

## ENGR 1204 Programming Languages in Engineering

### Homework 2

The problems are from S. Attaway, MATLAB – A Practical Introduction to Programming and Problem Solving (5th Edition).

For each problem, print out the script file if created and the relevant Command Window output. In later assignments plots may need to be printed as well. Also, show analytical work where appropriate.

Problems 1 to 6

(10 points each) Chapter 4 – Exercises 11, 12, 21 (generate one random integer between 1 and 100), 22

(10 points each) Chapter 5 – Exercises 15, 23

(20 points) Problem 7

Write a program to find the factorial of an integer  $n$ , defined as

$$n! = n(n-1)(n-2)(n-3) \dots (2)(1) \quad (n = 1, 2, 3, \dots)$$

Also,  $0! = 1$

The program should prompt you for the input  $n$  and use a **for** loop to do the repeated multiplication. The program should also work for  $n=0$ .

Include an error-check to reject negative values of  $n$ .

Format the result so that the value of  $n!$  displays all the integer digits. Otherwise you will see round-off when  $n$  gets large enough.

Show the result for several values of  $n$  (including  $n=0$ ), and compare to MATLAB's built-in function **factorial(n)**.

(20 points) Problem 8

The High-Low Game test program below (a class exercise) allows only a single “guess”. The program needs to be run repeatedly until the number is found.

```
*****
% High-Low Game (Test Program)
rng(1234567)
x = ceil(100*rand);
guess = input('Choose a number from 1 to 100: ');
if guess < x
    disp('TOO LOW')
elseif guess > x
    disp('TOO HIGH')
else
    disp('RIGHT!')
end
*****
```

Modify the program to allow you to continue to guess until the right number is entered. Keep track of the number of guesses you entered and display a message such as  
“You got the hidden number after 7 tries.”  
after getting the right number.

Use your student ID number as the initial random number seed, instead of 1234567. Show the output for two runs, entering different guesses for the second run. Alternatively, you can just reverse your ID digits.

Hint: Use a **while** loop and remain in the loop as long as **guess** is not equal to **x**.