In[•]:=
```
GaussJacobiWE[A0_, b0_, X0_, error_] :=
  Module[{A = N[A0], b = N[b0], xk = X0, xk1, maxNorm, i, j, k = 0, n, m, OutputD},
   size = Dimensions[A];
   n = size[[1]];
   m = size[[2]];
   If[n ≠ m, Print["Not a Square Matrix, cannot proceed with the Gauss Jacobi Method "];
    Return[]];
   OutputD = {xk};
   maxNorm = 10000;
   xk1 = Table[0, {n}];
   While[maxNorm > error, For[i = 1, i <= n, i++,
     xk1[[i]] = (1 / A[[i, i]]) * (b[[i]] -
          Sum[A[[i, j]] * xk[[j]], {j, i - 1}] - Sum[A[[i, j]] * xk[[j]], {j, i + 1, n}]);];
    k++;
    maxNorm = Max[Abs[xk1 - xk]];
    OutputD = Append[OutputD, xk1]; xk = xk1;];
   colHeading = Table[x[i], {i, 1, n}];
   Print[NumberForm[TableForm[OutputD, TableHeadings → {None, colHeading}], 6]];
   Print["Number of iterations taken to achieve desired accuracy ", k];
   Print["Max Norm at ", k, "th iterations = ", maxNorm];];
```

Question 1

```
A = {{5, 1, 2}, {-3, 9, 4}, {1, 2, -7}};
b = {10, -14, -33};
X0 = {0, 0, 0};
accuracy = 10^(-4);
GaussJacobiWE[A, b, X0, accuracy]
```

Out[•]=

Question

x[1]	x[2]	x[3]
0	0	0
2.	-1.55556	4.71429
0.425397	-2.98413	4.55556
0.774603	-3.43845	3.92245
1.11871	-3.04067	3.84253
1.07112	-2.89044	4.00534
0.975953	-2.97867	4.04146
0.979148	-3.02644	4.00266
1.00422	-3.00813	3.98947
1.00584	-2.99391	3.99828
0.99947	-2.99729	4.00257
0.998428	-3.00132	4.0007
0.999985	-3.00083	3.9994
1.00041	-2.99974	3.99976
1.00004	-2.99976	4.00013
0.999898	-3.00004	4.00008
0.999979	-3.00007	3.99997
1.00002	-2.99999	3.99998

Number of iterations taken to achieve desired accuracy 17

Max Norm at 17th iterations = 0.000072592

Question 2

In[•]:=
```
A = {{4, 1, 1}, {1, 5, 2}, {1, 2, 3}};
b = {2, -6, -4};
X0 = {0.5, -0.5, -0.5};
accuracy = 10^(-3);
GaussJacobiWE[A, b, X0, accuracy]
```

x[1]	x[2]	x[3]
0.5	-0.5	-0.5
0.75	-1.1	-1.16667
1.06667	-0.883333	-0.85
0.933333	-1.07333	-1.1
1.04333	-0.946667	-0.928889
0.968889	-1.03711	-1.05
1.02178	-0.973778	-0.964889
0.984667	-1.0184	-1.02474
1.01079	-0.987037	-0.982622
0.992415	-1.00911	-1.01224
1.00534	-0.993588	-0.9914
0.996247	-1.00451	-1.00605
1.00264	-0.996828	-0.995744
0.998143	-1.00223	-1.00299
1.00131	-0.998431	-0.997894
0.999081	-1.0011	-1.00148
1.00065	-0.999224	-0.998958
0.999545	-1.00055	-1.00073
1.00032	-0.999616	-0.999484
0.999775	-1.00027	-1.00036

Number of iterations taken to achieve desired accuracy 19

Max Norm at 19th iterations = 0.000878271