Quantum Computing and Graph Theory
Task 1

2025-02-21

Introduction

Complete the task below and compile a corresponding note containing

1. A detailed description of your (current) understanding of the problem.
2. A complete set of calculations with each step explained in as much detail as possible.
3. A collection of results with discussion.
4. A collection of any questions regarding this task at the end of the document.

After you have compiled your note, add a short summary (less than one page) stating what you have done, what results you obtained and a short comment regarding your confidence in the results.

Sub Task A

Compile a note on the important ideas contained in the video

- Introduction to Graph Theory: A Computer Science Perspective

Read the following webpages and make some notes on the ideas presented

- Graph Theory
- Ramsey Theory

Make a summary of the common ideas presented on these webpages and in the video. Include any clever or interesting examples in you summary.

Sub Task B

A two coloured Ramsey number $R(k,l)$ determines the minimum number of vertices n such that every graph with n vertices contains either a k-clique or an l-independent set.

1. What is the relationship between k, l and n?
2. How can we check that this relationship is correct? Give some examples to check.