



Lecture 10

Practice II

Example 1

Write a program that reads an array of temperature values in Celsius and compute the corresponding temperatures in Fahrenheit and Kelvin. The program shows the results in a tabular format aligned left.

Enter Array of Temp.: [23 37 40 15]

<i>Num</i>	<i>Cel</i>	<i>Fah</i>	<i>Kelvin</i>
<i>1</i>	<i>23.00</i>	<i>73.40</i>	<i>296.15</i>
<i>2</i>	<i>37.00</i>	<i>98.60</i>	<i>310.15</i>
<i>3</i>	<i>40.00</i>	<i>104.00</i>	<i>313.15</i>
<i>4</i>	<i>15</i>	<i>59.00</i>	<i>288.15</i>

$$T_F = T_R - 459.67$$

$$T_F = \frac{9}{5}T_C + 32$$

$$T_R = \frac{9}{5}T_K$$

Example 1

Enter Array of Temp.: [23 37 40 15]

```
x=input('Enter Array of Temp.:');
```

```
for i=1:length(x)
```

```
end
```

Example 1

Enter Array of Temp.: [23 37 40 15]

Num Cel Fah Kelvin

```
x=input('Enter Array of Temp.:');
```

```
fprintf('%-5s \t %-5s \t %-5s \t %-5s\n',Num',  
                                              'Cel', 'Fah', 'Kelvin');
```

```
for i=1:length(x)
```

```
end
```

Example 1

Enter Array of Temp.: [23 37 40 15]

<i>Num</i>	<i>Cel</i>	<i>Fah</i>	<i>Kelvin</i>
<i>1</i>	<i>23.00</i>	<i>73.40</i>	<i>296.15</i>
<i>2</i>	<i>37.00</i>	<i>98.60</i>	<i>310.15</i>
<i>3</i>	<i>40.00</i>	<i>104.00</i>	<i>313.15</i>
<i>4</i>	<i>15</i>	<i>59.00</i>	<i>288.15</i>

```
tc=input('Enter Array of Temp.:');  
fprintf('%-5s \t %-5s \t %-5s \t %-5s\n','Num',  
        'Cel', 'Fah', 'Kelvin');  
for i=1:length(tc)  
    tf = (9/5) * tc(i) + 32;  
    tr = tf + 459.67;  
    tk=(5/9) * tr;  
    fprintf('%-5d \t %-5.2f \t %-5.2f \t %-5.2f\n '  
            , i, tc(i), tf, tk);  
end
```

Example 2

Write a MATLAB script that takes the number of boxes as input and prompts the user to enter the size of bottles in each box and counts the number of bottles which has Big, Medium and Small sizes and the smallest bottle. The algorithm should stop for each box if the user entered a negative size.

Big: >150, Medium: 100-149, Small: <100.

Enter No. of Boxes:2

Box No. 1

Bottle 1- Enter size: 200

Bottle 2- Enter size: 102

Bottle 3- Enter size: 130

Bottle 4- Enter size: 90

Bottle 5- Enter size: 40

Bottle 6- Enter size: -12

We got 1 Big, 2 Medium, 2 Small.

Bottle 5 has the smallest size: 40

Box No. 2

Bottle 1- Enter size: 204

Bottle 2- Enter size: 133

Bottle 3- Enter size: 99

Bottle 4- Enter size: -2

We got 1 Big, 1 Medium, 1 Small.

Bottle 3 has the smallest size: 99

End of Boxes

Example 2

Enter No. of Boxes:2

Box No. 1

.....

.....

.....

.....

.....

Box No. 2

.....

.....

.....

.....

.....

End of Boxes

```
N=input('Enter No. of Boxes:');
```

```
for i=1:N
```

```
    fprintf('Box No. %d\n',i);
```

```
end
```

```
fprintf('End of Boxes\n');
```

Example 2

Enter No. of Boxes:2

Box No. 1

Bottle 1- Enter size: 200

Bottle 2- Enter size: 102

Bottle 3- Enter size: 130

Bottle 4- Enter size: 90

Bottle 5- Enter size: 40

Bottle 6- Enter size: -12

Box No. 2

.....
.....
.....
.....
.....

End of Boxes

```
N=input('Enter No. of Boxes:');
```

```
for i=1:N
```

```
    fprintf('Box No. %d\n',i);
```

```
    bot_size=1;
```

```
    bot_num=0;
```

```
    while bot_size>=0
```

```
        bot_num=bot_num+1;
```

```
        fprintf('Bottle %d- Enter size:',bot_num);
```

```
        bot_size=input();
```

```
    end
```

```
end
```

```
fprintf('End of Boxes\n');
```

Example 2

Enter No. of Boxes:2

Box No. 1

Bottle 1- Enter size: 200

Bottle 2- Enter size: 102

Bottle 3- Enter size: 130

Bottle 4- Enter size: 90

Bottle 5- Enter size: 40

Bottle 6- Enter size: -12

We got 1 Big, 2 Medium, 2 Small.

Box No. 2

.....

.....

.....

.....

.....

```
N=input('Enter No. of Boxes:');
```

```
for i=1:N
```

```
    fprintf('Box No. %d\n',i);
```

```
    bot_size=1;
```

```
    bot_num=0;
```

```
    big_bot=0;
```

```
    med_bot=0;
```

```
    sml_bot=0;
```

```
    while bot_size>=0
```

```
        bot_num=bot_num+1;
```

```
        fprintf('Bottle %d- Enter size:',bot_num);
```

```
        bot_size=input();
```

```
        if bot_size>150
```

```
            big_bot=big_bot+1;
```

```
        elseif bot_size<150 && bot_size>=100
```

```
            med_bot=med_bot+1;
```

```
        else
```

```
            sml_bot=sml_bot+1;
```

```
        end
```

```
    end
```

```
    fprintf('We got %d Big, %d Medium, %d Small.\n'
```

```
        ,big_bot, med_bot, sml_bot);
```

```
end
```

```
fprintf('End of Boxes\n');
```

Example 2

Enter No. of Boxes:2

Box No. 1

Bottle 1- Enter size: 200

Bottle 2- Enter size: 102

Bottle 3- Enter size: 130

Bottle 4- Enter size: 90

Bottle 5- Enter size: 40

Bottle 6- Enter size: -12

We got 1 Big, 2 Medium, 2 Small.

Bottle 5 has the smallest size: 40

Box No. 2

.....
.....
.....
.....
.....

```
min_bot=0;
min_boti=0;
while bot_size>=0
    bot_num=bot_num+1;
    fprintf('Bottle %d- Enter size:',bot_num);
    bot_size=input('');
    if bot_size>150
        big_bot=big_bot+1;
    elseif bot_size<150 && bot_size>=100
        med_bot=med_bot+1;
    else
        sml_bot=sml_bot+1;
    end
    if bot_num==1
        min_bot=bot_size;
    end
    if min_bot>bot_size
        min_bot=bot_size;
        min_boti=bot_num;
    end
end
fprintf('We got %d Big, %d Medium, %d Small.\n',
        big_bot, med_bot, sml_bot);
fprintf('Bottle %d has the smallest size: %d \n ', min_boti, min_bot);
end
fprintf('End of Boxes\n');
```

Vectorized Example 3

Write a MATLAB script using vectorized code to prompt the user to enter the size of bottles in a box (in an array) and counts the number of bottles which has Big, Medium and Small sizes and the smallest bottle. The algorithm should ask the user to enter the array if the user entered a negative size.

Big: >150, Medium: 100-149, Small: <100.

Vectorized Example 3

```
bot_size=input('enter bottle sizes as [ 2 5 6]:');  
while any(bot_size<0)  
    bot_size=input('Error! enter bottle sizes as [ 2 5 6]:');  
end  
big_bot =sum(bot_size>150);  
med_bot =sum(bot_size<=150 & bot_size>100);  
sml_bot =sum(bot_size<100);  
[min_bot, min_boti]=min(bot_size);  
  
fprintf('We got %d Big, %d Medium, %d Small.\n' ,big_bot, med_bot, sml_bot);  
fprintf('Bottle %d has the smallest size: %d \n ', min_boti, min_bot);
```

Vectorized Example 4

X is a 2-D Matrix contains the following:

- The **first column** is the cars **ID**.
- The **second column** is the **price** of the car.
- The **third column** is the amount of **fuel** that the car consumes to travel 1000 km.

105	155000	140
107	210000	120
110	170000	110
101	300000	100
103	185000	130

Write one statement to calculate

$$eff = \frac{amount_of_fuel * 2.6}{car_price / 1000}$$

<code>price = x(:,2)</code>	155000	<code>fuel = x(:,3)</code>	140
	210000		120
	170000		110
	300000		100
	185000		130

Vectorized Example 4

$$eff = \frac{amount_of_fuel * 2.6}{car_price / 1000}$$

```
eff = (fuel * 2.6) / (price/1000)
```

```
0    0    0  1.2133    0
0    0    0  1.0400    0
0    0    0  0.9533    0
0    0    0  0.8667    0
0    0    0  1.1267    0
```

```
eff = (fuel * 2.6) ./ (price/1000)
```

```
2.3484
1.4857
1.6824
0.8667
1.8270
```

Other Examples

What does Matlab print on the screen after the following commands executed in command window?

```
>>a=3;  
>>myfun1(a)  
>>reciprocal
```

Where myfun1.m file contains the following:

```
function myfun1(a)  
    reciprocal=1/a;  
    result = 2*reciprocal  
end
```

result =

0.6667

??? Undefined function or variable 'reciprocal'.

Other Examples

The number of elements in a vector generated by `[2 : 0.1 : 5]` is **31**

What is the value of `T(end)` after the Matlab code below executes? **1**

Hint: `T(end)` is the last element in the array `T`.

```
Z = [0 : 17 : 159808]
```

```
T = Z / Z(end)
```



Thank You

Course Site:

<http://scholar.cu.edu.eg/?q=eldeib/classes/genn004-computers-engineers>

Introduction to Computers and Engineering - MATLAB