

Swinburne University Of Technology*Faculty of Information and Communication Technologies***ASSIGNMENT COVER SHEET**

Subject Code: HIT3303/8303
Subject Title: Data Structures & Patterns
Assignment number and title: 6X – Tree Traversal
Due date: **May 26, 2009, 02:30 p.m., on paper**
Lecturer: Dr. Markus Lumpe

Your name: _____

Marker's comments:

| Problem | Marks | Obtained |
|---------|-------|----------|
| 1 | 50 | |
| Total | 50 | |

Extension certification:

This assignment has been given an extension and is now due on _____

Signature of Convener: _____

Problem Set 6X: Tree Traversal

Problem 1:

Add the required traversal functions to the template class `NTree`. That is, start with the following specification, add proper copy control, and implement the traversal methods `DepthFirstTraversal` and `BreadthFirstTraversal`:

```
template<class T, int N>
class NTree
{
private:
    const T* fKey;
    NTree<T,N>* fNodes[N];

public:
    NTree();
    NTree( const T& aKey );
    NTree( const NTree<T,N>& aOtherNTree );
    NTree<T,N>& operator=( const NTree<T,N>& aOtherNTree );
    ~NTree();

    bool IsEmpty();
    const T& GetKey();

    void AttachNTree( int aIndex, NTree<T,N>& aNTree );
    NTree<T,N>& DetachNTree( int aIndex );

    void DepthFirstTraversal( const TreeVisitor<T>& aVisitor ) const;
    void BreadthFirstTraversal( const TreeVisitor<T>& aVisitor ) const;
};
```

Use the supplied files `"NTree.h"` and `"TreeVisitor.h"` and add the required implementations. Use the solution of problem 5 and verify your results with the supplied main test code.

Please note that in contrast to the binary tree traversal, we cannot support In-Order in N-ary trees (i.e., trees with $N > 2$). Therefore, the solution will only require a proper handling of pre-order and post-order tree traversal. However, the general approach for tree traversal in N-ary trees follows the scheme shown in class for binary trees.

Submission deadline: Tuesday, May 26, 2009, 2:30 p.m.

Submission procedure: on paper in class.