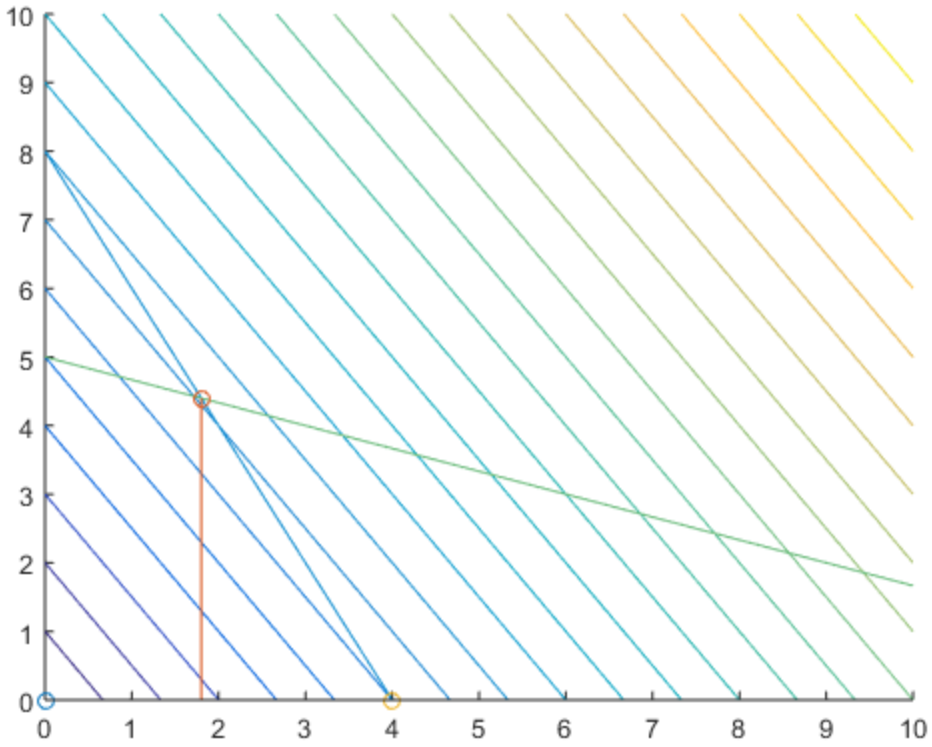
```
%%Ex 3 task 2b

A= [ 2 1 1 0;
    1 3 0 1;];
c_t= [-3/2 -1 0 0];
b= [8;
    15;];
x = linspace(0,10, 100);
y = linspace(0,10, 100);
[X,Y] = meshgrid(x, y);

Z = 3/2 * X + Y;
c1 = 2*X + Y;
c2 = 1*X + 3*Y;

x0= [0 0 8 15]';
[x, fval, iterates] = simplex(c_t',A,b,x0,'report');

[px,py]= gradient(Z);
figure(1);
hold on;
contour(X, Y, Z, 'Levelstep', 1)
contour(X, Y, c1, 'LevelList', 8)
contour(X, Y, c2, 'LevelList', 15)
stem(0,0);
stem(1.8, 4.4);
stem(4,0);


--------------------------------------------------------------------------------
    Iteration number: 1
    Basic index set:    {3, 4}
    Nonbasic index set: {1, 2}
    x_B =    [   8.0000,   15.0000]'
    x_N =    [   0.0000,    0.0000]'
    lambda = [   0.0000,    0.0000]'
    s_N =    [  -1.5000,   -1.0000]'
    x =      [   0.0000,    0.0000,    8.0000,   15.0000]'
    c'x =     0.00000000
    x_1 will enter the basis (q = 1)
    d =      [   2.0000,    1.0000]'
    x_q+ = x_1+ =    4.0000  (value of entering variable/step length)
    x_3 will leave the basis (p = 1)
    x_B+ =   [   0.0000,   11.0000]'  (Current basic vector at new
 point)
    x_N+ =   [   4.0000,    0.0000]'  (Current nonbasic vector at new
 point)
--------------------------------------------------------------------------------


--------------------------------------------------------------------------------
    Iteration number: 2
    Basic index set:    {1, 4}
```

```
   Nonbasic index set: {3, 2}
   x_B =    [   4.0000,   11.0000]'
   x_N =    [   0.0000,    0.0000]'
   lambda = [  -0.7500,    0.0000]'
   s_N =    [   0.7500,   -0.2500]'
   x =      [   4.0000,    0.0000,    0.0000,   11.0000]'
   c'x =    -6.00000000
   x_2 will enter the basis (q = 2)
   d =      [   0.5000,    2.5000]'
   x_q+ = x_2+ =    4.4000  (value of entering variable/step length)
   x_4 will leave the basis (p = 2)
   x_B+ =   [   1.8000,    0.0000]'  (Current basic vector at new
point)
   x_N+ =   [   0.0000,    4.4000]'  (Current nonbasic vector at new
point)
--------------------------------------------------------------------------------


--------------------------------------------------------------------------------
   Iteration number: 3
   Basic index set:    {1, 2}
   Nonbasic index set: {3, 4}
   x_B =    [   1.8000,    4.4000]'
   x_N =    [   0.0000,    0.0000]'
   lambda = [  -0.7000,   -0.1000]'
   s_N =    [   0.7000,    0.1000]'

   OPTIMAL POINT FOUND
   x^* =    [   1.8000,    4.4000,    0.0000,    0.0000]'
   c'x^* =    -7.10000000
--------------------------------------------------------------------------------
```



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