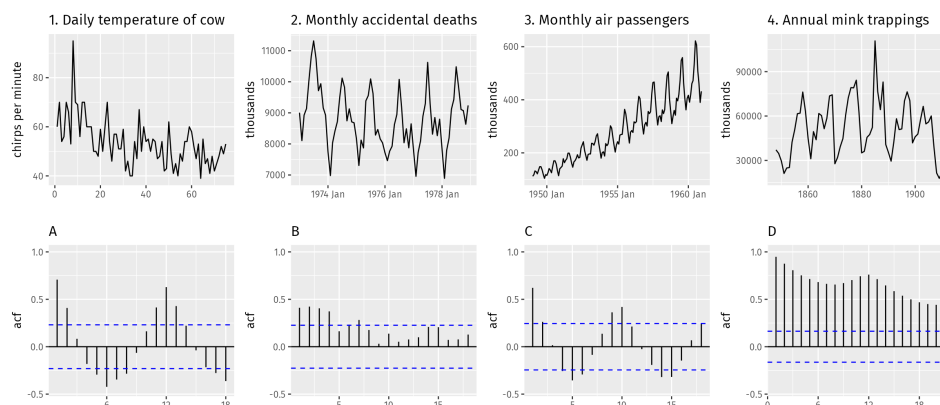1. The time plots and ACF plots in Figure 1 correspond to four different time series. Your task is to match each time plot in the first row with one of the ACF plots in the second row.

Source: Section 2.10 Exercise 9 from *Forecasting: Principles and Practice* (3rd ed).

2. For each of the provided stochastic processes, compute its mean, variance, and auto-covariance $cov(X_s, X_t)$, and determine whether it qualifies as white noise. In the following, consider that W_t is an iid white noise process with $Var(W_t) = \sigma^2$.

   (a) $X_t = 5 + W_t$.

   (b) $X_t = t \cdot W_t$.

   (c) $X_t = 2W_t + W_{t-1}$.

   (d) $X_t = (-1)^t W_t$

3. Show that a 3×5 MA is equivalent to a 7-term weighted moving average with weights $\left[\frac{1}{15}, \frac{2}{15}, \frac{3}{15}, \frac{3}{15}, \frac{3}{15}, \frac{2}{15}, \frac{1}{15}\right]$.
   Source: Section 3.7 Exercise 6 from *Forecasting: Principles and Practice* (3rd ed).

4. Figures 1 and 2 show the result of decomposing the number of persons in the civilian labour force in Australia each month from February 1978 to August 1995.

   Source: Section 3.7 Exercise 9 from *Forecasting: Principles and Practice* (3rd ed).

   (a) Write about 3–5 sentences describing the results of the decomposition. Pay particular attention to the scales of the graphs in making your interpretation.

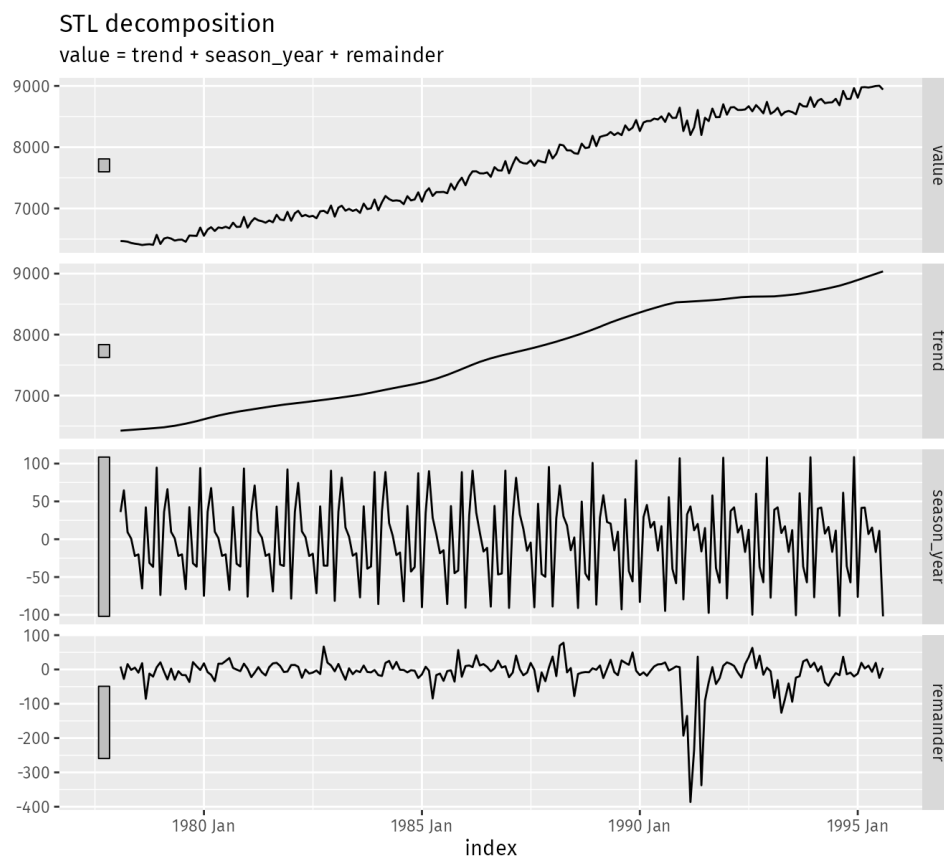   (b) Is the recession of 1991/1992 visible in the estimated components?

Figure 1: Decomposition of the number of persons in the civilian labour force in Australia each month from February 1978 to August 1995.
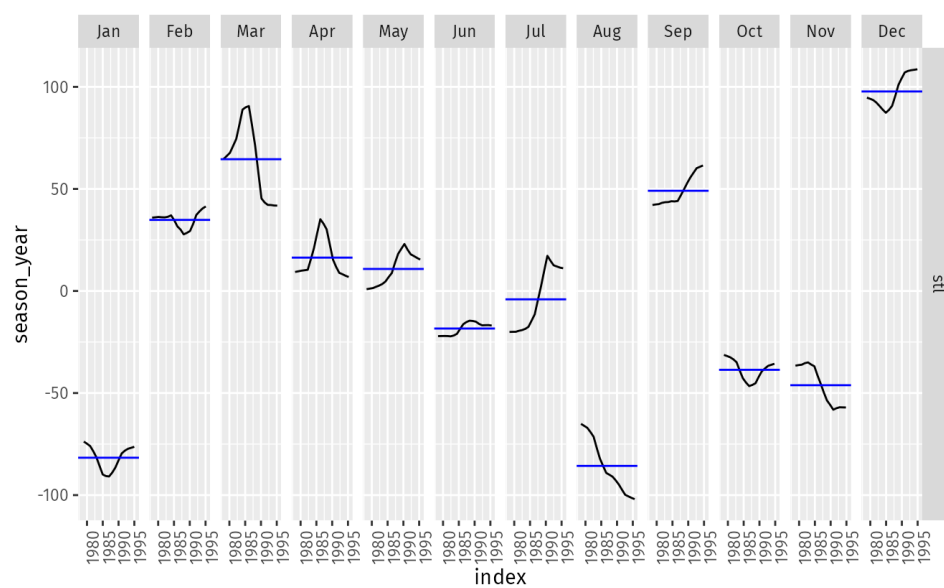

Figure 2: Seasonal component from the decomposition shown in Figure 1.