



# MATH 501 Homework 6

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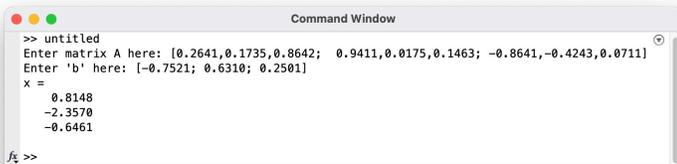
## Pseudocode Implementation

```

1 %Naive Gaussian
2
3 A = input("Enter matrix A here: ");
4 b = input("Enter b here: ");
5 n = size(A);
6 n = n(1);
7
8 for k = 1:n-1
9     for i = k+1:n
10        z = A(i,k) / A(k,k);
11        A(i,k) = 0;
12        b(i) = b(i) - z * b(k);
13        for j = k+1:n
14            A(i,j) = A(i,j) - z * A(k,j);
15        end
16    end
17 end
18
19 %Bwd substitution
20 x = zeros(n,1);
21
22 for i = 1:n
23     inew = n+1-i;
24     x(inew) = b(inew) - A(inew,inew+1:n) *
25         x(inew+1:n);
26     x(inew) = x(inew) / A(inew,inew);
27 end
28 disp("x = ");
29 disp(x);

```

Output of problem 4.3.22:



```

>> untitled
Enter matrix A here: [0.2641,0.1735,0.8642; 0.9411,0.0175,0.1463; -0.8641,-0.4243,0.0711]
Enter 'b' here: [-0.7521; 0.6310; 0.2501]
x =
    0.8148
   -2.3570
   -0.6461
fx >>

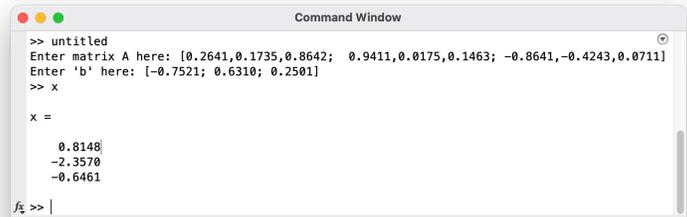
```

```

1 %Gaussian with scaled pivoting
2
3 A = input("Enter matrix A here: ");
4 b = input("Enter b here: ");
5 n = size(A);
6 n = n(1);
7 p = zeros(n,1);
8 s = zeros(n,1);
9 for i = 1:n
10    p(i) = i;
11    s(i) = max(abs(A(i,1:n)));
12 end
13
14 for k = 1:n-1
15    [M,I] = max( abs(A(p(k:n),k)) ./ s(p(k:n)) );
16    j = I + k-1;
17    [p(k),p(j)] = swap(p(k),p(j));
18    for i = k+1:n
19        z = A(p(i),k) / A(p(k),k);
20        A(p(i),k) = z;
21        for l = k+1:n
22            A(p(i),l) = A(p(i),l) - z * A(p(k),l);
23        end
24        b(p(i)) = b(p(i)) - A(p(i),k) * b(p(k));
25    end
26 end
27
28 x = zeros(n,1);
29 for i = 1:n
30    inew = n+1-i;
31    x(inew) = b(p(inew)) - A(p(inew),inew+1:n) *
32        x(inew+1:n);
33    x(inew) = x(inew) / A(p(inew),inew);
34 end
35 disp("x = ");
36 disp(x);
37
38 function [b, a] = swap(a, b)
39 end

```

Output of problem 4.3.22:



```

Command Window
>> untitled
Enter matrix A here: [0.2641,0.1735,0.8642; 0.9411,0.0175,0.1463; -0.8641,-0.4243,0.0711]
Enter 'b' here: [-0.7521; 0.6310; 0.2501]
>> x
x =
    0.8148
   -2.3570
   -0.6461
fx >>

```