ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

Lab Quiz - **02 (Set-G)**   Summer Semester - 2025

Course Number: EEE 4416   Full Marks: 20

Course Title: Simulation Lab   Time: 35 minutes

Question – 01

Write a script to swap two rows in a given matrix.

Test Case - 01:

- Input: [1 2 3;
                4 5 6;
                7 8 9];
    ⇨ Swap 1st and 3rd row.

- Output:

            [7 8 9;

            4 5 6;

            1 2 3];

Test Case 2:

- Input: [10 20 0;
                30 40 0;
                50 0 0]
    o Swap 2nd and 3rd row.

- Output:

            [10   20   0
            50   60   0
            30   40   0]

Question – 02

Write a function called **'zero_pad'** that takes three inputs – 'a', 'n', and 's'. The output should be a string/character array.

Say, a = 48 and n = 3. The function places **'n' number of zeros** at the beginning or the end of 'a'. If s = 'pre', then the output should be '00048'. If s = 'post', then the output should be '48000'.

Test case – 01

- Input: 9, 4, 'pre'
- Output: '00009'

Test case – 02

- Input: 27, 1, 'post'
- Output: '270'

Test case – 03

- Input: 97, 0, 'post'
- Output: '97'

Test case – 04

- Input: 9778, 10, 'pre'
- Output: '00000000009778'

Test case – 05

- Input: 1, 1, 'pre'
- Output: '01'

Test case – 06

- Input: 4, 4, 'pot'
- Output: 'wrong argument'

Question – 03

Write a function called **'draw_N'** that takes an integer 'n' as input and returns an 'N' shaped square matrix of size. 'n' has to be > 2.

Test case – 01

- Input: 2
- Output: 'Input must be greater than 2'

Test case – 02

- Input: 5
- Output:

$$
\begin{bmatrix}
1 & 0 & 0 & 0 & 1 \\
1 & 1 & 0 & 0 & 1 \\
1 & 0 & 1 & 0 & 1 \\
1 & 0 & 0 & 1 & 1 \\
1 & 0 & 0 & 0 & 1
\end{bmatrix}
$$

Test case – 04

- Input: 4
- Output:

$$
\begin{bmatrix}
1 & 0 & 0 & 1 \\
1 & 1 & 0 & 1 \\
1 & 0 & 1 & 1 \\
1 & 0 & 0 & 1
\end{bmatrix}
$$

Test case – 05

- Input: 1000
- Output: …

Question – 4

A Mersenne prime is a prime number that can be written in the form –

$$M = 2^p - 1$$

Where:

- p itself is a prime number
- M must also be prime

Not all numbers of the form $2^p - 1$ is prime; only some are. For instance,

- 7 is a Mersenne prime => $7 = 2^3 - 1$
- 17 is not a Mersenne prime => $17 = 2^4 + 1$

Write a function called '**Mersenne_prime**' that takes an integer as input and returns a logical true or false based on whether the number is a Mersenne prime or not.

Test case – 01
- Input: 131071
- Output: 1

Test case – 02
- Input: 29
- Output: 0

Test case – 03
- Input: 31
- Output: 1

Test case – 04
- Input: 2147483647
- Output: 1

Test case – 05
- Input: 999983
- Output: 0

Test case – 06
- Input: 131073
- Output: 0