You are given a set of n intervals $\mathcal{I} = \{I_1, \ldots, I_n\}$ and n colours. Your goal is to assign each interval a colour such that any two intervals that intersect must be assigned different colours. Describe an $O(n \log n)$ algorithm that assigns each interval a colour and uses the minimum number of colours.

Rubric.

- You must justify the correctness of the algorithm and argue its time complexity.
- This task will form part of the portfolio.
- Ensure that your argument is clear and keep reworking your solutions until your lab demonstrator is happy with your work.