A university introduced a **scholarship in 2019** for selected departments (“treated_group=1”). We have panel data on departments from **2017–2020** with average student GPA (variable **outcome**). “post=1” marks years ≥2019.

Task A — By-hand DiD

1. **Make a 2×2 table** (use 2018 as "pre" and 2019 as "post" for the quick version):
   - Mean outcome for Treated-Pre, Treated-Post, Control-Pre, Control-Post.
2. **Compute DiD:**
   $\hat{DiD} = (\bar{Y}^T_{post} - \bar{Y}^T_{pre}) - (\bar{Y}^C_{post} - \bar{Y}^C_{pre})$

   One sentence: **interpret** the number (units = GPA points).

Task B — Regression DiD

Fit OLS with columns: `outcome ~ treated_group + post + treated_group*post`.

- Report **coefficient on the interaction**; this should match your by-hand DiD (up to rounding).

Task C — Parallel trends check

Use **2017 & 2018** as pre-periods:

- Compute mean outcome by year and treatment group; make a quick line chart (two lines: treated vs control, years 2017–2018).
- Decide: **Do pre-trends look parallel?**
  - If yes → your DiD is more credible.
  - If no → discuss bias direction.

Placebo test: pretend treatment starts in 2018; does $\delta \approx 0$?