Algorithms II

The pseudocode below is a first attempt at a recursive algorithm to enumerate all the paths from source to sink, in the context of a maximum flow problem.

```python
def allPaths(graph, source, sink):
    # Each path is a list of vertices from source to sink, e.g. [2, 4, 7]
    # The result is a list of paths, e.g. [[2, 4, 7], [2, 7]], initially empty
    result = []

    if source == sink:
        result.append([source])
    else:
        for v in graph.verticesAdjacentTo(source):
            for path in allPaths(graph, v, sink):
                # Reject paths that revisit the source, else infinite loops
                if source not in path:
                    result.append([source] + path)
    return result
```

(a) Point out all the bugs you can find, highlighting the failures with test cases. [5 marks]

(b) Correct all the bugs you found, clearly explaining your fixes. Rewrite a corrected and clearly commented version of the pseudocode. [10 marks]

(c) Provide a correctness proof for your new version. [5 marks]