**University of Al−Mustansiriyah – College of Engineering – Dept. of Mech. Eng.**

**Computer Skills – First Classes Instructor: Dr. Aouf A. Al−Tabbakh**

The solutions of the homework problems

Q1/ You have two matrices; the first matrix has 2 rows and 3 columns and the second matrix has 5 rows and 3 columns. Write Matlab program to merge the two matrices into one matrix of 3 rows and 7 columns, and then calculate the summation of each column of the new matrix.

 **clear,clc**

**x = [2,5,4 ; 7,-1,3];**

**y = [1,8,9 ; 3,2,4 ; -3,5,7 ; 10,9,2 ; 3,4,0 ];**

**z = [x;y]';**

**s=sum(z);**

**disp(z)**

**disp(' ')**

**disp(s)**

Q2/ Write Matlab program to enter a group of any numbers. Then extract and print the maximum and minimum values along with their location in the group. The program then calculates the summation of the elements along with their number so that the following phrase appears:-

There are ( ) numbers and their summation is ( )

**clear,clc**

**x=[9,8,7,3,4,12,6,25,14,5];**

**bigx=max(x);**

**smallx=min(x);**

**sumx=sum(x);**

**n=length(x);**

**disp(' max min ')**

**disp('---------------')**

**disp([bigx,smallx])**

**fprintf(' There are (%2.0f) number and their**

 **summation is (%2.0f)\n',[n,sumx])**

Q3/ Write Matlab program to print a table four columns where:- the first and second columns represents the even (زوجي) and odd (فردي) numbers between 1 and 20, and the third and fourth columns each contain 10 arbitrary values between 21 and 40.

 **clear,clc**

**x=2:2:20;**

**y=1:2:20;**

**z=[25,33,27,40,34,31,26,30,36,29];**

**w=[28,24,39,21,32,37,23,38,35,22];**

**R=[x',y',z',w'];**

**disp(R)**

Q4/ Write Matlab program to define a two dimensional matrix of 8 rows and 4 columns so that the elements in the first four rows are zeros and the elements in the last four rows are ones. Modify the matrix so that the elements in the first and last columns become 8.

 **clear,clc**

**x=zeros(4);**

**y=ones(4);**

**z=[x;y];**

**z(:,1)=8;**

**z(:,4)=8;**

**disp(z)**

Q5/ Write Matlab program to print a table of 3 columns where:- the first column represents the seven days of the week (1 to 7), the second column is the profits of a bakery in each of the corresponding days and the third column is the number of working hours in each day. Print two suitable statements below the table telling about the total profits in the above 7 days and the average working hours each day.

**clear,clc**

**n=1:7;**

**p=[50,70,60,55,75,58,68];**

**w=[10,11,12,10,9,10,12];**

**R=[n' p' w'];**

**total=sum(p);**

**avg=mean(w);**

**disp(' Day Profit Hours')**

**disp('------------------------')**

**disp(R)**

**disp(' ')**

**fprintf('The total weekly profit is %3.0f thousands IQ \n',total)**

**fprintf('The average daily working hours is %4.1f hours \n',avg)**

Q6/ Write Matlab program to print a table of three columns. The first column represents the numbers from 0 to 1000 at a step of 100. The second column represents 11 arbitrary values ranging from 200 to 400. The third column is the average of the first two columns. Print the table with suitable titles.

 **clear,clc**

**A=0:100:1000;**

**B=[200,250,220,400,330,280,320,210,390,220,380];**

**C=(A+B)./2;**

**fprintf(' A B C \n')**

**fprintf('-------------------------\n')**

**R=[A;B;C];**

**fprintf(' %4.0f %4.0f %4.0f \n',R)**

Q7/ Write Matlab program to print a table of 3 columns where:- the first column represents ten arbitrary temperature readings of ten days in centigrade (oC), the second column is the temperatures converted to Fahrenheit (F) using the formula T(F)=T(oC)\*(8/5)+32, and the third column is ten arbitrary values of relative humidity ranging from 25% to 75%. The program should also calculate the average values of each of the three columns and print them under their corresponding columns.

**clear,clc**

**TC=[20,25,26,28,33,30,28,27,24,22];**

**TF=TC\*8/5+32;**

**RH=[.65,.6,.5,.42,.31,.25,.45,.55,.75,.62];**

**R=[TC;TF;RH];**

**avg=mean(R');**

**fprintf(' TF TC RH \n')**

**fprintf('-------------------------------\n')**

**fprintf(' %4.0f %4.0f %4.2f \n',R)**

**fprintf('-------------------------------\n')**

**fprintf(' %4.1f %4.1f %4.2f \n',avg)**

Q8/ Write Matlab program to print a table of 3 columns and 12 rows. The first column is the numbers from 1 to 12. The second column is 12 arbitrary numbers between 250 and 750. The third column is 12 arbitrary numbers between 18 and 45. Arrange the rows of the table so that the numbers in the second column is in an ascending order. Repeat the process for the third column.

**clear,clc**

**n=1:12;**

**x=[250,750,330,450,600,520,430,680,...**

 **290,710,360,540];**

**y=[22,35,44,39,20,26,31,18,45,33,48,30];**

**R=[n',x',y'];**

**disp(R)**

**Rs2=sortrows(R,2);**

**Rs3=sortrows(R,3);**

**disp(' ')**

**disp(Rs2)**

**disp(' ')**

**disp(Rs3)**

Q9/ You have two matrices; the first matrix has 5 rows and 2 columns and the second matrix has 2 rows and 5 columns. Write Matlab program to merge the two matrices into one matrix of 5 rows and 4 columns. Modify the new matrix so that the elements at all four sides become zero. Print the merged and the modified matrices.

**clear,clc**

**M1=[6,2;5,3;8,1;7,6;4,9];**

**M2=ones(2,5);**

**M3=M2';**

**M4=[M1,M3];**

**disp(M4)**

**disp(' ')**

**M5=M4;**

**M5(1,:)=0;M5(end,:)=0;M5(:,1)=0;M5(:,end)=0;**

**disp(M5)**

Q10/ Write Matlab program to evaluate the following functions for any value of x. Print all the results with 3 decimal digits:−

$$y=\frac{x^{2}-1}{x^{3}+1} z=\sin(\left(x\right))+\cos(\left(x\right)) w=2\left(\frac{y^{2}-z^{2}}{x+y}\right)$$

**clear,clc**

**x=input(' x = ');**

**y=(x^2-1)/(x^3+1);**

**z=sin(x)+cos(x);**

**w=2\*(y^2-z^2)/(x+y);**

**R=[x,y,z,w];**

**fprintf(' %5.3f %5.3f %5.3f %5.3f \n',R)**