**Class 26**

**Key Ideas**

* The **for** loop is the counted loop, used when an action is to be repeated a specified number of times
* To repeat an action, a loop or iterator variable is used; sometimes, the value of the loop variable is used in the action – but sometimes, it is just used to specify how many times to repeat the action
* If a vector is to be created in a loop, it is far more efficient to preallocate the vector to the desired number of elements first
* In many languages, loops are used to iterate through elements of a vector or matrix – to calculate sums, products, etc. However, in MATLAB, there are built-in functions for these operations. The use of the built-in functions and operators is called *vectorized* code, and is preferred.
* Nested loops: one loop inside of another. For every value of the outer loop variable, the inner loop is executed in its entirety.
* Loop variable(s) are used to index into the elements of vectors and matrices.
* **while** loops are conditional loops: used when an action is to be repeated, but ahead of time it isn’t known how many times the action will be repeated
* it is frequently useful to count how many times the action of a while loop is repeated
* error-checking is an important application: loop until the user enters a value in the correct range
* Vectorize code! In many languages, loops are necessary to iterate through elements in vectors/matrices – but usually not in MATLAB: built-in functions and operations on arrays can be used instead.
* Usually, what is efficient for the programmer (using built-in functions and operators) is also more efficient for MATLAB.

**Assessment Questions**

1) For the following **for** loop:

for i = 1:2:7

disp(i)

end

How many times will the action of the loop be executed?

1

4. correct

7

2

2)

(**T**/F): In the following code, the loop variable is used to index into the vector.

vec = [11 5 -1 2];

mysum = 0;

for i = 1:length(vec)

mysum = mysum + vec(i);

end