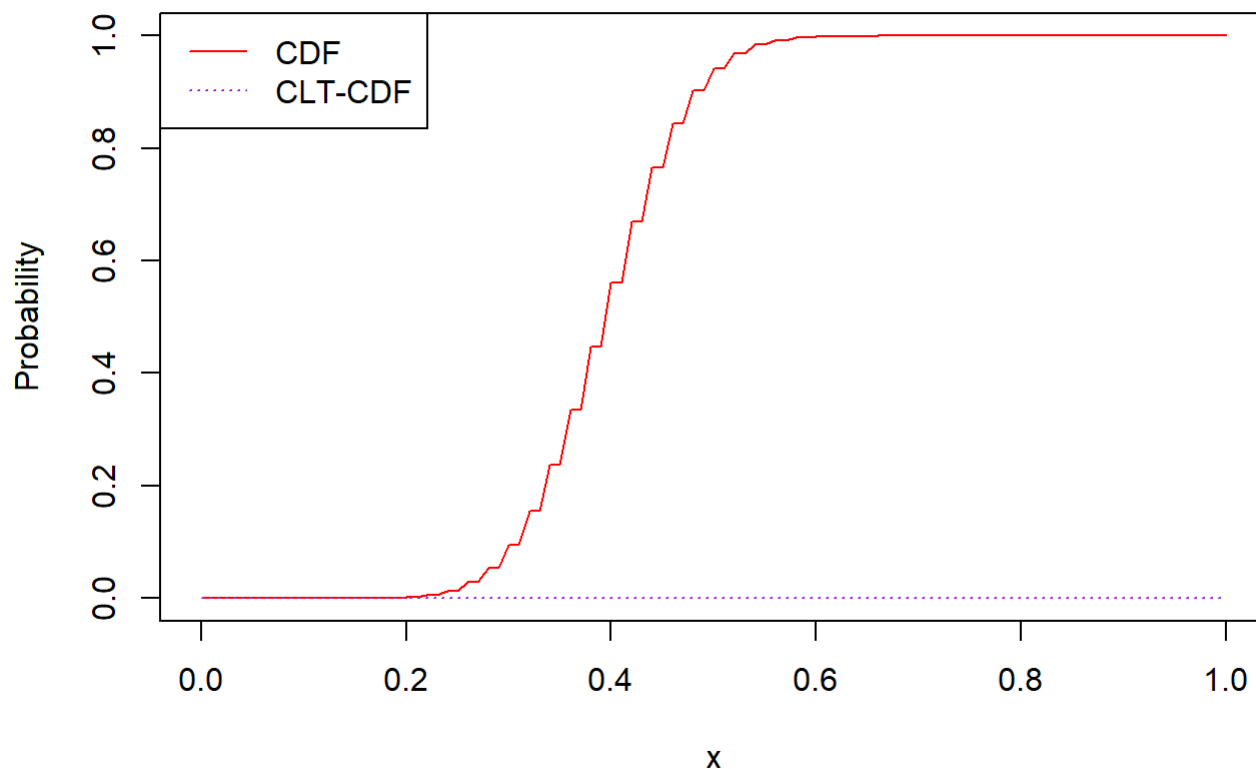# Assignment - 1

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1


```
## Maximum absolute difference between CDF and CLT-CDF: 1
```

Question 2

Distribution of X_n is coming out to a Gamma function with shape parameter $N\alpha$ and rate parameter $N\lambda$.

Question 3

To check f(x) to be a valid pdf , we have to check two condition:

- It should be non negative for its entire range.

- On integrating it over its entire range should equal 1e.

```
print(result)
```

```
## 1 with absolute error < 8.1e-06
```

As we can see, integral value of bessel function on integrating over given space is coming out to be 1 which implies f(x) is a valid pdf.

Question 4

- Joint distribution of X is coming out to be product of marginal distribution of X_1 and product of all conditional distribution from X_2 to X_T.
- Conditional distribution of X_t given $X_1...X_T$ is only depending on just previous point $X_{(}t-1)$. Therefor, it would be normally distributed.

Question 6

By applying Bayes theorem, we get that posterior distribution is coming out to be gamma distribution.

Question 7

Firstly writing function for given curve ,then applying accept reject for generating samples.

- Cheking time colapsed in generate_samples function using tictoc function using library tictoc.

```
## 0.27 sec elapsed
```

Acceptance-Rejection Sampling