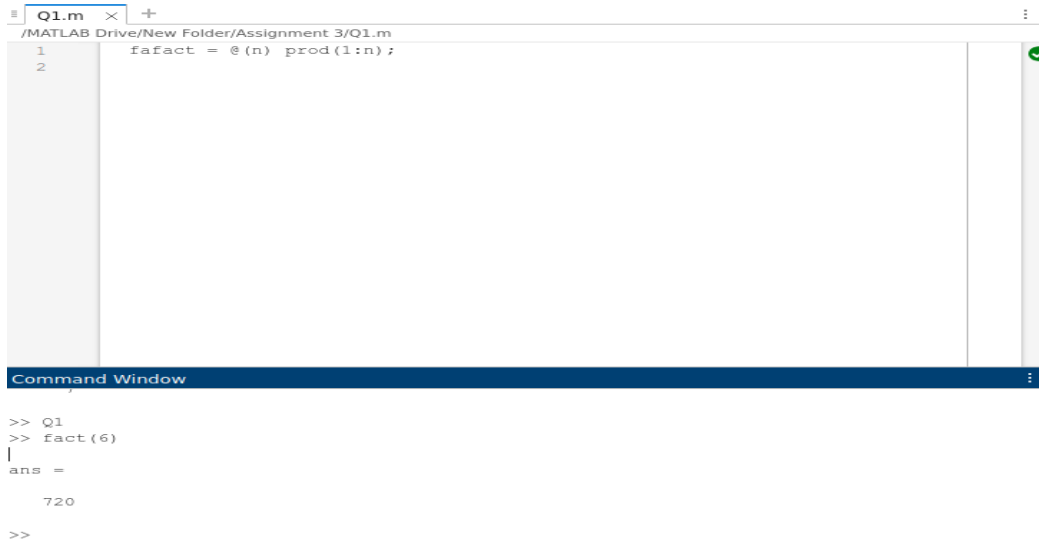


ASSIGNMENT: 3

1. Write a user-defined anonymous function in MATLAB, with one positive integer input argument and one output argument to compute the Factorial of N.



The image shows the MATLAB Editor and Command Window. The Editor window displays a file named Q1.m with the following code:

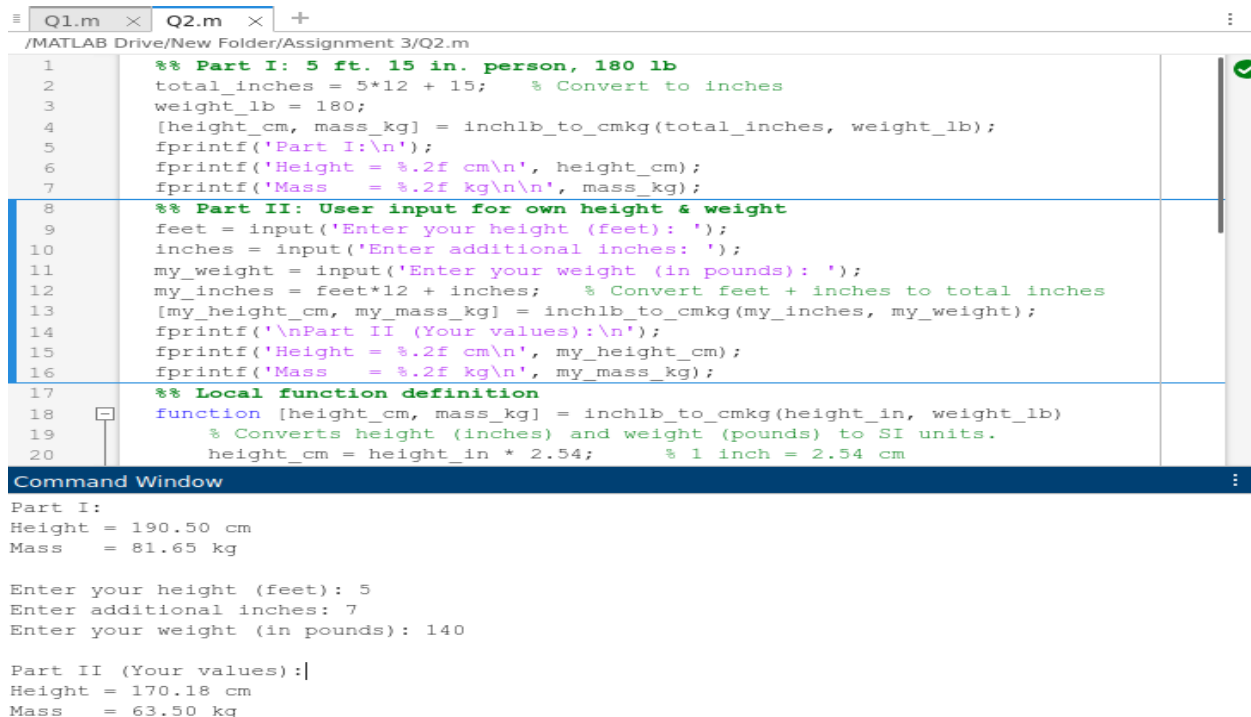
```
1 fafact = @(n) prod(1:n);
```

The Command Window shows the execution of the function:

```
>> Q1
>> fact(6)
ans =
    720
>>
```

2. Write a user-defined MATLAB function, with two input and two output arguments that determines the height in centimeters (cm) and mass in kilograms (kg) of a person from his height in inches (in.) and weight in pounds (lb).

- I. Determine in SI units the height and mass of a 5 ft.15 in. person who weight 180 lb.
- II. Determine your own height and weight in SI units.



The image shows the MATLAB Editor and Command Window. The Editor window displays a file named Q2.m with the following code:

```
1 %% Part I: 5 ft. 15 in. person, 180 lb
2 total_inches = 5*12 + 15; % Convert to inches
3 weight_lb = 180;
4 [height_cm, mass_kg] = inchlb_to_cmkkg(total_inches, weight_lb);
5 fprintf('Part I:\n');
6 fprintf('Height = %.2f cm\n', height_cm);
7 fprintf('Mass = %.2f kg\n\n', mass_kg);
8 %% Part II: User input for own height & weight
9 feet = input('Enter your height (feet): ');
10 inches = input('Enter additional inches: ');
11 my_weight = input('Enter your weight (in pounds): ');
12 my_inches = feet*12 + inches; % Convert feet + inches to total inches
13 [my_height_cm, my_mass_kg] = inchlb_to_cmkkg(my_inches, my_weight);
14 fprintf('\nPart II (Your values):\n');
15 fprintf('Height = %.2f cm\n', my_height_cm);
16 fprintf('Mass = %.2f kg\n', my_mass_kg);
17 %% Local function definition
18 function [height_cm, mass_kg] = inchlb_to_cmkkg(height_in, weight_lb)
19 % Converts height (inches) and weight (pounds) to SI units.
20 height_cm = height_in * 2.54; % 1 inch = 2.54 cm
```

The Command Window shows the execution of the function:

```
Part I:
Height = 190.50 cm
Mass = 81.65 kg

Enter your height (feet): 5
Enter additional inches: 7
Enter your weight (in pounds): 140

Part II (Your values):|
Height = 170.18 cm
Mass = 63.50 kg
```

3. a) Write a user-defined function in MATLAB, with one positive integer input argument and one vector output argument to compute the Fibonacci series of N values.

```
Q1.m x Q2.m x fibonacci_series.m x +
/MATLAB Drive/New Folder/Assignment 3/fibonacci_series.m
1 function F = fibonacci_series(N)
2 % If no input is given, ask user
3 if nargin < 1
4     N = input('Enter number of terms for Fibonacci series: ');
5 end
6
7 % Check valid input
8 if N <= 0 || floor(N) ~= N
9     error('Input must be a positive integer.');
```

```
end
12 % Generate Fibonacci series
13 F = zeros(1,N);
14 if N >= 1
15     F(1) = 0;
16 end
17 if N >= 2
18     F(2) = 1;
19 end
20 for k = 3:N
21     F(k) = F(k-1) + F(k-2);
22 end
23
```

```
Command Window
>> fibonacci_series
Enter number of terms for Fibonacci series: 10
Fibonacci series of 10 terms:
ans =
    0     1     1     2     3     5     8    13    21    34
>>
```

- b) Write a user-defined function in MATLAB, to computer prime numbers within given range as input argument and returns a vector of results.

```
Q1.m x Q2.m x fibonacci_series.m x prime_numbers.m x +
/MATLAB Drive/New Folder/Assignment 3/prime_numbers.m
1 function primes_list = prime_numbers(range_limit)
2 % If no input is given, ask user
3 if nargin < 1
4     range_limit = input('Enter the upper limit to find prime numbers: ');
5 end
6
7 % Check valid input
8 if range_limit <= 1 || floor(range_limit) ~= range_limit
9     error('Input must be an integer greater than 1.');
```

```
end
12 % Generate prime numbers
13 primes_list = [];
14 for n = 2:range_limit
15     if isprime(n)
16         primes_list = [primes_list n];
17     end
18 end
19
20 % Display results
21 fprintf('Prime numbers up to %d are: ', range_limit);
22 disp(primes_list);
23 end
```

```
Command Window
ans =
    0     1     1     2     3     5     8    13    21    34
|
>> prime_numbers
Enter the upper limit to find prime numbers: 20
Prime numbers up to 20 are:     2     3     5     7    11    13    17    19
```