1 Loops

Use a while or a for, to compute the following operations

- $1 + 4 + 9 + 16 + \cdots + 99^2 + 100^2$
- $1 - 2 + 3 - 4 + 5 - 6 + 7 - 8 + \cdots + 97 - 98 + 99 - 100$
- $1 + 2 + 3 + 4 + 5 + 6 + ... + 998 + 999 + 1000$
- $1 \cdot 2 \cdot 3 \cdots 49 \cdot 50$
- $1 + \frac{1}{2} + \frac{1}{2 \cdot 3} + \frac{1}{2 \cdot 3 \cdot 4} + \cdots \frac{1}{2 \cdot 3 \cdot 4 \cdots 29 \cdot 30}$

2 A nice distribution

- Generate 2 random numbers, A and B.
- Compute $C = \cos(2\pi A)\sqrt{-2log(B)}$ and store it.
- repeat 100000 times.
- plot a histogram of the stored C values.

3 How much is...

Using random numbers from the command runif(1), try to find the best approximate value of the following

- $\sqrt{15}$.
- the minimum of $x^3 - 18x^2 + x - 32$ for $x \in [0, 20]$.

4 Sophie Germain prime numbers

- Google what is a Sophie Germain prime number
- Use a loop to find all the Sophie Germain prime numbers between 100 and 1000.

5 A lazy teacher recycling exercises

Use loops to answer

♕+♕+♖=23

♕+♗+♗=15

♘+♘+♘=9

♘+♗+♕=15

♘+♘+♖=???

6 Aina's exam

Aina has an important test in two months. There are 68 topics, the day of the test they will pick 5 of them randomly and she will have to choose 1 of them. Aina wants to know how many topics she needs to study to have at least an 80% probability of passing.

7 Music lessons

Romeo is a music teacher at a secondary school. Last week, his students had a test, and Romeo wonders if Kevin was random guessing the answers, or if he learnt it all wrong.

The test consisted on naming the music notes: A, H, C, D, E, F or G (La, Si, Do, Re, Mi, Fa or Sol) of a music sheet. There were in total 70 notes, Kevin named 3 correctly and 67 wrong. Compute the probability of having 3 or less correct answers by random guessing.