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```
% Maximize Z = 5x1 + 8x2
% x1 + 2x2 ≤ 200,
% x1 + x2 ≤ 150,
% x2 ≤ 60,
% x1, x2 ≥ 0
```

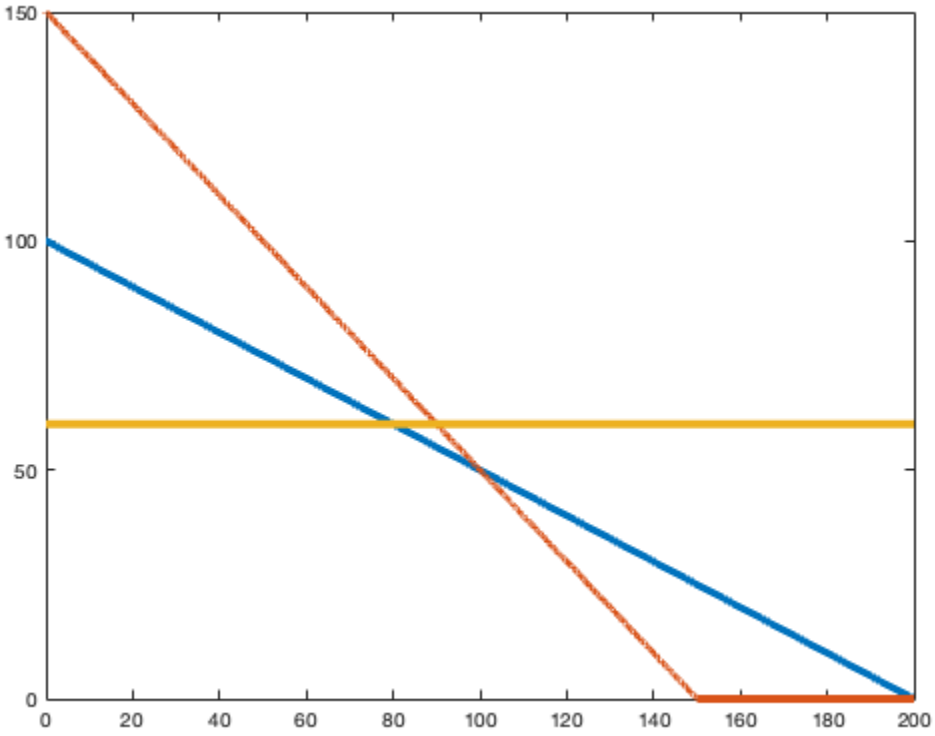
```
clc
clear all
format short
```

Input parameters

```
c=[5, 8]; %cost objective function
A=[1,2; 1,1; 0,1; 0,1; 1,0];
B=[200; 150; 60; 0; 0];
n=size(A,1);
x1=0:0.01:max(B);

for i=1:n-2 %we take n-2 since we are also taking x1=0 and x2=0 as they have
no significance in our graph
    y(i,:)=(B(i)-A(i,1)*x1)/A(i,2);
end
```

Drawing the lines

```
for i=1:n-2
    y(i,:)=max(0,y(i,:));
    plot(x1,y(i,:),'linewidth',4)
    hold on
end
hold on
```



Finding the point of intersection

```
pt=[0;0];
for i=1:size(A,1)
    A1=A(i,:);
    B1=B(i,:);
    for j=i+1:size(A,1)
        A2=A(j,:);
        B2=B(j,:);
        A3=[A1;A2];
        B3=[B1;B2];
        X3=inv(A3)*B3
        % X3=A3\B3;
        if(X3>=0)%since the number of chairs can never be negative
            pt= [pt X3];
        end
    end
end
X=pt';
X=unique(X,'rows')%solution
```

```
X3 =

   100
    50
```

```
X3 =

    80
    60


X3 =

   200
     0


X3 =

     0
   100


X3 =

    90
    60


X3 =

   150
     0


X3 =

     0
   150

Warning: Matrix is singular to working precision.

X3 =

   NaN
   NaN


X3 =

     0
    60


X3 =

     0
```

```
     0
```

```
X =

     0     0
     0    60
     0   100
     0   150
    80    60
    90    60
   100    50
   150     0
   200     0
```

Keep only Feasible Points

```
x1=X(:,1);
x2=X(:,2);

for i=1:n-2
    ind=find(A(i,:)*X'>B(i))
    X(ind,:)=[]
end
```

```
ind =

     4     6
```

```
X =

     0     0
     0    60
     0   100
    80    60
   100    50
   150     0
   200     0
```

```
ind =

     7
```

```
X =

     0     0
     0    60
     0   100
```

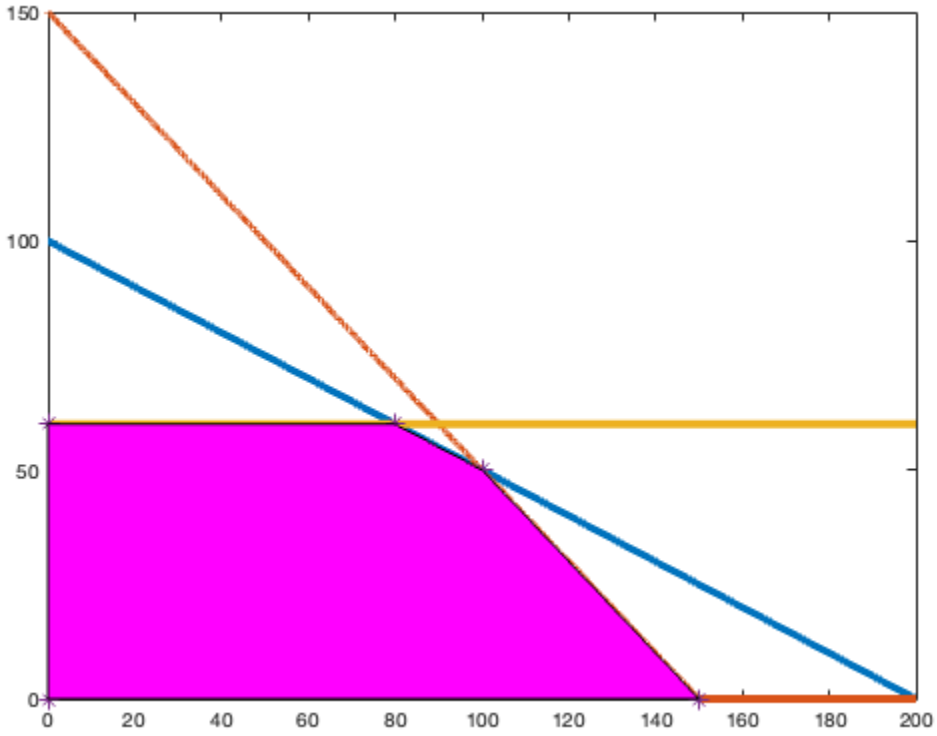
```
    80    60
   100    50
   150     0


ind =

     3


X =

     0     0
     0    60
    80    60
   100    50
   150     0
```

Evaluate The Objective Function Value

```
obj_val=c*X';
[value, ind]=max(obj_val);
value;
X(ind,:)
Optimal=[X(ind,:) value];


ans =

   100    50
```

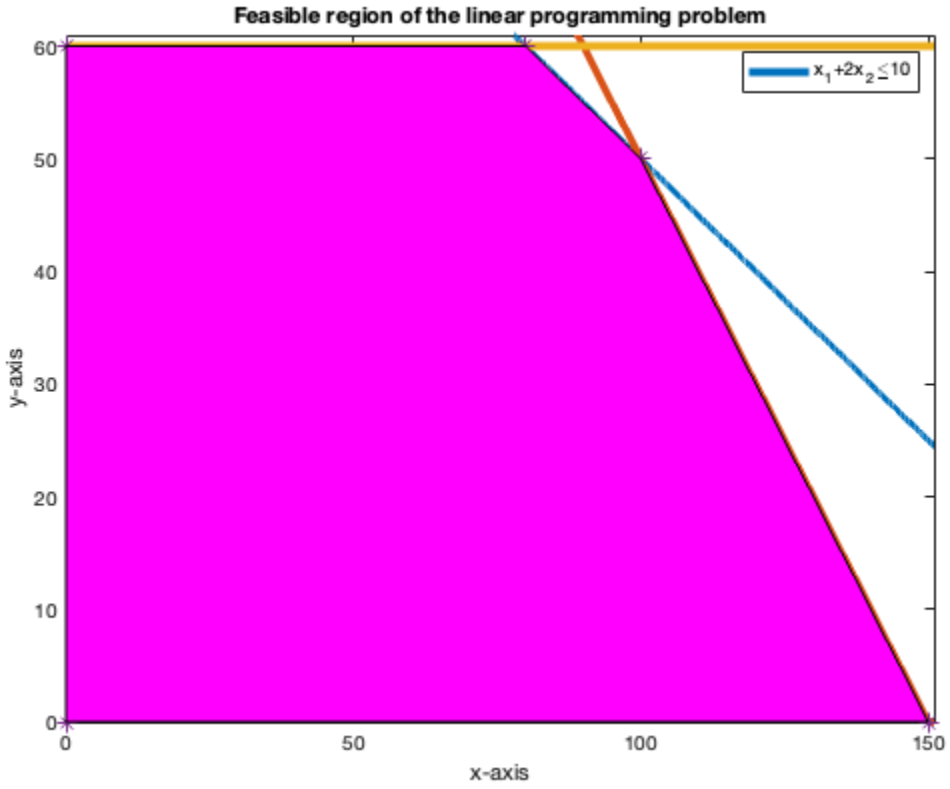
Shaded feasible region

```
x=X(:,1);
y=X(:,2);
scatter(X(:,1),X(:,2),'*')
hold on
k=convhull(x,y)%the shaded region where a and y is satisfied
fill(x(k),y(k),'m')


k =

     1
     5
     4
     3
     2
     1
```



setting the axes

```
xlim([0 max(x)+1])
ylim([0 max(y)+1])

xlabel('x-axis')
ylabel('y-axis')
title('Feasible region of the linear programming problem')
legend('x_1+2x_2\leq10')
```



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