Sir Syed University of Engineering & Technology
Faculty of Basic & Applied Sciences
Department of ____Computer Science_____

End Semester Examinations (Spring 2020)

Course Title with Code	CS-212: Data Structures and Algorithms		**Program**	BSCS
Instructor	Mohammad Asad Abbasi		**Semester**	3rd
Start date & Time	Wednesday July 01, 2020 at 10:30 AM	**Submission Deadline**	Wednesday July 01, 2020 at 4:30 PM	
Maximum Marks	50			

IMPORTANT INSTRUCTIONS:

Read the following Instructions carefully:

- Attempt All Questions on MS-Word. Font theme and size must be Times New Roman and 12 points respectively. Use line spacing 1.5. Convert file to PDF format before submitting.
- 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 been shared by email and WhatsApp.

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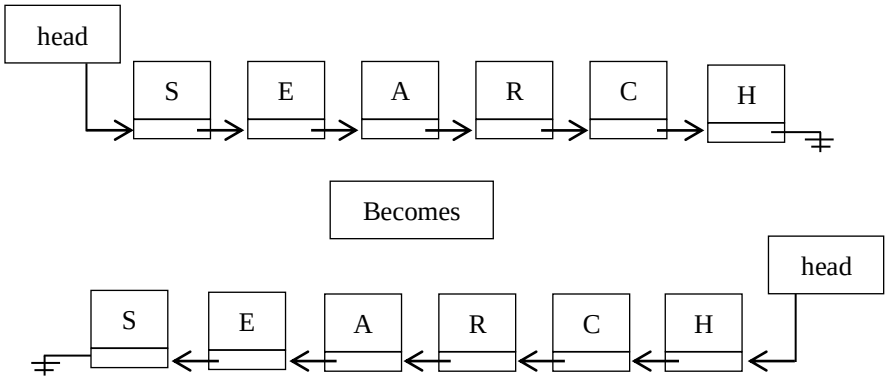
Q.1. **(10)**

Show the complete working of Radix-Sort and Merge-Sort algorithms by considering 13 digits of your CNIC and consider them as the input for this question.

NOTE: If student does not have CNIC, he/she may use CNIC of father/guardian. Also, attach the relevant CNIC.

Q.2. **(10)**

Using the concept of singly linked list, show all the pointer updates required for the following operation (show steps by using starting 6 characters of your full name):



Q.3. **(10)**

Create a stack S with 13 elements by using 13 digits of your CNIC number. Consider an empty queue Q, remove the elements one-by-one from S and insert them into Q, then remove them one-by-one from Q and re-insert them into S. Finally, show the elements of S (from top to bottom). Show all the steps.

Q.4. **(10)**

a) Show balance factor of every node after each insertion by creating an AVL tree with 13 digits of your CNIC number. Express all operations (single/double rotation) necessary to restore the balance.

b) Create min and max heap using the same input as in part (a) by showing all the necessary steps.

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Q.5. **(10)**

a) Create a binary search tree with the 13 digits of your CNIC number.

b) Provide the Preorder, Inorder and Postorder traversal of tree obtained in part (a). Show all the steps.