Assignment-2

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% Question 1

%%

clc

d = [1 2 3 4];

D = diag(d);

disp (D);

%%

clc

A = [1:4;5:8;9:12];

x = diag(A);

disp (A);

disp (x);

OUTPUT

1 2 3 4

5 6 7 8

9 10 11 12

1

6

11

% Question 2

clear all;

%%

clc;

L1 = linspace(1, 20);

disp(L1);

%%

clc;

L1 = linspace(1, 20, 5);

disp(L1);

%%

clc;

L1 = logspace(2, 4);

disp(L1);

%%

clc;

L1 = logspace(1, 4, 8);

disp(L1);

%%

clc;

L1 = 2:10;

disp(L1);

%%

clc;

L1 = 2:1.5:20;

disp(L1);

OUTPUT-1

Columns 1 through 9

1 118/99 137/99 52/33 175/99 194/99 71/33 232/99 251/99

Columns 10 through 18

30/11 289/99 28/9 109/33 346/99 365/99 128/33 403/99 422/99

Columns 19 through 27

49/11 460/99 479/99 166/33 47/9 536/99 185/33 574/99 593/99

Columns 28 through 36

68/11 631/99 650/99 223/33 688/99 707/99 22/3 745/99 764/99

Columns 37 through 45

87/11 802/99 821/99 280/33 859/99 878/99 299/33 916/99 85/9

Columns 46 through 54

106/11 973/99 992/99 337/33 1030/99 1049/99 356/33 1087/99 1106/99

Columns 55 through 63

125/11 104/9 1163/99 394/33 1201/99 1220/99 413/33 1258/99 1277/99

Columns 64 through 72

144/11 1315/99 1334/99 41/3 1372/99 1391/99 470/33 1429/99 1448/99

Columns 73 through 81

163/11 1486/99 1505/99 508/33 1543/99 142/9 527/33 1600/99 1619/99

Columns 82 through 90

182/11 1657/99 1676/99 565/33 1714/99 1733/99 584/33 161/9 1790/99

Columns 91 through 99

201/11 1828/99 1847/99 622/33 1885/99 1904/99 641/33 1942/99 1961/99

Column 100

20

OUTPUT-2

1 23/4 21/2 61/4 20

OUTPUT-3

Columns 1 through 9

100 5273/48 6396/53 65225/492 9175/63 11359/71 41653/237 8302/43 4454/21

Columns 10 through 18

48463/208 5631/22 41333/147 8031/26 30539/90 20129/54 24160/59 22942/51 17296/35

Columns 19 through 27

45058/83 41149/69 25550/39 25189/35 37949/48 37346/43 20036/21 55550/53 49510/43

Columns 28 through 36

96129/76 154234/111 18317/12 10061/6 25789/14 34401/17 631331/284 46399/19 61702/23

Columns 37 through 45

55994/19 35612/11 88912/25 66418/17 64379/15 70723/15 98410/19 85348/15 56255/9

Columns 46 through 50

295259/43 60345/8 58005/7 500664/55 10000

OUTPUT-4

10 14728/549 11443/159 8302/43 9841/19 154234/111 119283/32 10000

OUTPUT-5

2 3 4 5 6 7 8 9 10

OUTPUT-6

Columns 1 through 9

2 7/2 5 13/2 8 19/2 11 25/2 14

Columns 10 through 13

31/2 17 37/2 20

% Question 3

clear all;

%%

clc

A1 = ones(6,4); %populate with ones A1 = 6x4

disp (A1);

A2 = ones(5); %populate with ones A2 = 5x5

disp (A2);

%%

clc

B = zeros(4,4); %populate with zeros B = 4x4

disp (B);

%%

clc

C = eye(5); %eye-dentity matrix C=5x5

disp (C);

%%

clc

D = rand(8); %random 2x2 Matrix

disp (D);

disp(D(:,3));

disp(D(2,:));

disp(D(2,3));

D(3:6,3:6)=zeros(4,4);

disp(D);

Output - 1

1 1 1 1

1 1 1 1

1 1 1 1

1 1 1 1 1

1 1 1 1 1

1 1 1 1 1

1 1 1 1 1

1 1 1 1 1

Output-2

0 0 0 0

0 0 0 0

0 0 0 0

0 0 0 0

Output-4

1 0 0 0 0

0 1 0 0 0

0 0 1 0 0

0 0 0 1 0

0 0 0 0 1

Output-4

64/815 338/353 407/965 1481/2182 18/65 573/1306 659/929 1049/1093

1298/1433 687/712 1065/1163 979/1292 243/5263 1469/3850 1409/1867 547/1607

751/5914 589/3737 0 0 0 0 175/634 580/991

717/785 6271/6461 0 0 0 0 365/537 438/1957

1493/2361 581/607 0 0 0 0 302/461 1927/2565

694/7115 614/1265 0 0 0 0 655/4028 388/1521

408/1465 1142/1427 439/517 1016/1439 1069/1125 954/2141 1078/9059 637/1259

1324/2421 689/4856 283/303 128/4021 259/7519 561/868 457/917 1287/1841

% Question 4

clc;

clear all;

A = rand(8);

disp(A);

rm = [];

cm = [];

for i=1:8

rm(i) = max(A(i,:));

end

disp (rm(:)); %row max

for i=1:8

cm(i) = max(A(:,i));

end

disp(cm); %column max

if max(cm)>max(rm)

M = max(cm);

else

M = max(rm);

end

disp (M);

Output:

0.6791 0.0987 0.4942 0.0305 0.8055 0.9787 0.5216 0.9730

0.3955 0.2619 0.7791 0.7441 0.5767 0.7127 0.0967 0.6490

0.3674 0.3354 0.7150 0.5000 0.1829 0.5005 0.8181 0.8003

0.9880 0.6797 0.9037 0.4799 0.2399 0.4711 0.8175 0.4538

0.0377 0.1366 0.8909 0.9047 0.8865 0.0596 0.7224 0.4324

0.8852 0.7212 0.3342 0.6099 0.0287 0.6820 0.1499 0.8253

0.9133 0.1068 0.6987 0.6177 0.4899 0.0424 0.6596 0.0835

0.7962 0.6538 0.1978 0.8594 0.1679 0.0714 0.5186 0.1332

0.9787

0.7791

0.8181

0.9880

0.9047

0.8852

0.9133

0.8594

0.9880 0.7212 0.9037 0.9047 0.8865 0.9787 0.8181 0.9730

0.9880

% Question 5

n = input('Enter value of n:');

M = magic(n);

rsum = M(1,:);

csum = M(:,1);

diagsum = 0;

adiagsum = 0;

flag = 0;

for i=1:n-1

rsum = sum(M(i,:));

rsum1 = sum(M(i+1,:));

if rsum == rsum1

flag = 0;

else

flag = flag + 1;

end

end

for i=1:n-1

csum = sum(M(:,i));

csum1 = sum(M(:,i+1));

if csum == csum1

flag = 0;

else

flag = flag + 1;

end

end

for i=1:n

for j=1:n

if i == j

diagsum = diagsum + M(i,j);

end

end

end

for i=1:n

for j=1:n

if i+j == n+1

adiagsum = adiagsum + M(i,j);

end

end

end

if diagsum == adiagsum

flag = 0;

else

flag = flag + 1;

end

disp(M);

disp(rsum);

disp(csum);

disp(diagsum);

disp(adiagsum);

if flag ~= 0

disp('It is not a Magic Matrix');

else

disp('Magic Matrix Verified!');

end

>> Question5

Enter value of n:5

17 24 1 8 15

23 5 7 14 16

4 6 13 20 22

10 12 19 21 3

11 18 25 2 9

65

65

65

65

Magic Matrix Verified!

% Question 6

A=rand(3);

I=eye(3);

B=A^(-1);

C=I/A;

if B==C

disp('true');

else

disp('false');

end

B=A.^(-1);

C=I./A;

if B==C

disp('True');

else

disp('False');

end

Output:

>> Question6

true

False

% Question 7

p = [1 2 3 4 5];

disp((length(p):-1:1).\*p);

%(length(p)-1:-1:0) will produce a matrix of (5-1 i.e 4) to 0 with -1 step

% [4 3 2 1 0].\*[1 2 3 4 5] = [4 6 6 4 0] i.e element wise multiplication.

>> Question7

5 8 9 8 5

% Question 8

n = input('Enter value of n: ');

A = eye(n);

for i=1:n

for j=1:n

if i==j || j==n

A(i,j) = 1;

elseif i>j

A(i,j) = -1;

else

A(i,j) = 0;

end

end

end

disp(A)

Output:

>> Question8

Enter value of n: 5

1 0 0 0 1

-1 1 0 0 1

-1 -1 1 0 1

-1 -1 -1 1 1

-1 -1 -1 -1 1

% Question 9

clc

clear all

%%

n = input('Enter n: ');

v1 = zeros(n,1)-2;

v2 = zeros(n-1,1)+1;

v3 = zeros(1,1)+1;

D1 = diag(v1);

D2 = diag(v2,1);

D3 = diag(v2,-1);

D4 = diag(v3, n-1);

D5 = diag(v3, 1-n);

D = D1+D2+D3+D4+D5;

disp(D);

%%

a = [-2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1];

D = toeplitz(a);

disp(D);

%%

format rat

a = [1 2 3 4 5 6 7 8];

X = toeplitz(a);

for i=1:8

for j=1:8

if i>j

X(i,j) = 0;

end

end

end

disp(X);

%%

format rat

a = [1 1/2 1/3 1/4 1/5 1/6 1/7 1/8];

X = toeplitz(a);

disp(X);

Output:

Enter n: 5

-2 1 0 0 1

1 -2 1 0 0

0 1 -2 1 0

0 0 1 -2 1

1 0 0 1 -2

Output 2:

-2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1

1 -2 1 0 0 0 0 0 0 0 0 0 0 0 0 0

0 1 -2 1 0 0 0 0 0 0 0 0 0 0 0 0

0 0 1 -2 1 0 0 0 0 0 0 0 0 0 0 0

0 0 0 1 -2 1 0 0 0 0 0 0 0 0 0 0

0 0 0 0 1 -2 1 0 0 0 0 0 0 0 0 0

0 0 0 0 0 1 -2 1 0 0 0 0 0 0 0 0

0 0 0 0 0 0 1 -2 1 0 0 0 0 0 0 0

0 0 0 0 0 0 0 1 -2 1 0 0 0 0 0 0

0 0 0 0 0 0 0 0 1 -2 1 0 0 0 0 0

0 0 0 0 0 0 0 0 0 1 -2 1 0 0 0 0

0 0 0 0 0 0 0 0 0 0 1 -2 1 0 0 0

0 0 0 0 0 0 0 0 0 0 0 1 -2 1 0 0

0 0 0 0 0 0 0 0 0 0 0 0 1 -2 1 0

0 0 0 0 0 0 0 0 0 0 0 0 0 1 -2 1

1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 -2

Output 3

1 2 3 4 5 6 7 8

0 1 2 3 4 5 6 7

0 0 1 2 3 4 5 6

0 0 0 1 2 3 4 5

0 0 0 0 1 2 3 4

0 0 0 0 0 1 2 3

0 0 0 0 0 0 1 2

0 0 0 0 0 0 0 1

Output 4:

1 1/2 1/3 1/4 1/5 1/6 1/7 1/8

1/2 1 1/2 1/3 1/4 1/5 1/6 1/7

1/3 1/2 1 1/2 1/3 1/4 1/5 1/6

1/4 1/3 1/2 1 1/2 1/3 1/4 1/5

1/5 1/4 1/3 1/2 1 1/2 1/3 1/4

1/6 1/5 1/4 1/3 1/2 1 1/2 1/3

1/7 1/6 1/5 1/4 1/3 1/2 1 1/2

1/8 1/7 1/6 1/5 1/4 1/3 1/2 1