### Practical Example: Goodness of Fit on Pseudo-random Numbers using runif()

In this example, we will:

1. Generate pseudo-random numbers using runif().
2. Test the goodness of fit of these numbers to a theoretical uniform distribution using a chi-square test.

### Explanation

**Generate Pseudo-random Numbers**: We use the runif(n) function to generate n pseudo-random numbers uniformly distributed between 0 and 1.

**Histogram**: We create a histogram to visualize the distribution of the generated pseudo-random numbers.

**Goodness of Fit Test (Chi-square)**:

* 1. **Expected Frequencies**: Assuming a uniform distribution, we calculate expected frequencies for 20 bins (rep(1/20, 20)).
  2. **Observed Frequencies**: We calculate observed frequencies by binning the generated pseudo-random numbers using table(cut(pseudo\_numbers, breaks = 20)).
  3. **Chi-square Test**: We perform a chi-square test (chisq.test) to assess whether the observed frequencies differ significantly from the expected frequencies assuming a uniform distribution.

**Results**: The chi-square test results indicate whether the generated pseudo-random numbers fit the uniform distribution. A low p-value suggests that the numbers do not fit well with the expected uniform distribution.

### Interpretation

* **Histogram**: The histogram visually shows how the generated pseudo-random numbers are distributed.
* **Chi-square Test**: The chi-square test assesses whether the observed distribution (from pseudo\_numbers) matches the expected uniform distribution.
* **P-value**: A significant p-value (typically < 0.05) would indicate that the generated numbers do not fit well with the uniform distribution.