

# Homework 1

Harsh Mehta (Student Number: 24208383)

## Penguins Dataset

The **penguins dataset** contains data on **344 adult penguins** across **three species** (Adelie, Chinstrap, and Gentoo) found on **three islands** (Biscoe, Dream, and Torgersen) in the Palmer Archipelago, Antarctica. The data includes information on their **physical characteristics** (bill length, bill depth, flipper length, and body mass), **sex** (female or male), and **year** (2007, 2008, or 2009).

This dataset is a cleaned subset of the more detailed penguins\_raw dataset, which also includes nesting behavior and isotope data.

	species	island	bill_len	bill_dep	flipper_len	body_mass	sex	year
1	Adelie	Torgersen	39.1	18.7	181	3750	male	2007
2	Adelie	Torgersen	39.5	17.4	186	3800	female	2007
3	Adelie	Torgersen	40.3	18.0	195	3250	female	2007
4	Adelie	Torgersen	NA	NA	NA	NA	<NA>	2007
5	Adelie	Torgersen	36.7	19.3	193	3450	female	2007
6	Adelie	Torgersen	39.3	20.6	190	3650	male	2007

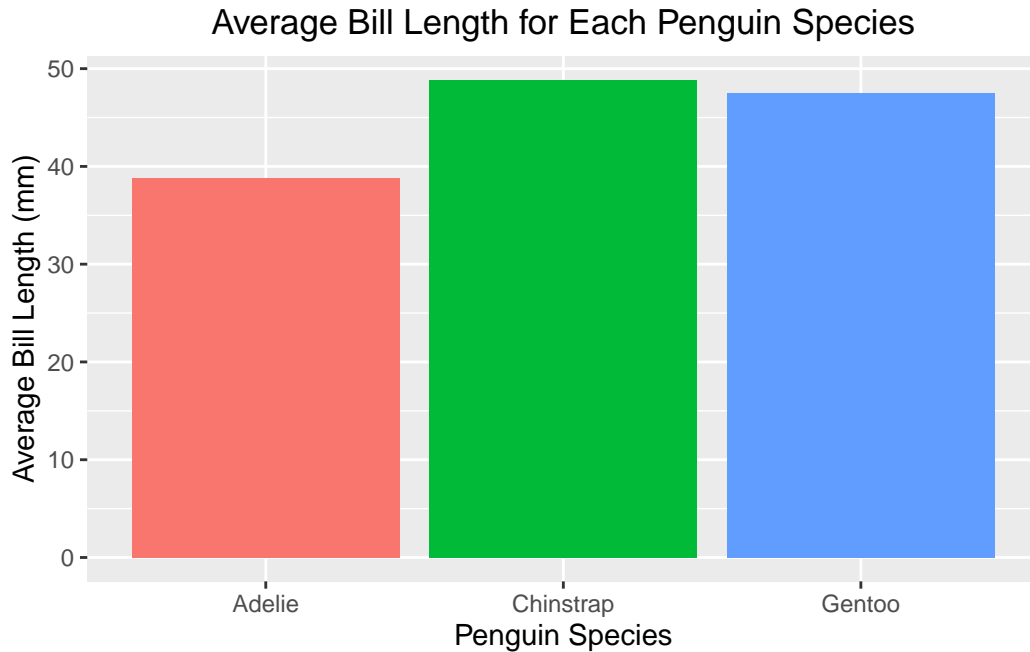
The dataset includes **8 variables**:

- **species (factor)**: Penguin species (Adelie, Chinstrap, and Gentoo)
- **island (factor)**: Island where the penguin was observed (Biscoe, Dream, and Torgersen)
- **bill\_len (numeric)**: Bill length in millimeters
- **bill\_depth (numeric)**: Bill depth in millimeters
- **flipper\_len (integer)**: Flipper length in millimeters
- **body\_mass (integer)**: Body mass in grams
- **sex (factor)**: Sex of the penguin (female or male)

- ***year (integer)***: Year the observation was recorded (2007, 2008, or 2009)

Here, we loaded the **palmerpenguins library** since it has the dataset of penguin species from the Palmer Archipelago. Then we loaded the **dplyr library** for data manipulation and transformation. After that we loaded the **ggplot2 library** for data visualization.

Now, we will create a barplot to visualize the average bill length for each penguin species.



*The following can be interpreted from the above plot:*

- **Chinstrap penguins** have the **longest average bill length**, measuring just under 50 mm.
- **Gentoo penguins** follow closely, with an average slightly lower than Chinstrap.
- **Adelie penguins** have the **shortest average bill length**, at around 39 mm.

This suggests that **bill length varies significantly between species**, potentially reflecting differences in **feeding habits, ecological adaptation, or evolutionary traits**.