Table of Contents

In [1]:
```
# Import required library
import matplotlib.pyplot as plt
import scipy.optimize as opt
```
executed in 4.05s, finished 10:16:46 2020-05-28

1 Plotting Routine [...]

2 Apples and Bananas

2.1 The Puzzle

In [3]:
```
# Input parameters and bounds
A = [[-2,1], [0.5, -1]]
b = [0,0]
c = [-1, -1]
bounds=[(0, 9),(0, 4)]  # no more than 9 apples and 4 bananas
```
executed in 4ms, finished 10:16:46 2020-05-28

In [4]:
```
# Run the model
res = opt.linprog(c, A, b, bounds=bounds, method='simplex')
```
executed in 10ms, finished 10:16:46 2020-05-28

In [13]:
```
[apples, bananas]=res.x
```
executed in 3ms, finished 10:17:55 2020-05-28

In [14]:
```
apples
```
executed in 6ms, finished 10:18:06 2020-05-28

Out[14]: 8.0

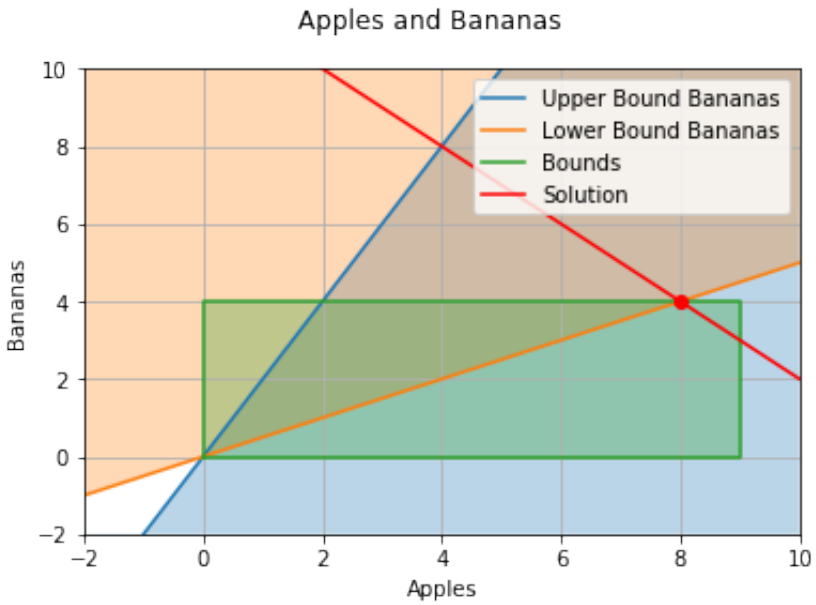
In [15]:
```
bananas
```
executed in 6ms, finished 10:18:20 2020-05-28

Out[15]: 4.0

In [16]:
```
1 res.fun
```
executed in 5ms, finished 10:18:38 2020-05-28

Out[16]: -12.0

In [5]:
```
1 # Drawing
2 # fig=plt.figure(figsize=(4,4), dpi=300)
3 plot_linopt(A, b, c, bounds, res,
4              borders=[(-2, 10), (-2,10)],
5              title='Apples and Bananas',
6              labels=['Apples', 'Bananas'],
7              legend=['Upper Bound Bananas',
8                      'Lower Bound Bananas'])
```
executed in 418ms, finished 10:16:46 2020-05-28



2.2 Variation 1

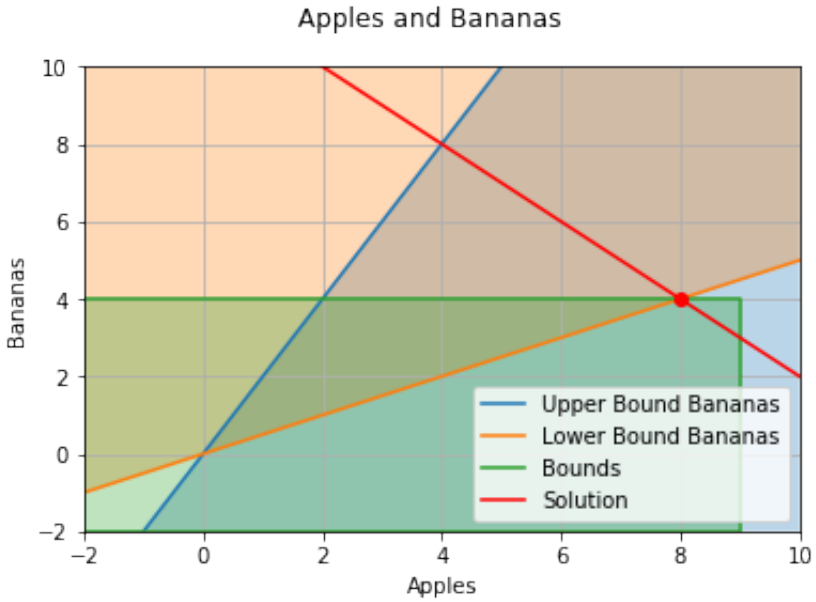
Drop Positivity Condition

In [6]:
```
1 bounds=[(None, 9),(None, 4)]  # no more than 9 apples and 4 ban
```
executed in 3ms, finished 10:16:46 2020-05-28

In [7]:
```
1 res=opt.linprog(c, A, b, bounds=bounds, method='simplex')
```
executed in 8ms, finished 10:16:46 2020-05-28

In [8]:
```
# fig=plt.figure(figsize=(4,4), dpi=300)
plot_linopt(A, b, c, bounds, res,
            borders=[(-2, 10), (-2,10)],
            title='Apples and Bananas',
            labels=['Apples', 'Bananas'],
            legend=['Upper Bound Bananas',
                    'Lower Bound Bananas'])
```

executed in 297ms, finished 10:16:47 2020-05-28



2.3 Variation 2

Automatic setting of drawing region around solution

In [9]:
```
bounds=[(0, 9),(0, 4)]  # no more than 9 apples and 4 bananas
```

executed in 4ms, finished 10:16:47 2020-05-28

In [10]:
```
res=opt.linprog(c, A, b, bounds=bounds, method='simplex')
```

executed in 11ms, finished 10:16:47 2020-05-28

In [11]:

```
# fig=plt.figure(figsize=(4,4), dpi=300)
plot_linopt(A, b, c, bounds, res,
            title='Apples and Bananas',
            labels=['Apples', 'Bananas'],
            legend=['Upper Bound Bananas',
                    'Lower Bound Bananas'])
```

executed in 279ms, finished 10:16:47 2020-05-28