



ME 444 MATLAB FOR ENGINEERS

Practice 05- Control Structures 1

1. Create a script that asks the user to enter the midterm and final grades from the keyboard, calculate the grade point average and print it on the screen together with the letter grade. Have the grade calculation process done by a function named **termgrade** and send it to the script, which is the main program, then print the letter grade to the excel file named **grades** according to the average value from the function (NOTE: Midterm grades are 30% of the end of term grade and the final grade is 40% forms it.)

<u>Grade</u>	<u>Average</u>
AA	90-100
BA	85-89
BB	80-84
CB	70-79
CC	60-69
DC	55-59
DD	50-54
FD	40-49
FF	0-39

2. Write an expression that will store the value of the variable **x** entered from the keyboard between (0 and 10), logical true 1) or otherwise logical false (logical false) in a variable named **isit**. Do this with just an assignment statement, no **if** or **if-else** statement!

3. The Pythagorean theorem states that for a right triangle, the relationship between the length of the hypotenuse **c** and the lengths of the other sides **a** and **b** is given as:

$$c^2 = a^2 + b^2$$

Write a script that will ask the user for the lengths of **a** and **c**, call the **findb** function to calculate and return the length of **b**, and print the result to the screen. Note that values of **a** or **c** that are less than or equal to zero will not make sense, so the script should print an error message if the user enters an invalid value. The **findb** function is given below:

```
function b=findb(a,c)
% Finds the side length of b using the values of a and c.
b=sqrt(c^2-a^2)
end
```

4. Simplify the code given below.

```
if value>100
    value =100;
else
    value = value;
end
```

5. In chemistry, the pH of an aqueous solution is a measure of its acidity. The pH scale ranges from 0 to 14. A solution with a pH of 7 is said to be neutral, a solution with a pH greater than 7 is alkaline, and a solution with a pH less than 7 is acidic. Write a script that will ask the user for the pH of a solution and print whether it is neutral, alkaline, or acidic. If the user enters an invalid pH, the program will print an error message.

6. Write a script that determines whether the number entered by the user is even or odd. (TIP: The function that returns the remainder (remainder) after dividing a by b is the expression `rem(a,b)` in MATLAB.)

7. Write a MATLAB program that finds the real roots of the quadratic equation with a, b, c coefficients such as $ax^2+bx+c=0$ and prints it to the screen.

8. In a script, the user must enter 'y' or 'n' in response to the question of "Do you want to continue?". Assign the user's input to a character (string) variable named **response**. If the user enters 'y' or 'Y' from the keyboard, the program will print the message "OK, we continue", if he enters 'n' or 'N', the message "OK, we are stopping", and if he enters a different word, "Error". When writing your script, first use this phrase:

```
response = input('Do you want to continue? (y/Y or n/N): ', 's');
```

Write the script using a single **nested if-else** conditional (You can also use the **elseif** conditional)

9. The Mach (mah) number is a critical quantity in aerodynamics. It is defined as the ratio of the speed of an object (eg an airplane) to the speed of sound. If the Mach number is less than 1, the flow is **subsonic**; If the Mach number is equal to 1, the flow is **sonic**; and if the Mach number is greater than 1, the flow is **supersonic**. Write a script that will ask the user about the speed of an aircraft and the speed of sound at the current altitude of the aircraft and print whether the status is **subsonic**, **sonic** or **supersonic**. (NOTE: As we all know, pressure, density and temperature decrease as you go higher above sea level. For this

reason, the transmission of sound, and therefore the speed of sound, decreases as you go higher. For example, 1 Mach=1234.8 km/h (343m/s) at 1 atm pressure at sea level. However, in the range of 10-12 km, which is the average altitude at which the jets fly, 1 Mach = 1072 km / h.)



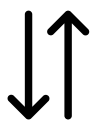
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Practice 05- Control Structures 1

1.

```
Editor - D:\Belgelerim\MATLAB\soru2.m
soru2.m x donemsonu.m x + Komut dosyası
1 %Bu program donemsonu.m isimli fonksiyondan gelen sonucu notlar.txt dosyasına yazdırır.
2 isim=input('İSİM: ','s');
3 s_isim=input('SOYİSİM: ','s');
4 v=input('Vize notunu giriniz: ');
5 f=input('Final notunu giriniz: ');
6 %not bilgilerini fonksiyona yollayalım, gelen harf bilgisini not isimli değişkene atayalım.
7 not=donemsonu(v,f);
8 ogrenci={isim s_isim not};
9 %Gerekli bilgileri dosyaya yazdıralım.
10 xlswrite('notlar.xls',ogrenci,'Sayfa1','A1:C1');
```

```
Editor - D:\Belgelerim\MATLAB\donemsonu.m
soru2.m x donemsonu.m x + Fonksiyon dosyası
1 function harf=donemsonu(v,f)
2 %Bu fonksiyon dönem sonu notunu hesaplar ve harf notunu verir.
3 ortalama=0.4*v+0.6*f;
4 if ortalama<=100 && ortalama>=90
5     harf='AA';
6 elseif ortalama<=89 && ortalama>=85
7     harf='BA';
8 elseif ortalama<=84 && ortalama>=80
9     harf='BB';
10 elseif ortalama<=79 && ortalama>=70
11     harf='CB';
12 elseif ortalama<=69 && ortalama>=60
13     harf='CC';
14 elseif ortalama<=59 && ortalama>=55
15     harf='DC';
16 elseif ortalama<=54 && ortalama>=50
17     harf='DD';
18 elseif ortalama<=49 && ortalama>=40
19     harf='FD';
20 else harf='FF';
21 end
22 end
```



```
Command Window
>> soru2
İSİM: NEVA
SOYİSİM: DOGAN
Vize notunu giriniz: 85
Final notunu giriniz: 90
```

Komut Penceresi



Dosya	Giriş	Ekle	notlar.xls dosyası
J11			
A	B	C	D
1 NEVA	DOGAN	BA	
2			
3			

2.

```
>> x=5

x =

     5

>> isit=x>0 && x<107

isit =

     1
```

3.

```
1   c = input('c kenarının uzunluğunu girin: ');
2   a = input('a kenarının uzunluğunu girin: ');
3   if a > 0 && c > 0
4       b = findb(a,c);
5       fprintf('b kenarının uzunluğu %.1f ''dir.\n', b)
6   else
7       fprintf('Hatalı giriş yaptınız\n')
8   end |
```

Komut dosyası

4.

```
if sayi > 100
    sayi = 100;
end |
```

5.

```
% Kullanıcıdan çözeltinin pH değerini isteyen
% daha sonra çözeltinin asidik,bazik ya da nötr olduğunu söyler.

ph = input('Çözeltinin pH değerini girin: ');
if ph >=0 && ph <= 14
    if ph < 7
        disp('Asidiktir')
    elseif ph == 7
        disp('Nötrdür')
    elseif ph > 7
        disp('Baziktir')
    end
else
    disp('Geçersiz pH!')
end
```

Çözüm 1

```
% Kullanıcıdan çözeltinin pH değerini isteyen
% daha sonra çözeltinin asidik,bazik ya da nötr olduğunu söyler.

ph = input('Çözeltinin pH değerini girin: ');
if ph >=0 && ph < 7
    disp('Asidiktir')
elseif ph == 7
    disp('Nötrdür')
elseif ph > 7 && ph <= 14
    disp('Baziktir')
else
    disp('Geçersiz pH!')
end
```

Çözüm 2

6.

```
% Kullanıcıdan bir sayı girmesini ister
% daha sonra girilen sayının tek ya da çift olduğunu söyler.

sayi = input('Bir sayı girin: ');
if rem(sayi,2)==0
    fprintf('Girilen %d sayısı çifttir.\n',sayi);
elseif rem(sayi,2)~=0
    fprintf('Girilen %d sayısı tektir.\n',sayi);
else
    error('Geçersiz girdi!')
end
```

7.

```
1 %Bu program ax^2+bx+c=0 denkleminin köklerini bulur.
2 a=input('a = ');
3 b=input('b = ');
4 c=input('c = ');
5 delta=b^2-4*a*c;
6 if delta>0
7     x1=(-b-sqrt(delta))/(2*a);
8     x2=(-b+sqrt(delta))/(2*a);
9     fprintf('İki reel kök; x1 = %f , x2 = %f\n ',x1,x2);
10 elseif delta==0
11     fprintf('Tek kök var; x1 = x2= %f \n ',-b/(2*a));
12 else
13     fprintf('Reel kök yoktur\n ');
14 end
```

8.

```
1 %Kullanıcıya devam edip etmedğini sorar, karşılığında cevap verir.
2 - cevap = input('Devam etmek istiyor musunuz? (e/E ya da h/H): ', 's');
3 - if cevap == 'e' || cevap == 'E'
4 -     disp('Tamam, devam ediyoruz')
5 - elseif cevap == 'h' || cevap == 'H'
6 -     disp('Tamam, duruyoruz')
7 - else
8 -     disp('Hata!')
9 - end
```

9.

```
1      % Mach sayısını kullanarak, uçağın hızının subsonik,  
2      %sonik veya süpersonik olduğunu yazdırır.  
3  
4 -    ucağ_hizi = input('Uçağın hızı: ');  
5 -    ses_hizi = input('İlgili şartta ses hızı: ');  
6 -    mach = ucağ_hizi/ses_hizi;  
7  
8 -    if mach < 1  
9 -        disp('Subsonik')  
10 -    elseif mach == 1  
11 -        disp('sonik')  
12 -    else  
13 -        disp('Süpersonik')  
14 -    end
```