Roll No.: 19D100011 **ME 793 - Assignment 1**

Which method of calculating inverse is used in Matlab?

In MATLAB, the `inv()` function is commonly used to calculate the inverse of a matrix. MATLAB uses various numerical algorithms based on the properties of the matrix to compute the inverse.

```
n_values = [5, 10, 20, 50, 100];
lu_times = zeros(size(n_values));
inv_times = zeros(size(n_values));
```

```
for i = 1:length(n_values)
    n = n_values(i);
    %A = randi([1, 9], n, n);
    A = readmatrix(sprintf('%d.csv', n));
    % Measure time for LU decomposition
    tic;
    lu(A);
    lu_times(i) = toc * 1.0e6; % convert to microseconds

    % Measure time for inverse calculation
    tic;
    inv(A);
    inv_times(i) = toc * 1.0e6; % convert to microseconds
end
```

```
writematrix(transpose(lu_times), 'lu_times_mat.csv')
writematrix(transpose(inv_times), 'inv_times_mat.csv')
```

Time to compute LU Decomposition in Matlab

```
disp('LU Decomposition time (microsec):')
```

```
LU Decomposition time (microsec):
```

```
disp(lu_times)
```

```
    65    36   105   111   194
```

Time to compute Inverse in Matlab

```
disp("Inverse Calculation time (microsec):")
```

```
Inverse Calculation time (microsec):
```

```
disp(inv_times)
```

```
    37    25    43    65   410
```