Assignment2

1. The movie showtime

A cinema has provided a series of movie showtime schedules `intervals` to the audience, where each movie's showtime is marked by its start and end times, i.e., `intervals[i] = [starti, endi]`. Please determine if a person can watch all the movies in these intervals without missing any of them.

Example 1:

```
Input: intervals = [[0, 30], [5, 10], [15, 20]]
Output: false
```

Example 2:

```
Input: intervals = [[7, 10], [2, 4]]
Output: true
```

Tips:

- `0 <= intervals.length <= 10^4`
- `intervals[i].length == 2`
- `0 <= starti < endi <= 10^6`

2. Movie theater requirements:

Given an array `intervals` representing the showtime schedule of movies, where each movie's showtime is marked by its start and end times, i.e., `intervals[i] = [starti, endi]`, please return **the minimum number of movie theaters** required by the cinema to ensure that all movies can be screened as planned.

Example 1:

```
Input: intervals = [[0, 30], [5, 10], [15, 20]]
Output: 2
```

Example 2:

```
Input: intervals = [[7, 10], [2, 4]]
Output: 1
```

Tips:

- `1 <= intervals.length <= 10^4`
- `0 <= starti < endi <= 10^6`

3. Film program consolidation

A cinema has provided the audience with a series of movie showtime schedules `intervals`, where each movie's showtime is marked by its start and end times, i.e., `intervals[i] = [starti, endi]`. Due to some movies having overlapping showtimes, the cinema decides to merge these time slots and provide a new consolidated showtime schedule. Please merge all overlapping showtimes and return **a non-overlapping array of showtime intervals** that exactly cover all the given time slots.

Example 1:

```
Input: intervals = [[1, 3], [2, 6], [8, 10], [15, 18]]
Output: [[1, 6], [8, 10], [15, 18]]
Explanation: The showtimes [1, 3] and [2, 6] overlap, so they are merged into [1,
6].
```

Example 2:

```
Input: intervals = [[1, 4], [4, 5]]
Output: [[1, 5]]
Explanation: The showtimes [1, 4] and [4, 5] can be considered overlapping time
slots.
```

Tips:

- `1 <= intervals.length <= 10^4`
- `intervals[i].length == 2`
- `0 <= starti <= endi <= 10^4`