Sir Syed University of Engineering & Technology
Faculty of Computing & Applied Sciences
Department of Computer Science & Information Technology

Online End Semester Examinations (Spring 2021)

Course Code with Title	**CS-330: Microprocessor & Assembly Language**		**Program**	BS (Computer Science)
Instructor	**Ms. Tahmina Khan**		**Semester**	5th
Start date & Time	June 12, 2021 at 11:30 AM	**Submission Deadline**	June 12, 2021 at 4:30 PM	
Maximum Marks	50			
Students must meet their submission deadline as there is no re-take or re-attempt after the deadline.				

IMPORTANT INSTRUCTIONS:

Read the following Instructions carefully:

- All Questions carries equal marks
- Attempt All Questions on MS-Word. Font theme and size must be Times New Roman and 12 points respectively. Use line spacing 1.5.
- You may provide answers HANDWRITTEN. The scanned solution must be submitted in PDF file format (Use any suitable Mobile Application for Scanning)
- For Diagrams, you can use paper and share a clear visible snapshot in the same Answer Sheet.
- Arrange questions and their subsequent parts in sequence.
- Make sure that your answers are not plagiarized or copied from any other sources. In case of plagiarism, **ZERO** marks will be awarded.
- Provide relevant, original and conceptual answers, as this exam aims to test your ability to examine, explain, modify or develop concepts discussed during the course.
- Recheck your answer before the submission on **VLE** to correct any content or language related errors.
- You must upload your answers via the VLE platform ONLY.

You must follow general guideline for students before online examination and during online examination which had already shared by email and WhatsApp.

This paper has a total of _03__ pages including this title page

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Please calculate the following values before you start solving the paper (all data items are given in *decimal*, if any *hexadecimal data* is given then *hex* will mention with the data)

(i) D_1 = your Year of Birth (e.g. if your Date of Birth = 13th March, 1985 then D_1 will be 1985)
(ii) D_2 = add all digits of your Date of Birth (e.g. if your Date of Birth = 13th March, 1985 then D_2 = 1+3+0+3+1+9+8+5 = 30)
(iii) D_3 = your Month of Birth (e.g. if your Date of Birth = 13th March, 1985 then D_3 will be 03)
(iv) D_4 = your Roll Number (e.g. if your Roll# is 306, then D_4 will be 306)
(v) D_5 = your Date of Birth (e.g. if your Date of Birth = 13th March, 1985 then D_5 will be 13)

Note: Kindly attach the copy of your CNIC or University card with answer script.

Q.1. [10]

(a) Convert D_1 (hex) into decimal and D_2 into hexadecimal.
(b) Find the 2's complement of D_3 and D_5 (hex).
(c) Perform the following operations on the given data:
  i) D_4 / D_2
  ii) $D_3 - D_4$
(d) Show how the computer would represent $-D_4$ and $-D_2$ (hex).
(e) Convert D_1 in packed BCD and unpacked BCD. Also mention total number of bytes required for packed and unpacked BCD.

Q.2. [5 + 5]

(a) Assume that the physical address for a location is (D_1 * 10) H. Suggest a possible logical address.
(b) If an instruction that needs to be fetched is in physical memory location that is D_4 hex (multiplied D_4 with 100 or 1,000 or 10,000 in order to make a 20 bits address in hexadecimal) and DS = D_1, does the data segment range include it or not? If not, what value should be assigned to DS if the offset must be equal to D_2?

Q.3. [5 + 5]

(a) Consider a data D_1, convert this data into hexadecimal and count the number of 1's in data. Provide the count in BCD.
(b) Consider data items given as D_1, D_2, D_3, D_4 and D_5. All data items are in hexadecimal. Write a program to find the highest and lowest values in the given data.

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Q.4. **[5 + 5]**

(a) Write a program that adds D_2 and D_4 as signed byte operands. Show the status of flag registers. If the overflow flag is 1, then rewrite the code to fix the problem.

(b) Using string instructions, consider D_1, D_2, D_3, D_4 and D_5 as an ASCII digits, convert these ASCII digits into packed BCD, then storing it to a different location. Then tests the contents of each location that the data transfers correctly or not. If test fails, system shows the message 'INCORRECT DATA'.

Q.5. **[5 + 5]**

(a) If the keyboard is not an ASCII type. Write a code to translate hex keys to ASCII equivalent. Take the string of ***your full name*** in hex values and convert each character in ASCII codes.

(b) Write a program that scans ***your father's name***. Assume that one of the character in the string typed wrong. Replace the wrong character with the right one and displays the correct name on monitor.