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jupyter Statistic Assignment 4 (Computer-based) - Yohandi Last Checkpoint: 30 minutes ago (autosaved)

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Run Code

In [53]:

```
import pandas as pd
import matplotlib.pyplot as plt
import random

def C(n, r):
    ret = 1
    for i in range(n):
        ret *= (i + 1)
    for i in range(r):
        ret /= (i + 1)
    for i in range(n - r):
        ret /= (i + 1)
    return ret

def f(x):
    return C(50, x) * C(50, 5-x) / C(100, 5)

redObtained = [0, 0, 0, 0, 0, 0]
relativeFrequency = [0, 0, 0, 0, 0, 0]

for i in range(1000):
    red = 50
    black = 50
    redBall = 0
    for j in range(5):
        if random.randint(1,red+black) <= red:
            red -= 1
            redBall += 1
        else:
            black -= 1
    redObtained[redBall] += 1

for i in range(6):
    relativeFrequency[i] = float(redObtained[i]/1000)

x = tuple([i for i in range(6)])
y = tuple([relativeFrequency[i] for i in range(6)])
z = tuple([f(i) for i in range(6)])
plt.bar(x, y, align = 'center')
plt.xlabel('Red Balls Obtained')
plt.ylabel('Relative Frequency')
for i in range(3):
    plt.hlines(z[i+3], -0.6, x[i+3] + 0.4, colors = 'green')
for i in range(3):
    plt.hlines(z[i], -0.6, x[i] + 0.4, colors = 'red')
plt.show()
```