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**Please indicate your answers by entering the option ( (i), (ii), (iii) or (iv) ) where asked. You should append the completed document as a pdf with your typewritten worked solutions including MATLAB code) and upload to Blackboard by Friday 22nd of March 2019.**

**Q 4.23**

(i)

L =

| | | | |
|---|---|---|---|
| 1.5000 | 0 | 0 | 0 |
| -2.0000 | 1.0000 | 0 | 0 |
| 0.5000 | 1.0000 | 1.5000 | 0 |
| -2.0000 | 3.5000 | -0.5000 | 1.0000 |

U =

| | | | |
|---|---|---|---|
| 4.0000 | -1.0000 | 3.0000 | 2.0000 |
| 0 | -1.0000 | 3.0000 | 0.5000 |
| 0 | 0 | 2.0000 | 1.0000 |
| 0 | 0 | 0 | 3.0000 |

**(ii)**

**L =**

| | | | |
|---|---|---|---|
| **1.0000** | **0** | **0** | **0** |
| **-2.0000** | **1.0000** | **0** | **0** |
| **0.5000** | **1.5000** | **1.0000** | **0** |
| **-2.0000** | **3.0000** | **-0.5000** | **1.0000** |

**U =**

| | | | |
|---|---|---|---|
| **4.0000** | **-1.0000** | **3.0000** | **2.0000** |
| **0** | **-2.0000** | **3.0000** | **0.5000** |
| **0** | **0** | **4.0000** | **2.0000** |
| **0** | **0** | **0** | **3.0000** |

(iii)

```
L =
    1.5000         0         0         0
   -2.0000    1.0000         0         0
    0.5000    1.0000    1.0000         0
   -2.0000    2.0000   -0.5000    1.0000

U =
    3.0000   -1.5000    3.0000    2.0000
         0   -2.0000    3.0000    0.5000
         0         0    4.0000    2.5000
         0         0         0    1.0000
```

(iv)

```
L =
    1.5000         0         0         0
   -2.0000    1.5000         0         0
    0.5000    1.5000    1.5000         0
   -2.0000    3.0000   -0.5000    1.5000

U =
    4.0000   -1.0000    3.0000    2.0000
         0   -2.0000    3.0000    0.5000
         0         0    4.0000    2.0000
         0         0         0    2.0000
```

**Your Answer ((i) – (iv)): (ii)**

```
function [L, U] = LUdecompGauss(A)
[r, c]=size(A);  % r= no. of rows in A, c= no. of columns in A

if r ~= c     % check if A is square
   L = 'The matrix must be square';
   U = 'The matrix must be square';
else
   L = eye(r);  %sets to identity matrix
   U = A;  %copies given array
   for i1 = 1:r-1
     for i2 = i1+1:r
        L(i2, i1) = U(i2,i1)/U(i1,i1);
        for i3= 1:r
           U(i2,i3) = U(i2,i3) -(L(i2,i1)*U(i1,i3));
        end
     end
   end
```

```
    disp(L)
    disp(U)
    if L*U == A
        disp("Success")
    end
end
```

```
    1.0000         0         0         0
   -2.0000    1.0000         0         0
    0.5000    1.5000    1.0000         0
   -2.0000    3.0000   -0.5000    1.0000

    4.0000   -1.0000    3.0000    2.0000
         0   -2.0000    3.0000    0.5000
         0         0    4.0000    2.0000
         0         0         0    3.0000

Success
```

**Q 5.17**

You need only to indicate the best team and the worst team (from teams 1 to 6).

**Your Answers:** **Best : 2&5** **Worst: 1**

i)

```
>> eigenvalue
  Columns 1 through 5

   0.1761 + 0.0000i   0.3379 + 0.0000i   0.0000 + 0.0000i  -0.5773 - 0.0000i  -0.5773 + 0.0000i
   0.5155 + 0.0000i  -0.1443 + 0.0000i   0.0000 + 0.0000i  -0.0000 + 0.0000i  -0.0000 - 0.0000i
   0.3938 + 0.0000i  -0.7555 + 0.0000i  -0.7071 + 0.0000i   0.0000 - 0.0000i   0.0000 + 0.0000i
   0.4611 + 0.0000i   0.1290 + 0.0000i   0.0000 + 0.0000i   0.5774 + 0.0000i   0.5774 + 0.0000i
   0.5155 + 0.0000i  -0.1443 + 0.0000i  -0.0000 + 0.0000i  -0.0000 + 0.0000i  -0.0000 - 0.0000i
   0.2642 + 0.0000i   0.5068 + 0.0000i   0.7071 + 0.0000i   0.5773 + 0.0000i   0.5773 - 0.0000i

  Column 6

   0.5774 + 0.0000i
  -0.0000 + 0.0000i
   0.0000 + 0.0000i
  -0.5773 + 0.0000i
  -0.0000 + 0.0000i
  -0.5774 + 0.0000i

  Columns 1 through 5

   2.6180 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i
   0.0000 + 0.0000i   0.3820 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i  -1.0000 + 0.0000i   0.0000 + 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i  -1.0000 - 0.0000i
   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i   0.0000 + 0.0000i

  Column 6

   0.0000 + 0.0000i
   0.0000 + 0.0000i
   0.0000 + 0.0000i
   0.0000 + 0.0000i
   0.0000 + 0.0000i
  -1.0000 + 0.0000i
```

**ii)ranked best to worst,**

| |
|---|
| Team 2 & 5 |
| Team 4 |
| Team 3 |
| Team 6 |
| Team 1 |

**DONT DO:**
**Q 6.3**

(i) $b = 4.6831 \times 10^{-8}, m = 0.022, population(1985) = 1014\ million$
(ii) $b = 4.8932 \times 10^{-8}, m = 0.022, population(1985) = 1024\ million$
(iii) $b = 4.6931 \times 10^{-8}, m = 0.012, population(1985) = 1038\ million$
(iv) $b = 4.9932 \times 10^{-8}, m = 0.014, population(1985) = 1042\ million$

**Your Answer ((i)-(iv)): N/A_____**