

Monte Carlo Assignment

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Lab No: **04**

Ques.1)

--> **Beta Distribution:**

(**a1,a2**) are chosen and value of a point x^* is calculated by the following formula:

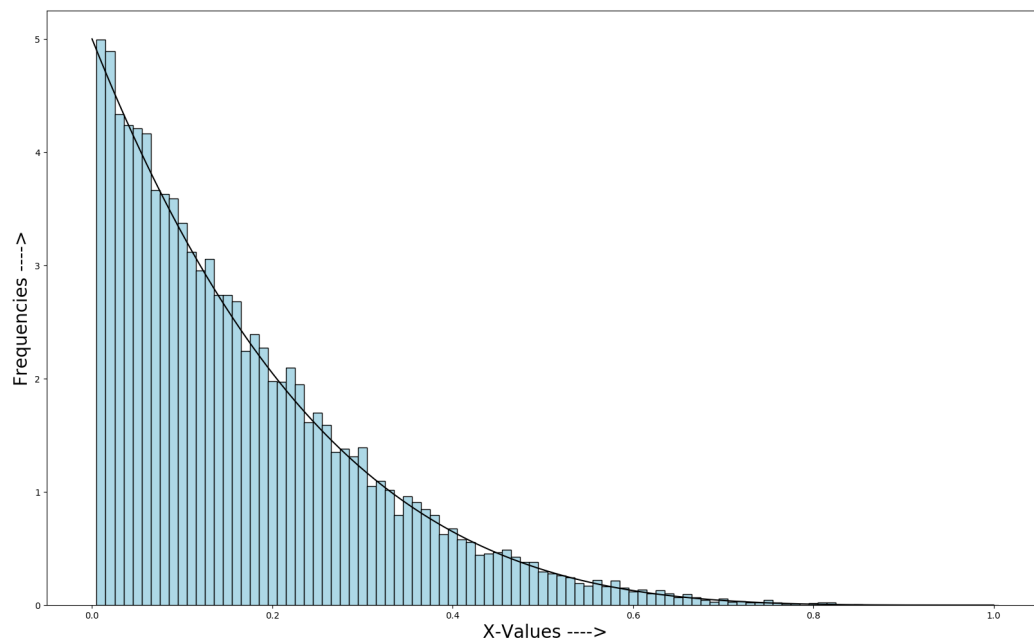
$$x^* = (a1-1)/(a1+a2-2)$$

-> x^* is the point where our Beta function maximizes and value of function at x^* .
That is $f(x^*) = c$.

1.)

$$a1 = 1, a2 = 5$$

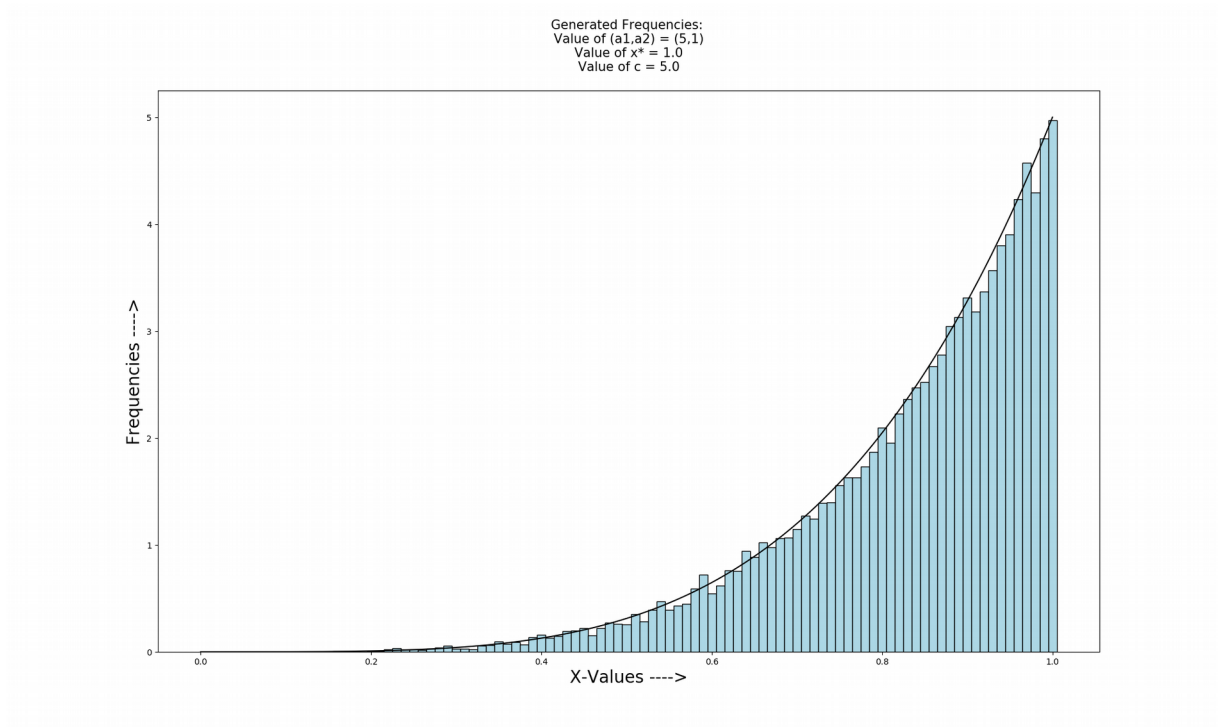
Generated Frequencies:
Value of (a1,a2) = (1,5)
Value of $x^* = 0.0$
Value of $c = 5.0$



Calculated value of $x^* = 0.0$ and $f(x^*) = 5.0$.

2.)

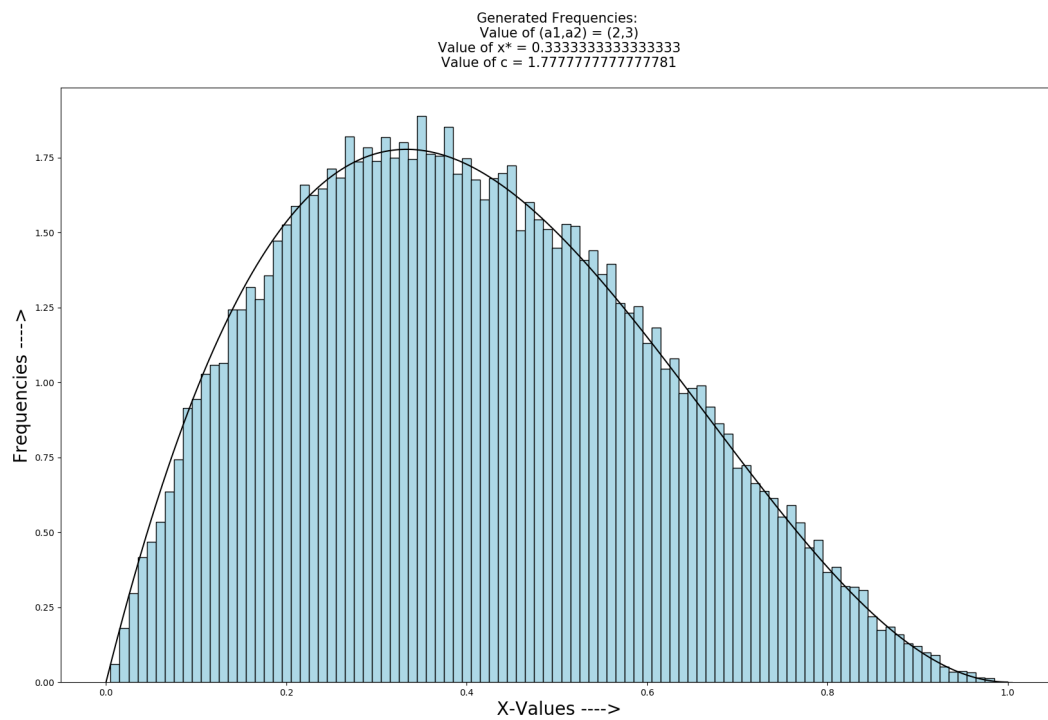
$a_1 = 5, a_2 = 1$



Calculated value of $x^* = 1.0$ and $f(x^*) = 5.0$

3.)

$a_1 = 2, a_2 = 3$

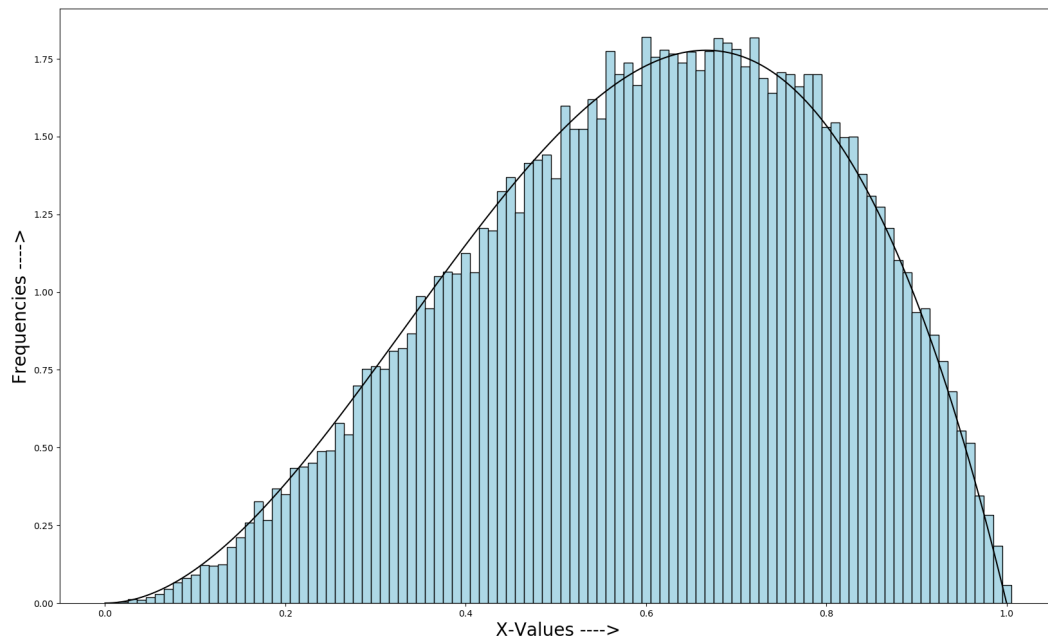


Calculated value of $x^* = 0.33$ and $f(x^*) = 1.77$

4.)

$a_1 = 3, a_2 = 2$

Generated Frequencies:
Value of $(a_1, a_2) = (3, 2)$
Value of $x^* = 0.6666666666666666$
Value of $c = 1.7777777777777778$

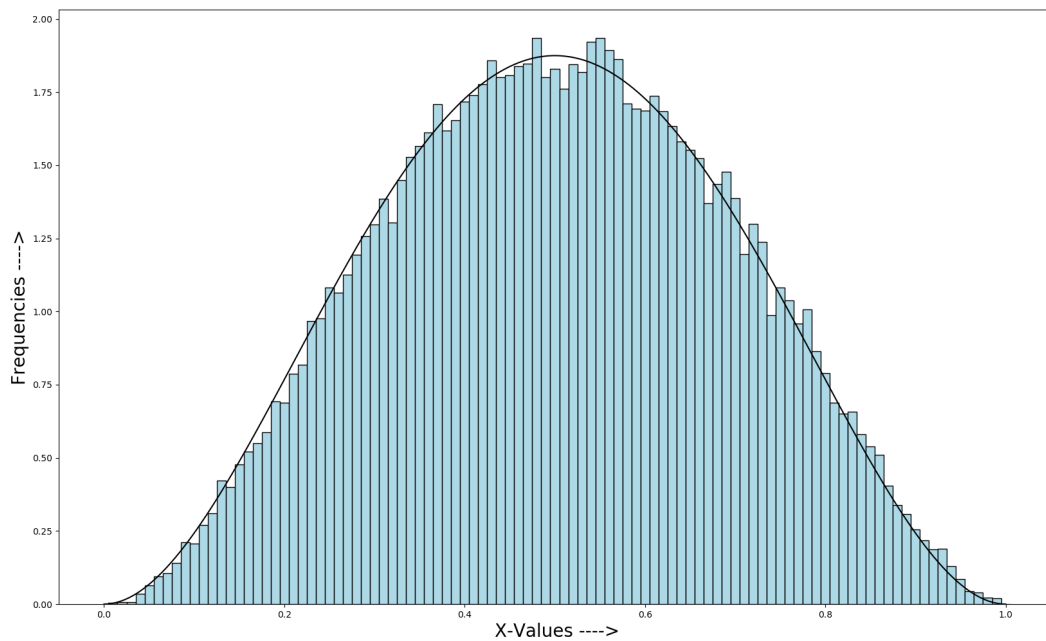


Calculated value of $x^* = 0.66$ and $f(x^*) = 1.77$

5.)

$a_1 = 3, a_2 = 3$

Generated Frequencies:
Value of $(a_1, a_2) = (3, 3)$
Value of $x^* = 0.5$
Value of $c = 1.875$



Calculated value of $x^* = 0.5$ and $f(x^*) = 1.875$

Some Observations:

- > The peak depends on the values of a_1, a_2 . Thus in the 1st case we observe the graph to be decreasing as the peak shifts towards the left side. Thus changing a_1 we can change the value of x having the peak value.
 - > In the 2nd fig I interchanged the value of a_1, a_2 from the previous problem. Since the value of a_2 becomes 1 hence the graph shown is increasing since the value of x^* becomes 1.
 - > In 3rd and 4th fig I have taken some values of a_1, a_2 , in the former case we have peak to the left of $x = 0.5$, because $a_1 < a_2$ and in the later case I have peak to the right of $x = 0.5$ because I just interchanged the value of a_1 and a_2 .
 - > In 5th fig, I kept the value of $a_1 = a_2 = 2$ which results in value of peak to be at exact $x = 1.5$ that is the middle because we have same values of a_1 and a_2 .
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