LAB 04

Question 1

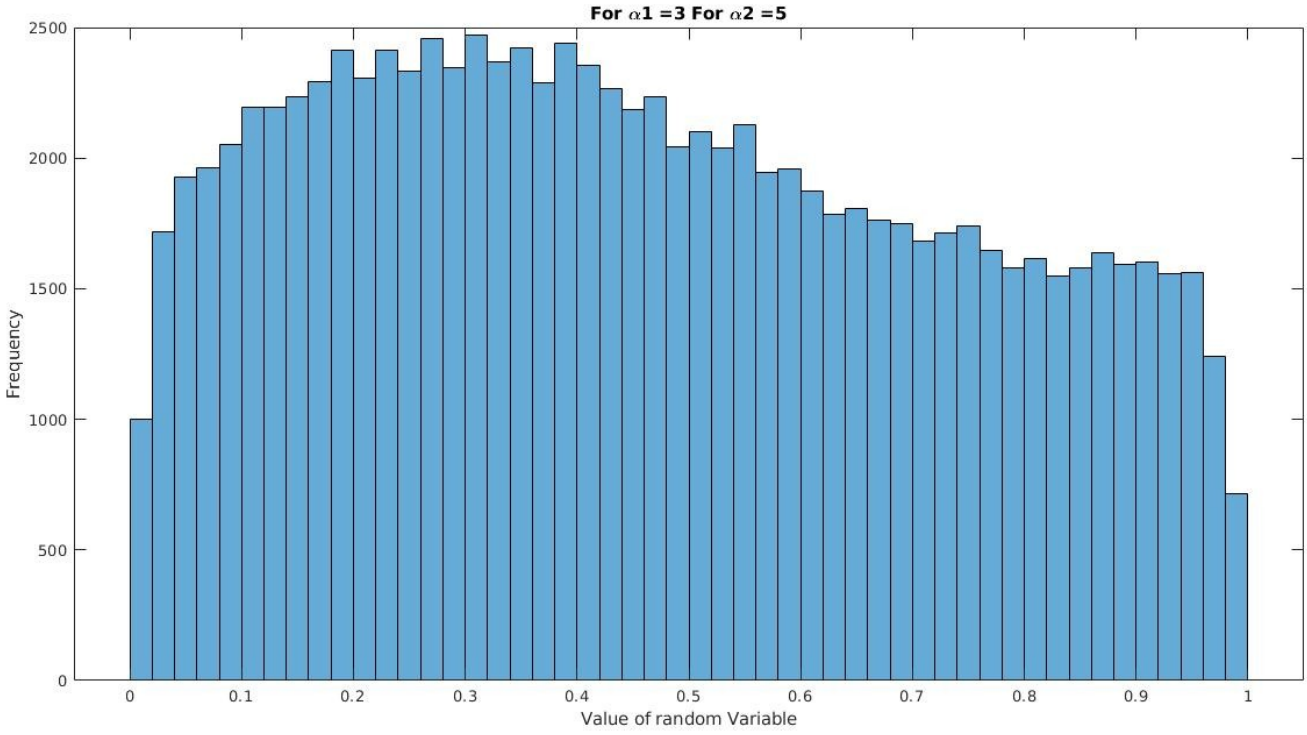
a) We will be generating random variable from the beta distribution using acceptance-rejection method for various values of α_1 and α_2.

Number of values of testing uniform random variable is taken to be 100000.

I. For $\alpha_1 = 3$ and $\alpha_2 = 5$

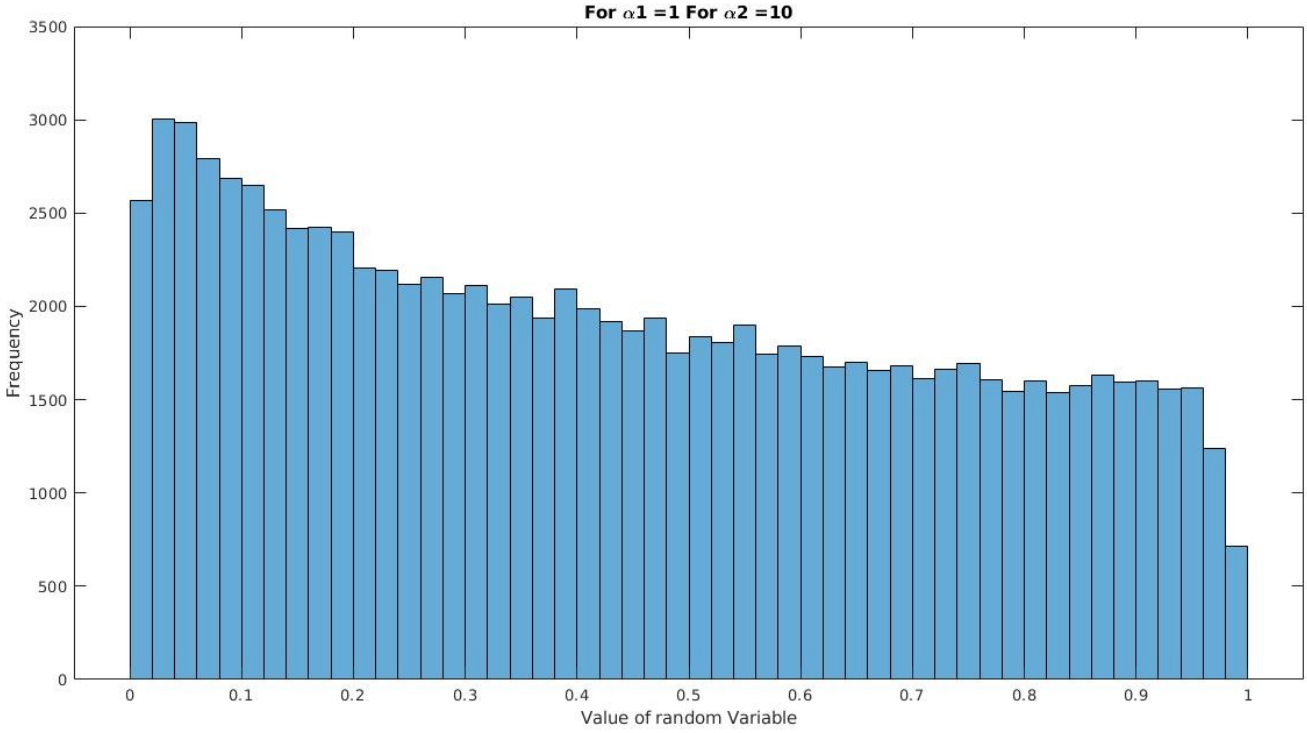
Point of Maxima (X*) = $(\alpha_1 - 1)/(\alpha_1 + \alpha_2 - 2) = 0.3333$

c = f(X*) = 11.5226



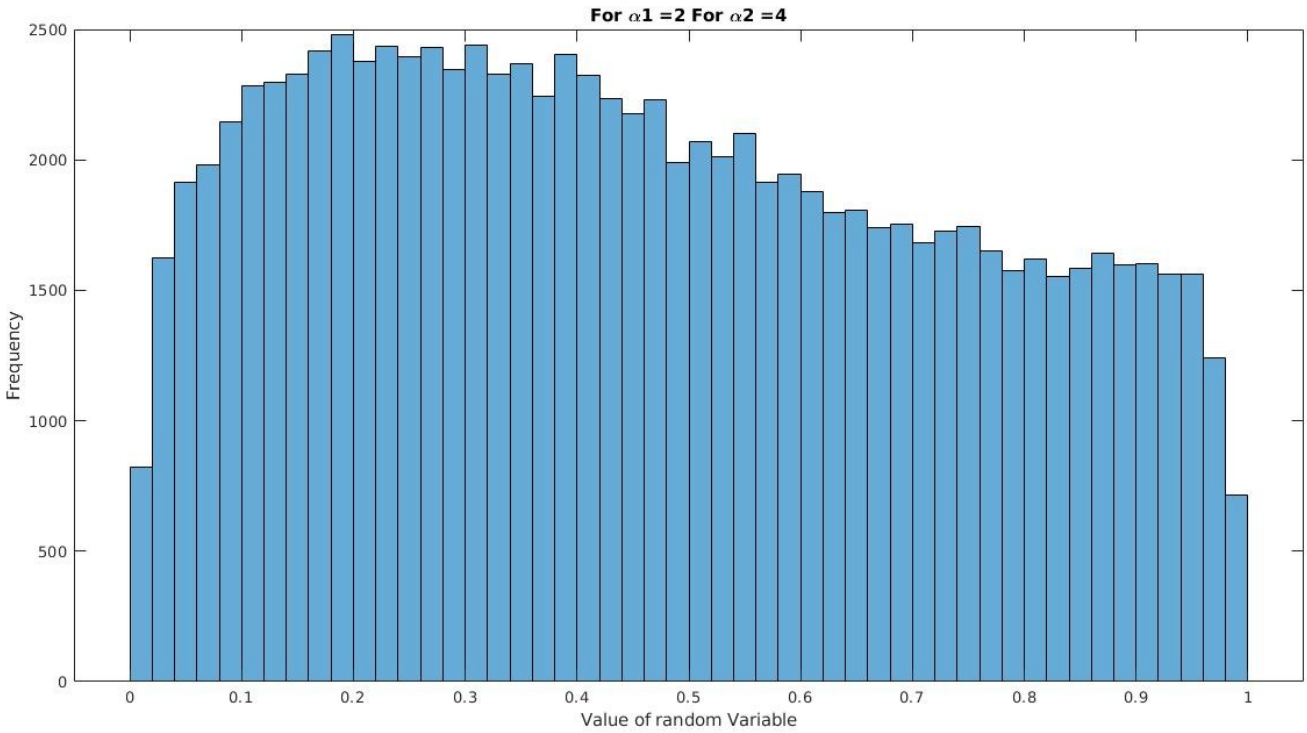
II. For $\alpha_1 = 1$ and $\alpha_2 = 10$

Point of Maxima (X*) = $(\alpha_1-1)/(\alpha_1+\alpha_2-2) = 0$
c = f(X*) = 10.0



III. For $\alpha_1 = 2$ and $\alpha_2 = 4$

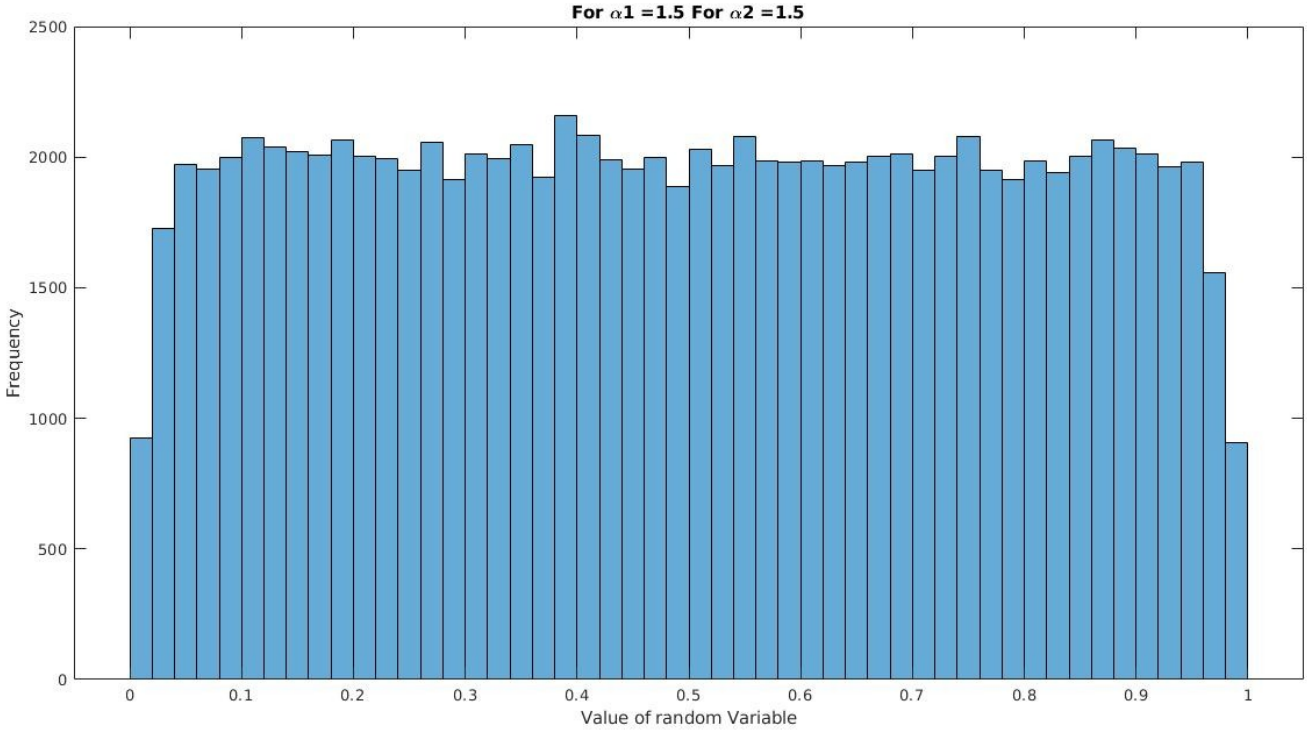
Point of Maxima (X*) = $(\alpha_1-1)/(\alpha_1+\alpha_2-2) = 0.2500$
c = f(X*) = 4.9219



IV. For $\alpha_1 = 1.5$ and $\alpha_2 = 1.5$

Point of Maxima (X*) = $(\alpha_1-1)/(\alpha_1+\alpha_2-2) = 0.5000$

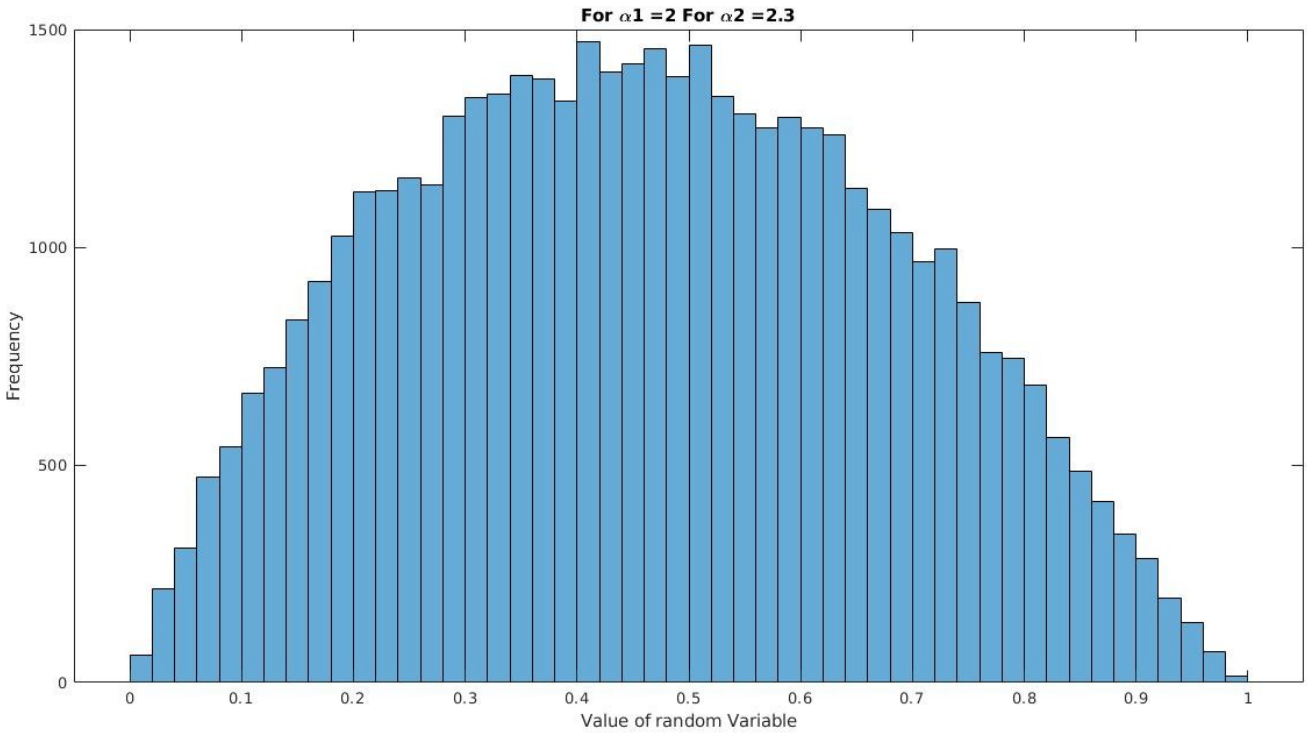
c = f(X*) = 0.5274



V. For $\alpha_1 = 2.0$ and $\alpha_2 = 2.3$

Point of Maxima (X*) = $(\alpha_1-1)/(\alpha_1+\alpha_2-2) = 0.4348$

c = f(X*) = 2.1824



b) OBSERVATIONS AND ANALYSIS:

I. We observe that frequencies of the values generated varied with the values of α_1 and α_2 in the following manner :

a) The historgram was observed to be skewed towards left if the value of α_1 taken is less that α_2.

b) The histogram was observed to be skewed towards right if the value of α1 taken is less that α1.

II. Further following observations were made for cases where $\alpha_1 = \alpha_2$:

a) The frequencies of values generated were observed to be almost equally distributed and skewness of historgram was negligible.

b) Further spread of frequencies for different values of equal α_1 and α_2 were also observed to be similar.