



Sheet 4

Exercise 1

A vector s contains only two elements. Write a Matlab program to sort the vector s into ascending order. Use the `swap()` function in your code.

Exercise 2

Write a Matlab function that has three input arguments and returns the maximum value of its input arguments. Name this function `max3a`. This function should not call any other functions.

Exercise 3

Rewrite the program using an if-elseif-else statement:

```
x = 10;
units = 'cm';
switch (units)
    case {'km'}
        y = 1000 * x
    case {'m'}
        y = x
    case {'cm'}
        y = x / 100
    case {'mm'}
        y = x / 1000
    otherwise
        disp(['Unknown Units: ', units])
end
```

Exercise 4

Write a Matlab program to calculate the mean of a vector. Your program should be able to calculate the mean of the vector irrespective of its length. The mean of a vector is given by the following equation:

$$\text{mean} = m = \frac{1}{n} \sum_{i=1}^n v(i)$$

where $v(1)$ is the first element of the vector v and n is the number of elements in the vector.

Exercise 5

Find the value of the array A in the Matlab program:

```
a) A = [1, 4, 6; 2, 3, 5; 7, 8, 9];
    for i=2:3
        A(i-1,:) = A(i,:) - A(i-1,:);
    end
```

```
b) A = [1, 4, 6; 2, 3, 5; 7, 8, 9];
    for j=2:3
        A(:,j) = A(:,j) - A(:,j-1);
    end
```

```
c) m = 3;
    n = 3;
    A = zeros(m,n);
    for i = 1:m
        for j = i:n
            A(i,j) = i + j;
        end
    end
```

Exercise 6

Write a Matlab function that determines a number if its factorial is given. The function has one input argument and returns one value. For example, if the number 120 is given to the function, it returns the value 5. Give this function a meaningful and descriptive name.

Exercise 7

Define a structure color with the data fields red, blue, and green. Then define a 1×20 field of structures of this type and initialize the red component with the value 'yes', the blue component with the value 'no', and the green component with the value [0,256,0].