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|  | **AMERICAN INTERNATIONAL UNIVERSITY – BANGLADESH (AIUB)**  **Faculty of Science and Technology (FST)**  **Department of Computer Science** |
| **Course Name**: Data Structure (Theory) **Section**: [F] **Semester:** Fall 2020-2021  **Submission Date:** 19.11.2020 **Term:** Mid-Term **Faculty Name:** Mahfujur Rahman | |

1. Perform the following operations on the STACK and draw the STACK after each operation:

push (6), push(4), push(8) pop(), push(1), push(9), pop(), pop(), push(2), pop(), pop()

1. You are given the following **circular queue.** Here, **front = 3** and **rear = 6.** Do the following operations on the queue. Draw the queue after each operation with the change of the value of **front** and **rear**. If you think any of the operations is not possible to execute, specify why so.

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 53 | 25 | 87 | 15 |  |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**Operations:** Enqueue(5), Enqueue(9), Enqueue(8), Enqueue(10), Enqueue(12), Dequeue(), Dequeue().

1. Use STACK to convert the following infix expression to postfix expression: P /{(Q \* R) - S} \*{(A / F)+T}

Show the changes in the stack in each step.

1. Evaluate the value of a post-fix expression: **10 12 8 - \* 18 3 / + 2 /**

1. Given numbers are stored elements of an array: **{10, 8, 2, 35, 5}.** Now, apply insertion sort on it and show the simulation for ascending order.

**Instructions For Preparing Your Assignment:**

- Your assignment must be in the form of **handwritten hard copy**, not the typing copy.

- You can use a **scanner to create a PDF file** of your completed handwritten assignment, or you can **use your smartphone to take images of your work that can be compiled in a Word document and convert it into PDF.** Please check the video tutorial who cannot understand how to make a PDF.

~ Scanner: (<https://www.youtube.com/watch?v=fPp8Ox7qfCM>)

~ Images: (<https://www.youtube.com/watch?v=5K7xxQ8np90>)

- Rename the PDF as your student ID \_ DS \_ Asg \_ Mid \_ Sec **(Example: 19-12345-2\_DS\_Asg\_Mid\_F.pdf)**

- **Copy and paste is prohibited.** I will check everyone's assignment carefully.

- Submit the assignment on 19 November 2020 (Thursday) 10:00 PM. **Deadline will be strictly followed** and marks will be deducted who misses submission deadline.

- You must **add a cover page.** The key contents of your cover page should be (Course Title, Submission Type [e.g. Mid-Assignment], Your Name, ID, Section, Department and Date of Submission).

**Instructions For Submitting Your Assignment:**

1. Complete all the tasks and create a PDF of your assignment.
2. ​Rename the PDF as your student ID \_ DS \_ Asg \_ Mid \_ Sec (Example: 19-12345-2\_DS\_Asg\_Mid\_F.pdf)
3. Attach the file here **(Add Work).**
4. **Turn in / Hand in.**
5. **Submit the assignment on 19 November 2020 (Thursday) 10:00 PM.**
6. For Submission Instruction, please check the video tutorial (https://www.youtube.com/watch?v=hgJAUupKkfM)