

# Covid19 Report

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## 1 The *CRISTINA* project

This report is part of a research project “**Co**Rona vIrus **Spa**Tial **a**NAlysis” (CRISTINA) which examines the time series progress of COVID-19 events in 177 countries of the world.

## 2 France

A series of visualizations for the progress of COVID-19 for **France**. We use absolute numbering scale and logarithmic scale to visualize the progress of “*confirmed cases*”, “*deaths*” and “*recovered cases*”. We also indicate the goverment interventions as dots on top of each line.

2.1 Confirmed Cases

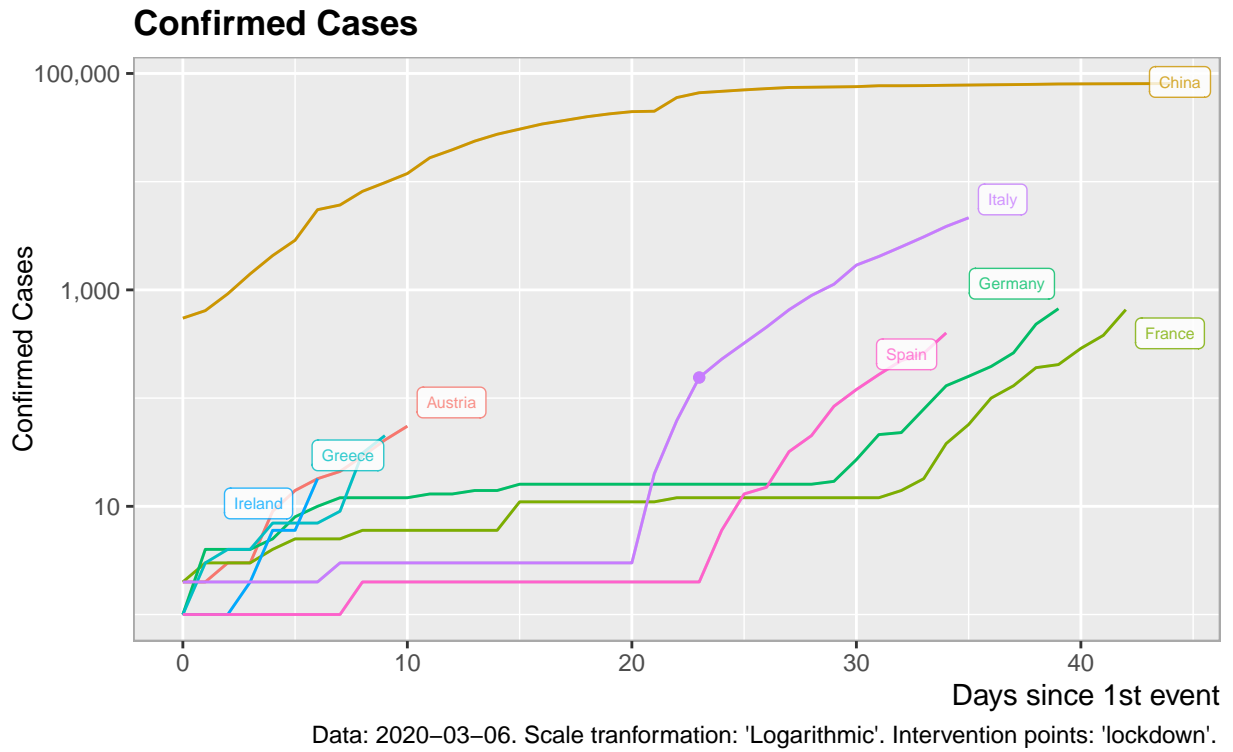


Figure 1: Confirmed Cases

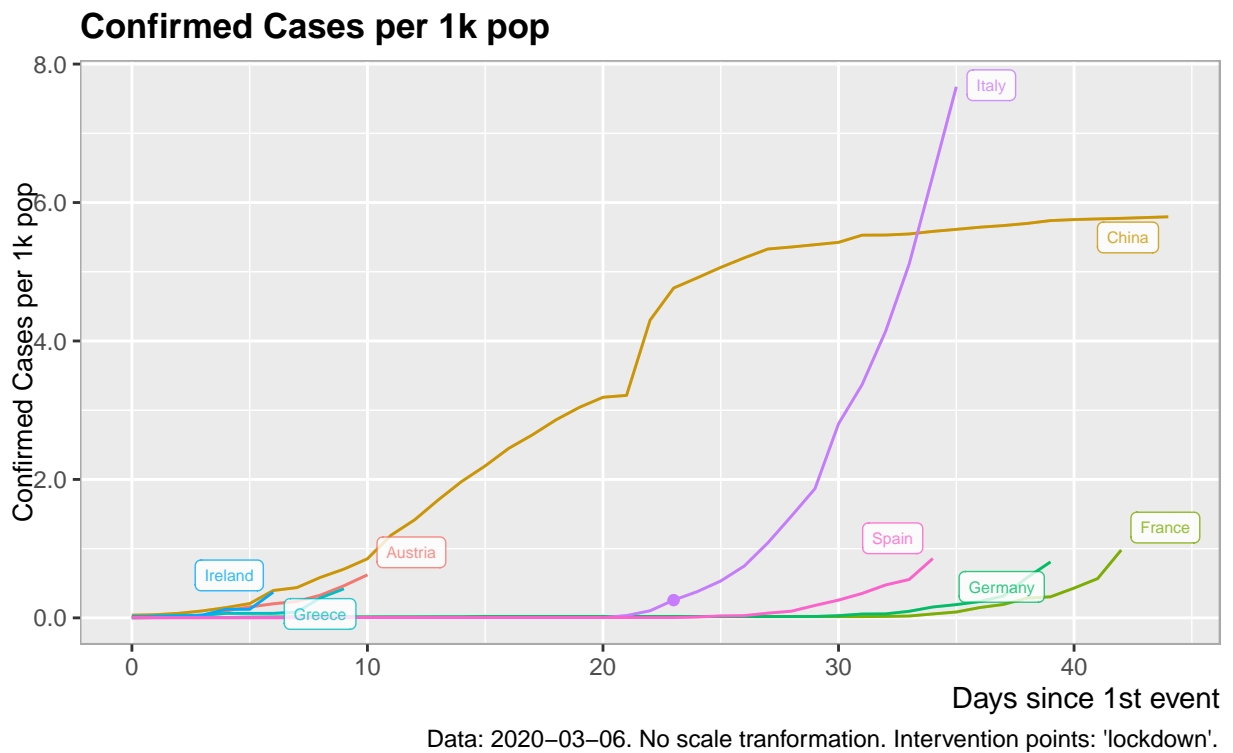


Figure 2: Confirmed Cases by 1000 population

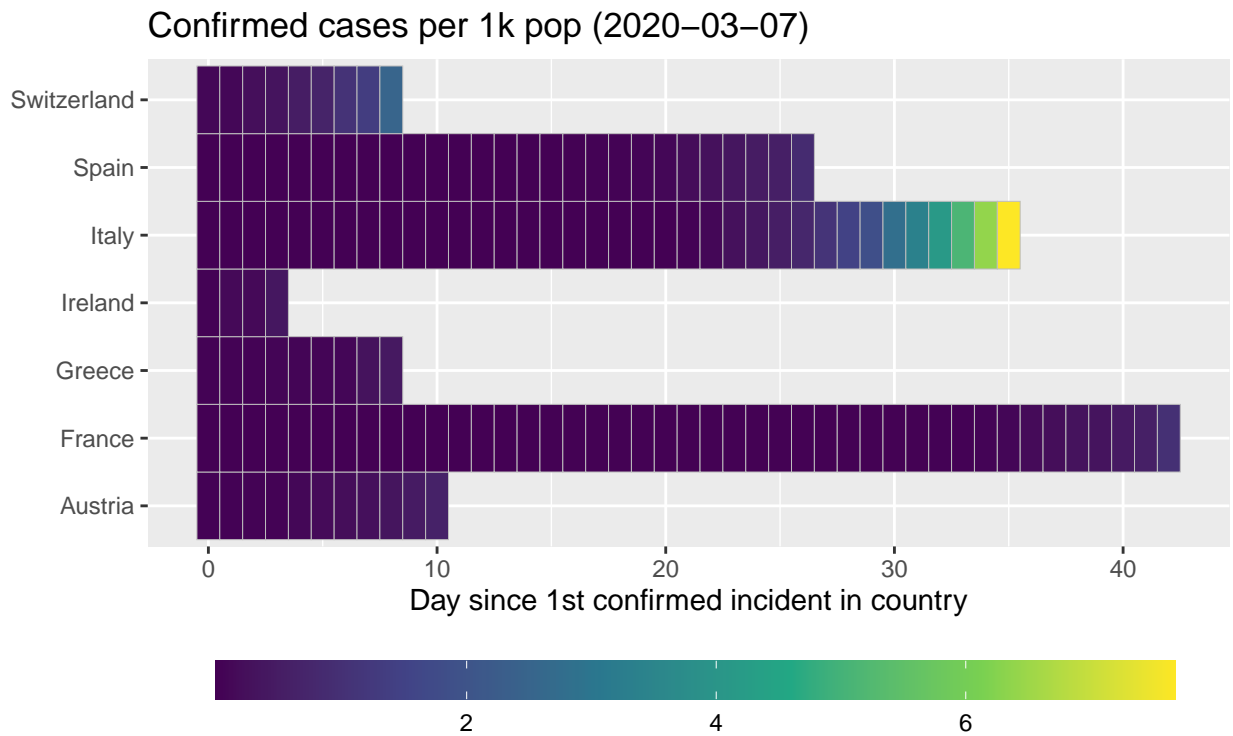


Figure 3: Confirmed Cases by 1000 population

## 2.2 Deaths

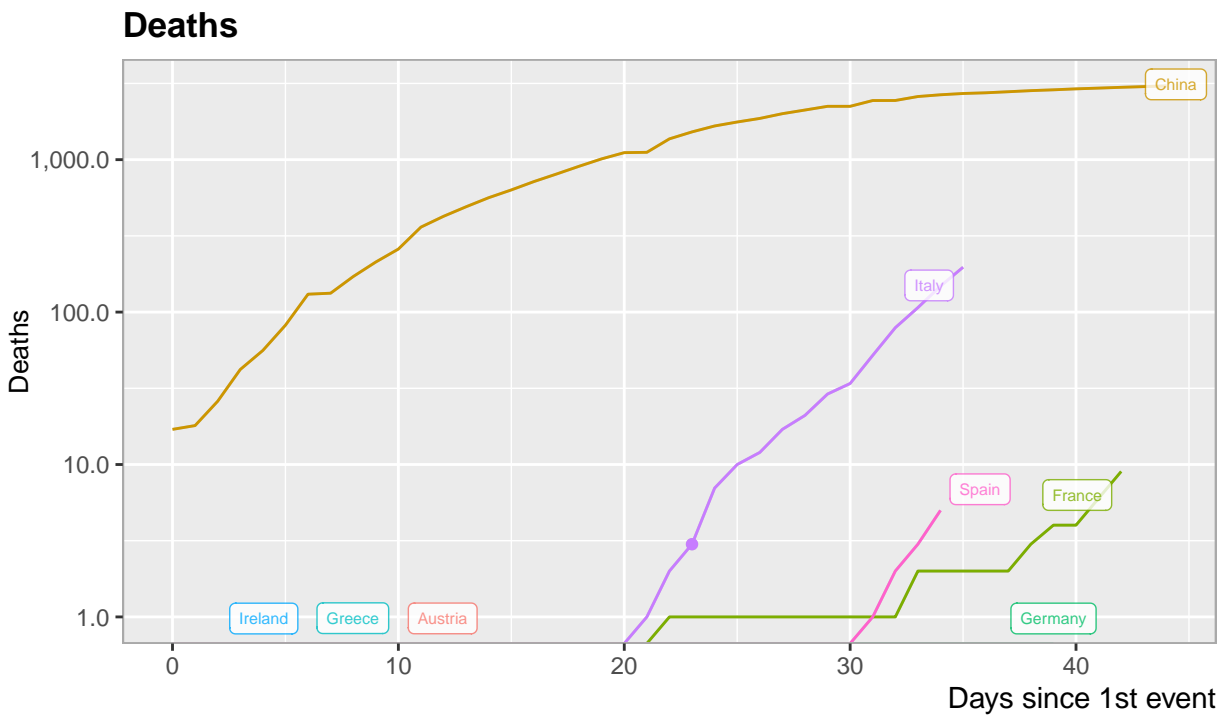


Figure 4: Number of deaths by country

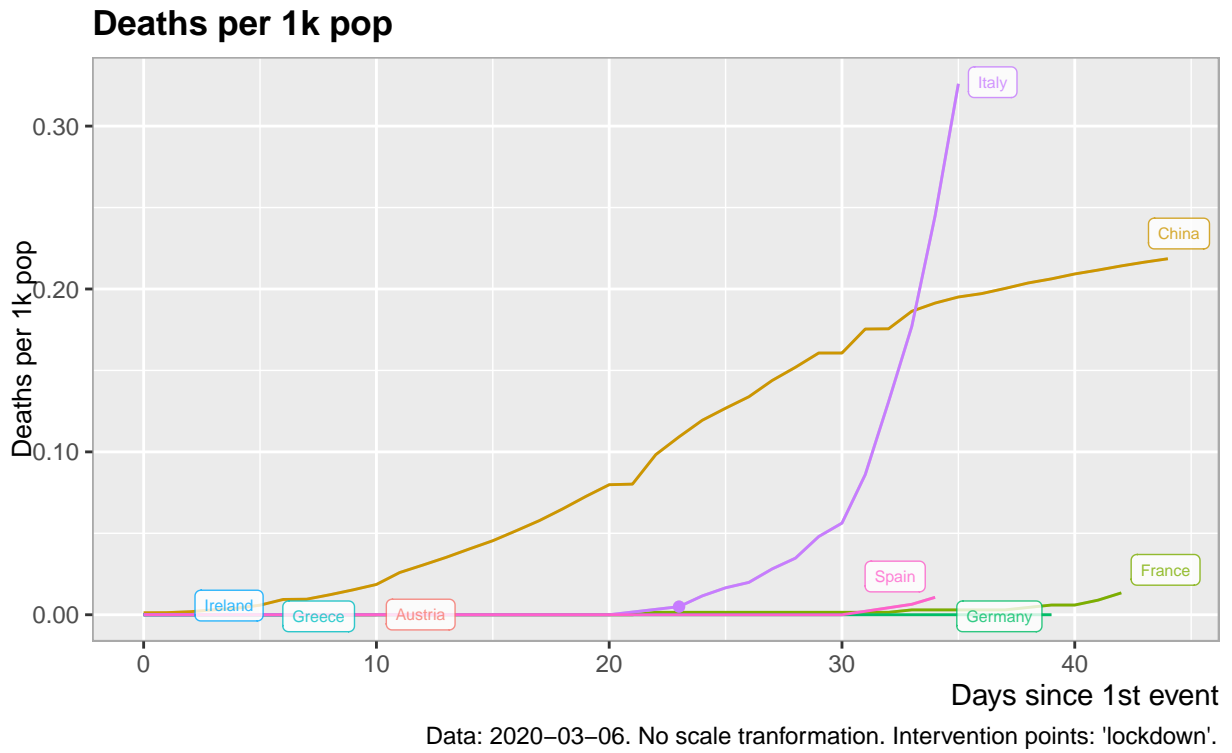


Figure 5: Deaths by 1000 population

### 3 Rate of change over time

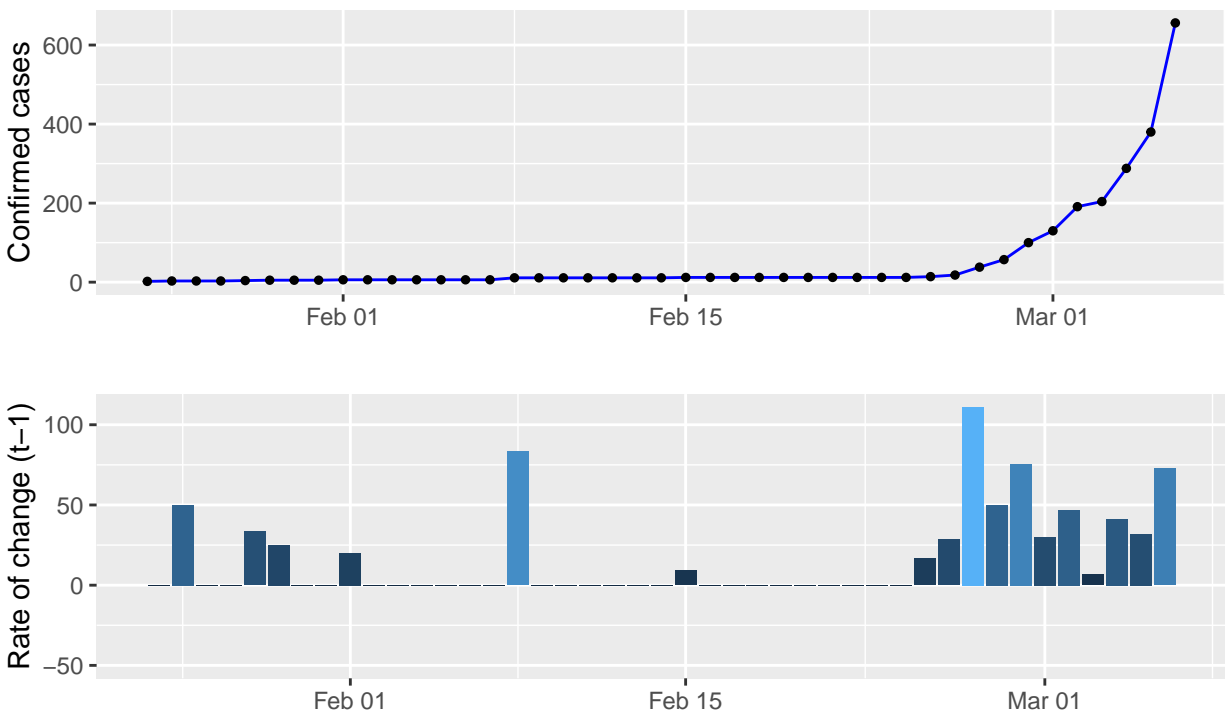


Figure 6: Rate of change of confirmed cases

## 4 Estimations

We estimate the future projection of *confirmed cases* for the next 5 days in France with two methods.

### 4.1 ARIMA projection

#### Projection of 'confirmed' cases for 5 ahead

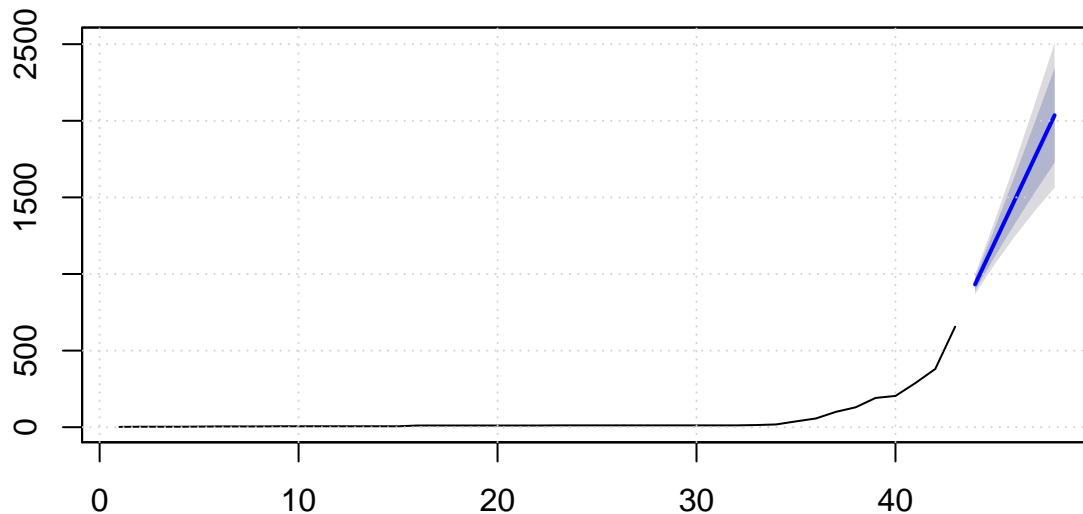


Figure 7: ARIMA projection

Table 1: ARIMA of 'confirmed cases' for 5 days ahead

|                         | Estimation | Confidence 95%<br>(Low) | Confidence 95%<br>(High) |
|-------------------------|------------|-------------------------|--------------------------|
| <b>t+1 (2020-03-07)</b> | 932        | 868.3                   | 995.7                    |
| <b>t+2 (2020-03-08)</b> | 1208       | 1066                    | 1350                     |
| <b>t+3 (2020-03-09)</b> | 1484       | 1246                    | 1722                     |
| <b>t+4 (2020-03-10)</b> | 1760       | 1411                    | 2109                     |
| <b>t+5 (2020-03-11)</b> | 2036       | 1564                    | 2508                     |

- The estimated proportion of cases detected is 8.48%.
- With data up to 2020-03-06 in France we have 656 confirmed cases and 9 deaths.
- Estimated doubling time (based on 5 days time window) is approximately 2.2 days

## 4.2 PROPHET projection

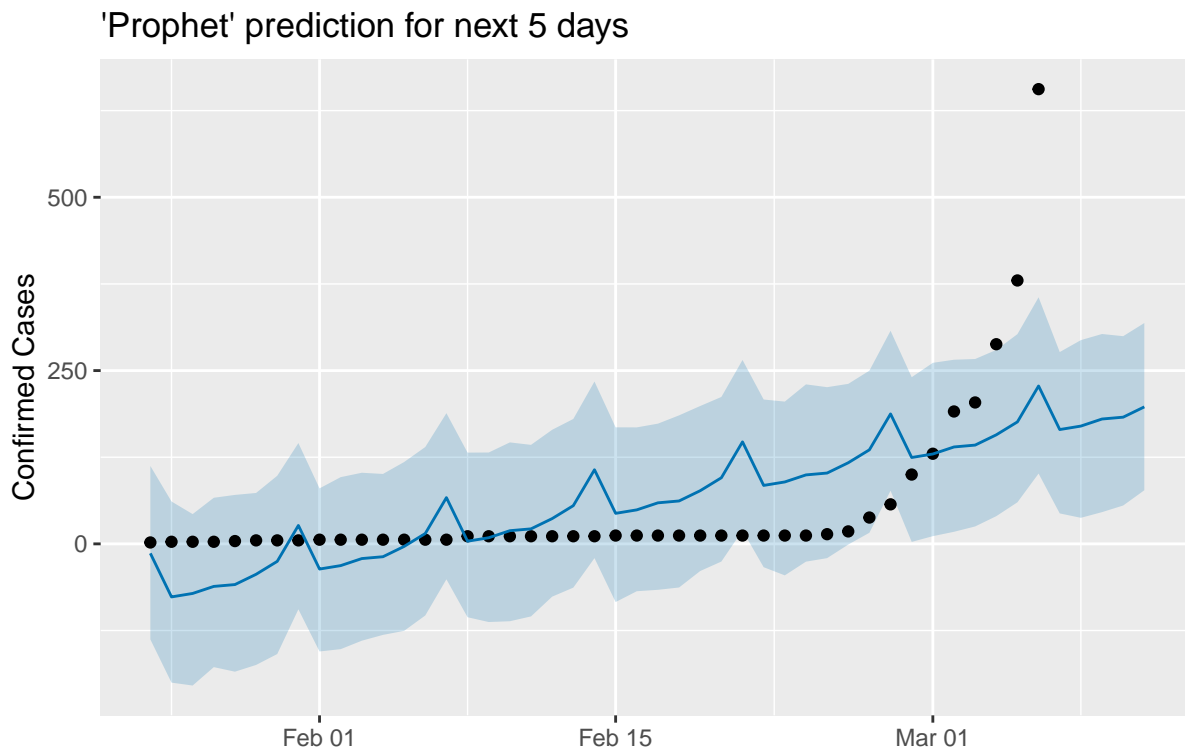


Figure 8: PROPHET Projection of confirmed cases over the next 5 days for France

Table 2: PROPHET of 'confirmed cases' for 5 days ahead for France

|            | Future_Date | Estimation | Confidence 95%<br>(Low) | Confidence 95%<br>(High) |
|------------|-------------|------------|-------------------------|--------------------------|
| <b>t+1</b> | 2020-03-07  | 164.9      | 43.92                   | 276.7                    |
| <b>t+2</b> | 2020-03-08  | 169.9      | 37.57                   | 293.9                    |
| <b>t+3</b> | 2020-03-09  | 180.1      | 45.79                   | 302.8                    |
| <b>t+4</b> | 2020-03-10  | 182.8      | 55.31                   | 299.6                    |
| <b>t+5</b> | 2020-03-11  | 197.6      | 77.31                   | 318.6                    |