**Week 6 Submit Task**

**Part A**

For these questions, take the time to practise your exam writing skills.

1. Define backtracking and explain its basic operation. (3 marks)
2. Explain the concept of recursion and its role in backtracking algorithms. (2 marks)
3. What is the purpose of pruning in backtracking algorithms? Provide an example of how pruning can improve the efficiency of a backtracking solution. (2 marks)
4. What are some common applications of backtracking algorithms in computer science or real-world scenarios? (3 marks)
5. Describe the graph colouring problem and explain how backtracking can be used to solve it. (3 marks)
6. Discuss the time complexity of the graph colouring problem when solved using backtracking. (2 marks)

**Part B – Optional Extension**

The Subset Sum problem involves, for a given set of integers and target sum, determining whether there is a subset of the given set whose elements sum up to the target value. This can be solved with backtracking.

Write Python code based on the following pseudocode structure. It should return the current subset if the target is found, or null if the target cannot be found. Otherwise add the next element from the set to the current subset and call recursively. If the subset is not found, the element should be excluded and the call repeated with the next element.

function subsetSum(set, targetSum):

return backtrack(set, targetSum, [], 0)

function backtrack(set, targetSum, currentSubset, currentIndex):