R you willing to accept the Challenge?

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Preparing the modern student

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Background

- Statistics 122 was born at the University of Pretoria, South Africa, in July 2020.
- The course is presented by the Department of Statistics to first-year students majoring in various degrees and from diverse socio-economic backgrounds.
- Most students in the course have no prior programming experience and are consequently extremely anxious about coding.
- This poses a unique problem that our team has aimed to address through coding challenges.

Aims and Objectives

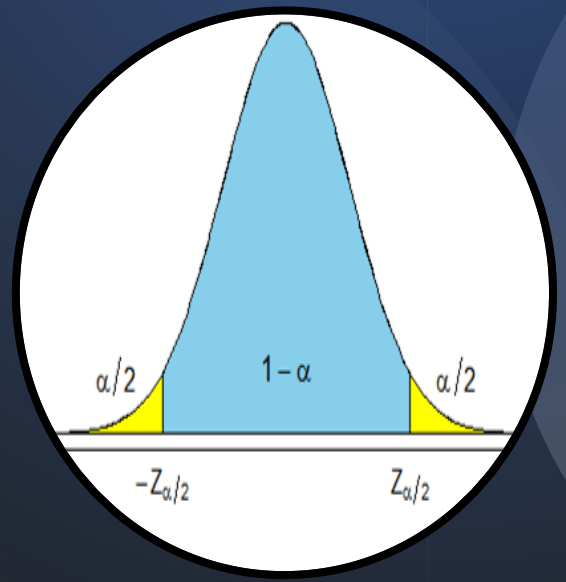
- Engage students and encourage independent thinking through active learning.
- Improve our students' coding capabilities, while building their confidence as statistical programmers.
- Promote continuous learning in which students receive instant feedback as they progress.
- Provide an encouraging assessment opportunity in which marks may be gained, but there is no penalty for mistakes (or non-participation).

Context of Challenges

- Improve coding skills through bonus challenges, additional to the formal assessment tasks, creating a positive learning experience.
- Coding submissions facilitated through *Programming Assignments* in gradescope.
- Autograding ensures immediate feedback to students allowing for self-paced learning.
- Unlimited submission opportunities during a prescribed time frame.

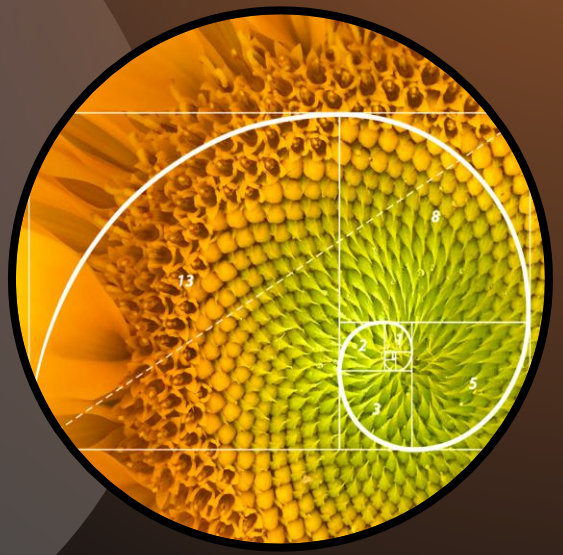
Overview of Challenges

1. Gauss summation



2. Confidence interval

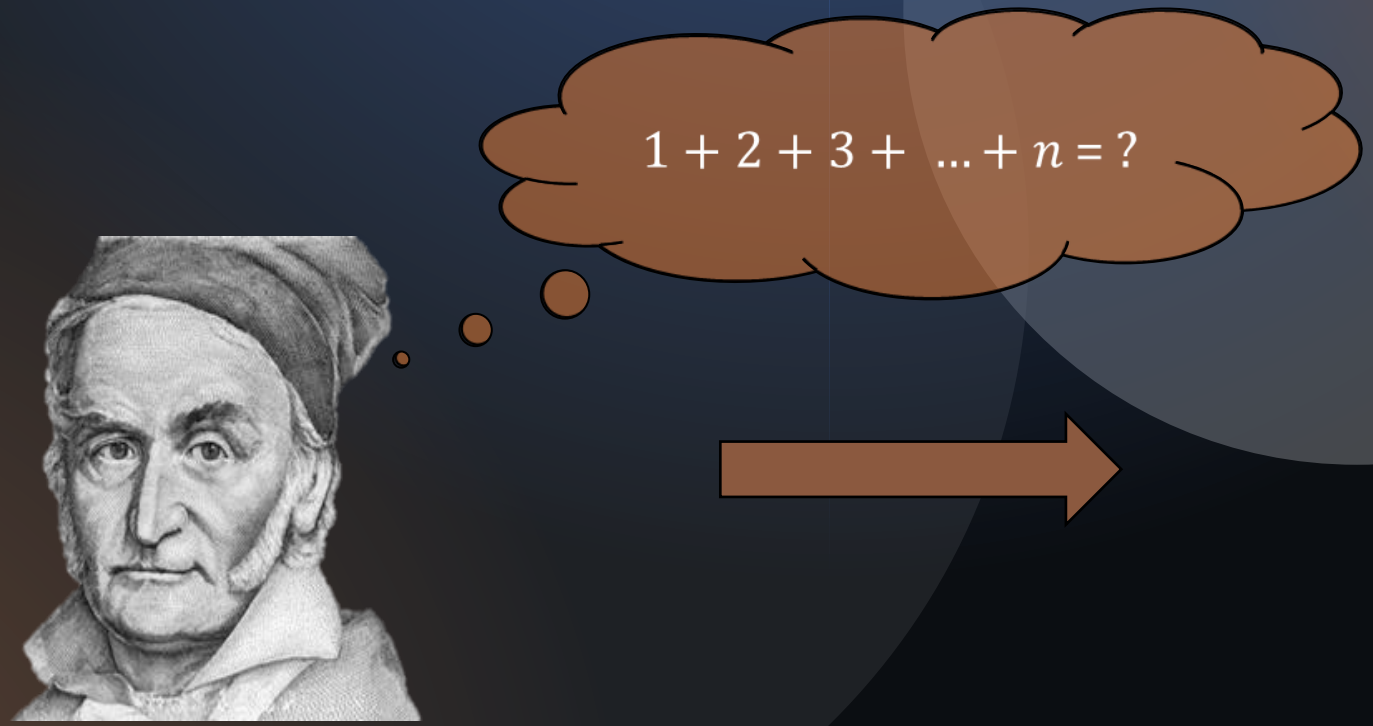
3. Divisibility



4. Fibonacci sequence

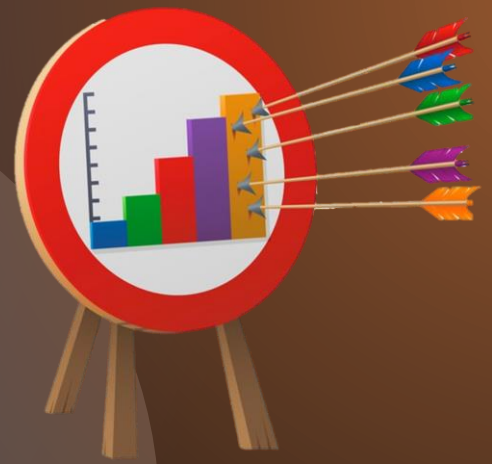
Challenge 1

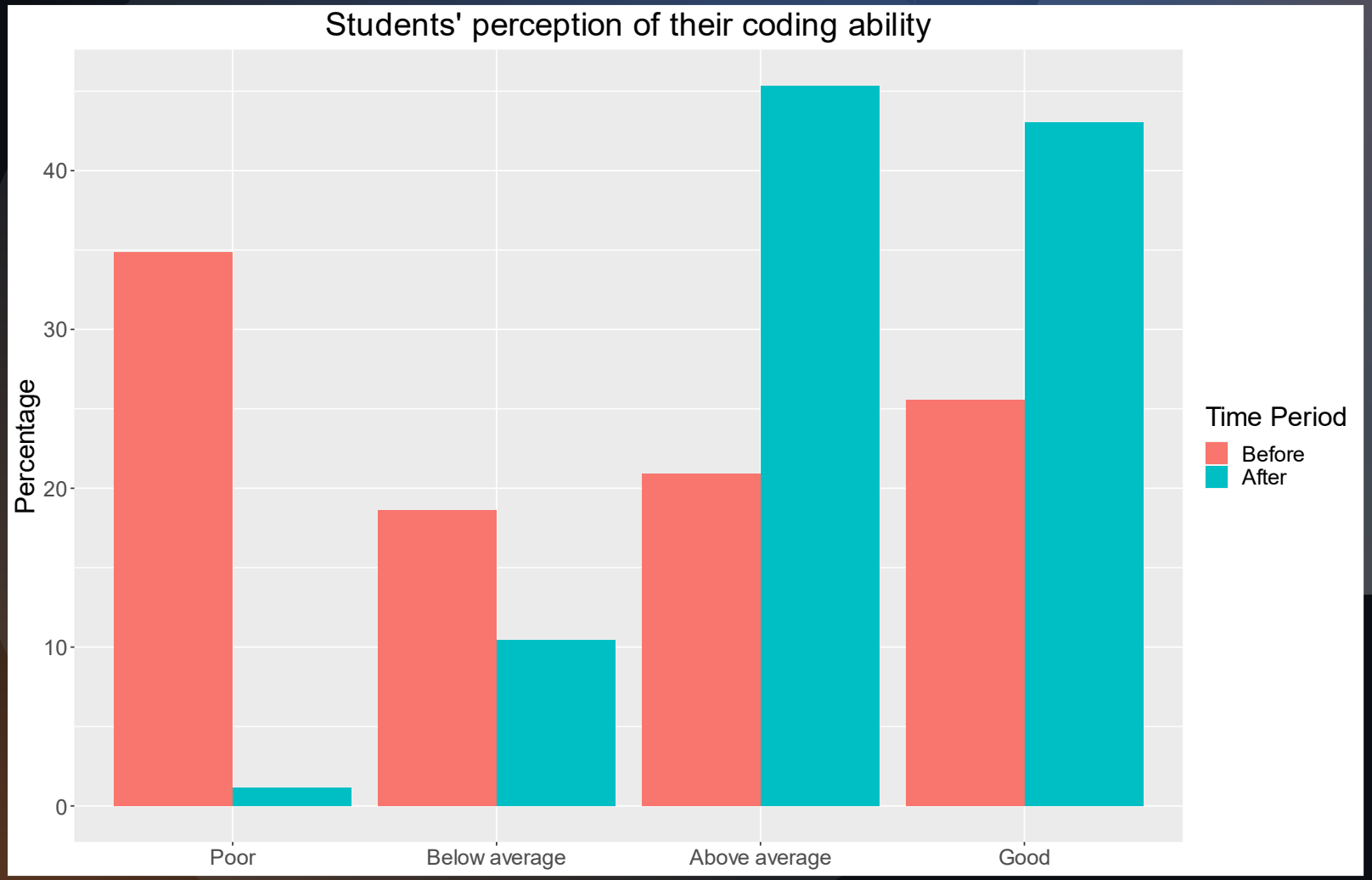
Code a function in **R** that can calculate the sum of all integers from 1 to *n*. Your function must operate on the argument *n* and return the sum. Call your function **`SumToN`**




```
SumToN <- function(n){
   ...
}
```

Student Feedback





- Students were surveyed regarding their belief in their coding ability before undertaking the course and upon completion of the course.
- This graph shows the substantial improvement in students' abilities regardless of their prior knowledge.

Conclusions

- The challenges have an overall positive impact on student grades, hence ensuring graduates are true *modern students* with the necessary coding skills for the modern workplace.
- These small digestible assessments can be a constructive addition to any university curriculum when implemented as shown.