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%Last Four Numbers of RUID: 8169

%Section C1

%Math 250 MATLAB Assignment #1

rand('seed',8169)

%Question 1(a)

R = rand(2, 3)

R =

0.9531 0.3798 0.6588

0.6918 0.4286 0.7423

R = rand(2, 3)

R =

0.3445 0.4270 0.6764

0.8738 0.7102 0.5386

R = rand(2, 3)

R =

0.8745 0.5439 0.6590

0.9984 0.9494 0.5603

%Question 1(b)

A = [1 2; 3 4; 5 6]

A =

1 2

3 4

5 6

B = [1 2 3; 4 5 6; 7 8 9]

B =

1 2 3

4 5 6

7 8 9

x = [ 4 3 2]

x =

4 3 2

X = [1; 2; 3]

X =

1

2

3

A

A =

1 2

3 4

5 6

B

B =

1 2 3

4 5 6

7 8 9

x

x =

4 3 2

X

X =

1

2

3

whos

Name Size Bytes Class Attributes

A 3x2 48 double

B 3x3 72 double

R 2x3 48 double

X 3x1 24 double

x 1x3 24 double

%Question 1(c)

[size(A); size(B); size(X); size(x)]

ans =

3 2

3 3

3 1

1 3

S = ans

S =

3 2

3 3

3 1

1 3

%Question 1(d)

a32 = A(3,2)

a32 =

6

A(3, 2) = 7

A =

1 2

3 4

5 7

A(3, 2) = 6

A =

1 2

3 4

5 6

%Question 1(e)

C(:,1) = B(:,1); C(:,2) = B(:,3)

C =

1 3

4 6

7 9

D(1,:) = B(1,:); D(2,:) = B(3, :)

D =

1 2 3

7 8 9

C, D

C =

1 3

4 6

7 9

D =

1 2 3

7 8 9

%Question 2(a)

%A, B, C, X can be put side by side because they have the same number of

%rows (3 rows)

%A, C can be put on top of one another because they have the same number of

%columns (2 columns)

%B and D can be put on top of one another because they have the same number of

%columns (3 columns)

[A X]

ans =

1 2 1

3 4 2

5 6 3

[B C]

ans =

1 2 3 1 3

4 5 6 4 6

7 8 9 7 9

[C D]

{Error using <a href="matlab:matlab.internal.language.introspective.errorDocCallback('horzcat')" style="font-weight:bold">horzcat</a>

Dimensions of arrays being concatenated are not consistent.}

[C;B]

{Error using <a href="matlab:matlab.internal.language.introspective.errorDocCallback('vertcat')" style="font-weight:bold">vertcat</a>

Dimensions of arrays being concatenated are not consistent.}

[B;D]

ans =

1 2 3

4 5 6

7 8 9

1 2 3

7 8 9

%Question 2(b)

eye(4)

ans =

1 0 0 0

0 1 0 0

0 0 1 0

0 0 0 1

zeros(3)

ans =

0 0 0

0 0 0

0 0 0

zeros(3,5)

ans =

0 0 0 0 0

0 0 0 0 0

0 0 0 0 0

ones(2,3)

ans =

1 1 1

1 1 1

diag([4 5 6 7])

ans =

4 0 0 0

0 5 0 0

0 0 6 0

0 0 0 7

%Question 3

u = fix(10\*rand(3,1)), v = fix(10\*rand(3,1)), A = fix(10\*rand(2,3)), B = fix(10\*rand(2,3))

u =

9

5

8

v =

7

8

4

A =

7 0 2

1 7 4

B =

2 6 8

7 2 1

%Question 3(a)

A + B

ans =

9 6 10

8 9 5

B + A

ans =

9 6 10

8 9 5

6\*B

ans =

12 36 48

42 12 6

2\*(3\*B)

ans =

12 36 48

42 12 6

6\*A + 15\*B

ans =

72 90 132

111 72 39

3\*(2\*A + 5 \*B)

ans =

72 90 132

111 72 39

3\*A

ans =

21 0 6

3 21 12

( (3\*A)' )'

ans =

21 0 6

3 21 12

%A + B and B + A return the same matrix because of the commutative law of matrix addition

%6B and 2(3B) return the same matrix because of Theorem 1.1, Property(e)(Page 6)which states (given s and t are any scalars and A is an m \* n matrix):(st)A = s(tA)

%6A + 15B and 3(2A + 5B) return the same matrix because of Theorem 1.1, Property(f)(Page 6), which states (given s is any scalars and A & B are m \* n matrices): s(A + B) = sA + sB .... the only slight difference in this case is at A and B are matrices that are being multiplied by scalars but the property still applies

% 3A and ((3A)T)T return the same matrix because of Theorem 1.2, Property9(c)(Page 7) which states (A is an m \* n matrix): (A)T)T = A. The transpose of a transpose is the original matrix. In this case, the only slight difference is that A is a matrix that is being multiplied by a scalar (3)

%Question 3(b)

A\*u + A\*v

ans =

136

155

A(u + v)

ans =

136

155

(A + B)\*u

ans =

191

157

A\*u + B \* u

ans =

191

157

A \* (3\*u)

ans =

237

228

3\*A\*(u)

ans =

237

228

%Au + Av and A(u + v) return the same matrix because of Theorem 1.3, Property(a) (Page 24). The property states (given u and v are vectors in R^N and A & B are m \* n matrices): A(u + v) = Au + Av

%(A + B)u and Au + Bu return the same matrix because of Theorem 1.3, Property(c) (Page 24). The property states (given u and v are vectors and A & B are m \* n matrices): (A + B)u = Au + Bu

%A(3u) and 3A(u) return the same matrix because of Theorem 1.3, Property(b)(Page 24)which states (given s and t are any scalars and A is an m \* n matrix):A(cu) = c(Au) = (cA)u for every scalar c

%Question 4(a)

A = fix(10\*rand(3,4))

A =

4 2 1 0

1 9 6 6

0 6 8 7

R = A; R(1,:) = R(1,:)/R(1,1)

R =

1.0000 0.5000 0.2500 0

1.0000 9.0000 6.0000 6.0000

0 6.0000 8.0000 7.0000

R(2,:) = R(2,:) - R(2,1)\*R(1,:)

R =

1.0000 0.5000 0.2500 0

0 8.5000 5.7500 6.0000

0 6.0000 8.0000 7.0000

R(3,:) = R(3,:) - R(3,1)\*R(1,:)

R =

1.0000 0.5000 0.2500 0

0 8.5000 5.7500 6.0000

0 6.0000 8.0000 7.0000

%Question 4(b)

R(2,:) = R(2,:)/R(2,2)

R =

1.0000 0.5000 0.2500 0

0 1.0000 0.6765 0.7059

0 6.0000 8.0000 7.0000

R(1,:) = R(1,:) - R(1,2)\*R(2,:)

R =

1.0000 0 -0.0882 -0.3529

0 1.0000 0.6765 0.7059

0 6.0000 8.0000 7.0000

R(3,:) = R(3,:) - R(3,2)\*R(2,:)

R =

1.0000 0 -0.0882 -0.3529

0 1.0000 0.6765 0.7059

0 0 3.9412 2.7647

%Question 4(c)

R(3,:) = R(3,:)/R(3,3)

R =

1.0000 0 -0.0882 -0.3529

0 1.0000 0.6765 0.7059

0 0 1.0000 0.7015

R(2,:) = R(2,:) - R(2,3)\*R(3,:)

R =

1.0000 0 -0.0882 -0.3529

0 1.0000 0 0.2313

0 0 1.0000 0.7015

R(1,:) = R(1,:) - R(1,3)\*R(3,:)

R =

1.0000 0 0 -0.2910

0 1.0000 0 0.2313

0 0 1.0000 0.7015

%Question 4(d)

rref(A)

ans =

1.0000 0 0 -0.2910

0 1.0000 0 0.2313

0 0 1.0000 0.7015

R

R =

1.0000 0 0 -0.2910

0 1.0000 0 0.2313

0 0 1.0000 0.7015

%The answers match

%Question 5(a)

a = [0.1;0.15;0.30]

a =

0.1000

0.1500

0.3000

m = [0.2;0.25;0.1]

m =

0.2000

0.2500

0.1000

s = [0.2;0.35;0.1]

s =

0.2000

0.3500

0.1000

C = [a, m, s]

C =

0.1000 0.2000 0.2000

0.1500 0.2500 0.3500

0.3000 0.1000 0.1000

%Question 5(b)

x = [40; 50; 30]

x =

40

50

30

x - C\*x

ans =

20

21

10

%The net production for the agriculture sector of the economy is $20 million

%The net production for the manufacturing sector of the economy is $21 million

%The net production for the service sector of the economy is $10 million

%Question 5(c)

%Part (i)

%For an economy with n\*n input-output matrix C,

%the gross production necessary to satisfy exactly a demand d

% is a solution of: (In - C)x = d

d = [90; 72; 96]

d =

90

72

96

i = [1 0 0; 0 1 0; 0 0 1]

i =

1 0 0

0 1 0

0 0 1

i - C

ans =

0.9000 -0.2000 -0.2000

-0.1500 0.7500 -0.3500

-0.3000 -0.1000 0.9000

ans(:,4) = d

ans =

0.9000 -0.2000 -0.2000 90.0000

-0.1500 0.7500 -0.3500 72.0000

-0.3000 -0.1000 0.9000 96.0000

%Part (ii)

rref(ans)

ans =

1.0000 0 0 194.0000

0 1.0000 0 226.5000

0 0 1.0000 196.5000

%The gross production of the manufacturing sector of the economy to satisfy the given demand d is $194 million

%The gross production of the agriculture sector of the economy to satisfy the given demand d is $226.5 million

%The gross production of the service sector of the economy to satisfy the given demand d is $196.5 million