Armstrong State University
Engineering Studies
MATLAB Marina – Logic Expressions Exercises

1. Create the MATLAB program of Figure 1 using the MATLAB editor. Execute the program and verify that the results of the logic expression are false, false, and true for values of `number` being less than zero, zero, and greater than zero respectively.

```
clear all;
clc;
number = input('Enter a number: ');
result = (number > 0);
disp(result);
```

Figure 1, MATLAB Program for Exercise 1

2. Create the MATLAB program of Figure 2 using the MATLAB editor. Execute the program and verify that two plots for $0 \leq t \leq 1$ and $0 \leq t \leq 0.5$ are generated. Note the interval used for the variable `tt` in this example is not small enough for the sinusoid to be smooth.
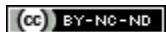
```
clear;
clc;
close all;
tt = 0.0 : 0.1 : 1.0;
xx = cos(2*pi*tt);
loc = (tt <= 0.5);
figure(1)
plot(tt, xx)
figure(2)
plot(tt(loc), xx(loc))
```

Figure 2, MATLAB Program for Exercise 2

3. Write MATLAB programs to do the following:
   a) Read in a number from the user and determine if the number is a positive number.
   b) Read in a number from the user and determine if the number is greater than zero and less than or equal to 100.
   c) Read in a number from the user and determine if the number is real. Hint: MATLAB has a built in functions `real` and `imag` that return the real and imaginary parts of a complex number respectively. MATLAB also has a built in `isreal` function.
   d) Read in a number and determine if the number is an odd number.
   e) Generate a 1D array containing 50 values linearly spaced from 0.0 to 1.0 and determine the indices of the values greater than 0.25 and less than 0.75.
4. Write MATLAB programs to do the following:
   a) Generate a 1D array of values named `x` from -2.0 to 2.0 with an increment of 0.05.

b) Evaluate the function $f = -2x^2 + x + 1$ for the values in the variable x.

c) Plot the variable x versus the variable f.

d) Using a logic expression, determine where the function f equals zero. Verify these locations using the plot from part c).

e) Using a logic expression, determine where the function f is greater than zero. Verify these locations using the plot from part c).

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