {
               si++;
          }
     }
}
```

Question 4 [6 Marks]

Write an assembly program that copies contents of ***string1*** to ***copystring*** in reverse order.

copystring should look like: '**ssergorp ni si mretdim ruoy**'

```
string1 db 'your midterm is in progress',0

copystring db LENGTHOF string1 DUP('a')
```

Question 5 [8 Marks]

Consider the following data declaration in hexadecimal (h). Fill in the given memory:

```
.data
     word2     dw        -1
     list1     BYTE      1,2
     quad1     dq        0123456789ABCDEFh
     list2     db        10, 041h, 'A', 00111111b
     string    BYTE      'ABC',0
     list4     WORD      2 DUP(0AB12h)
     quad3     QWORD     'AB'
```

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
0000																
0010																
0020																

ROUGH SPACE