QUES 1
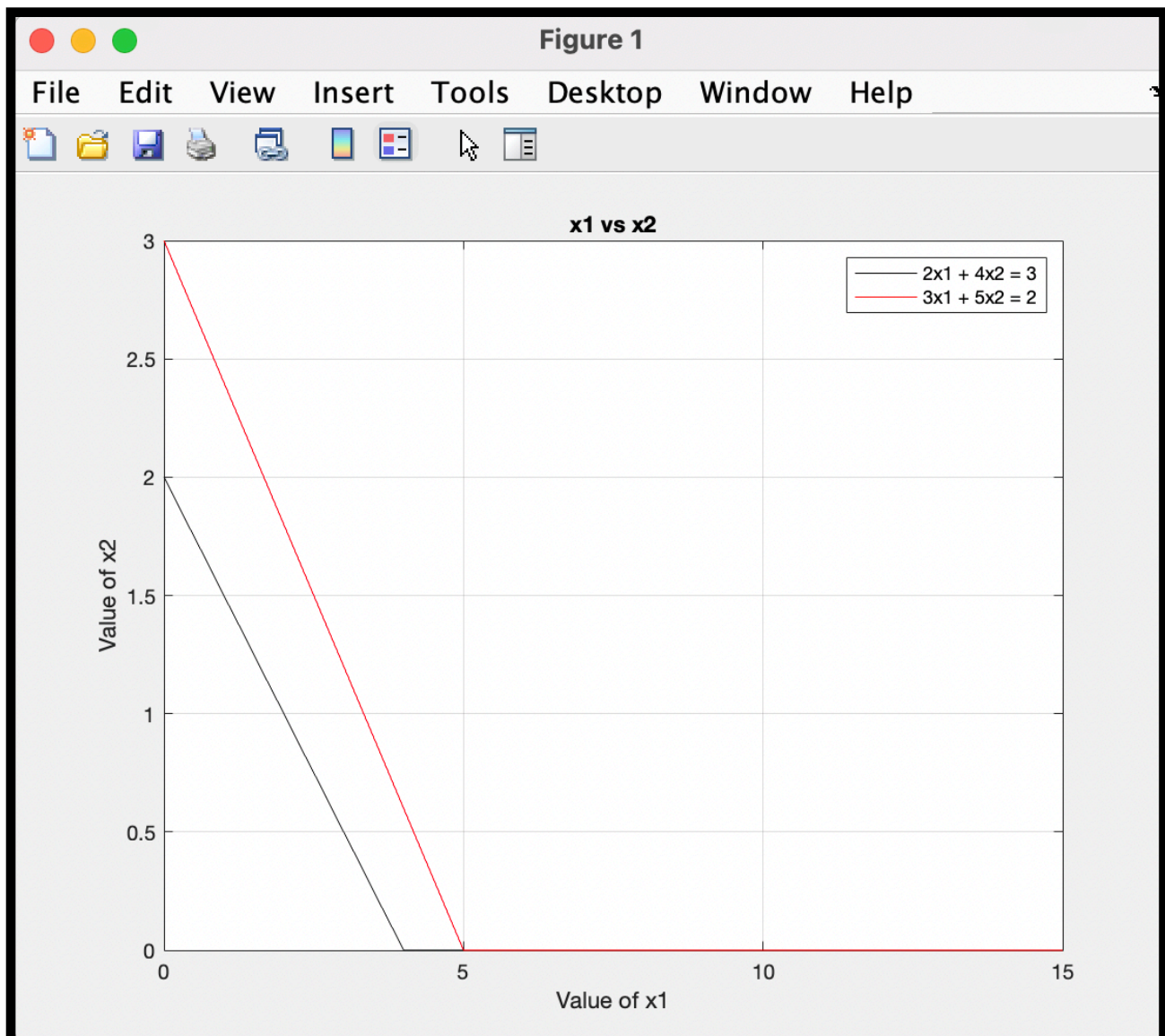
```
Editor – /Users/utkarshchauhan/Documents/OPTIMISATION_TECHNIQUE/LAB ASSIGNMENT/q1.m
Q1.m    untitled *    q1.m    constraint.m    +
1    C = [3 2];
2    A = [2 4; 3 5];
3    B = [8; 15];
4
5    y1 = 0 : 1 : max(B);
6    x21 = (B(1) - A(1, 1) .* y1) ./ A(1, 2);
7    x22 = (B(2) - A(2, 1) .* y1) ./ A(2, 2);
8
9
10   x21 = max(0, x21);
11   x22 = max(0, x22);
12
13   plot(y1, x21, 'k', y1, x22, 'r');
14   xlabel("Value of x1");
15   ylabel("Value of x2");
16   title("x1 vs x2");
17   legend("x1 + 2x2 = 2000", "x1 + x2 = 1500", "x2 = 600");
18   grid on;
19
20   cx1 = find(y1 == 0);
21   c1 = find(x21 == 0);
22   Line1 = [y1(:, [c1 cx1]); x21(:, [c1 cx1])]';
23
24   c2 = find(x22 == 0);
25   Line2 = [y1(:, [c2 cx1]); x22(:, [c2 cx1])]';
26
27
28
29   corpt = unique([Line1; Line2], 'rows');
30
31   HG = [0; 0];
32   for i = 1 : size(A, 1)
33       hg1 = A(i, :);
34       B1 = B(i, :);
35       for j = i + 1 : size(A, 1)
```

```
36           hg2 = A(j, :);
37           B2 = B(j, :);
38           Aa = [hg1 ; hg2];
39           Bb = [B1; B2];
40           Xx = Aa \ Bb;
41           HG = [HG Xx];
42       end
43   end
44   pt = HG';
45
46   allpt = [pt; corpt];
47   points = unique(allpt, 'rows');
48
49   PT = constraint(points);
50   PT = unique(PT, 'rows');
51
52
53   for i = 1 : size(PT, 1)
54       Fx(i, :) = sum(PT(i, :) .* C);
55   end
56   Vert_Fns = [PT Fx];
57
58   [fxval, indfx] = max(Fx);
59   optval = Vert_Fns(indfx, :);
60   OPTIMAL_BFS = array2table(optval);
61   disp(OPTIMAL_BFS);
```

CONSTRAINTS CODE

```matlab
function out = q1(X)
x1 = X(:, 1);
x2 = X(:, 2);
cons1 = x1 + 2 .* x2 - 2000;
h1 = find(cons1 > 0);
X(h1, :) = [];

x1 = X(:, 1);
x2 = X(:, 2);
cons2 = x1 + x2 - 1500;
h2 = find(cons2 > 0);
X(h2, :) = [];

x1 = X(:, 1);
x2 = X(:, 2);
cons3 = x2 - 600;
h3 = find(cons3 > 0);
X(h3, :) = [];

out = X;
end
```

OUTPUT-

```
Command Window
>> q1
    optval1     optval2     optval3
    _____     _____     _____

      15           0          45
```