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Title of work: Data Structure Assignment 3

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Module name: Data Structure

Module Code: CMP2006

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GCD

Part 1 (Greatest Common Divisor):

$$GCD(x,\ y) = \begin{cases} x & y=0 \\ GCD(y,\ x \bmod y) & x \geq y, x \neq 0 \end{cases}$$

```
int gcd(int x, int y) {
	// TODO Auto-generated method stub
	//System.out.println("Iteration GCD Not Implemented");
	int temp;
	while(y!=0) {
		if(x>=y && x!= 0) {
		temp = x;
		x=y;
		y=temp % y;
		}
	}
	return x;
}
```

Big O notation

1 + n (1 + 1 + 1 + 1) + 1
1 + n (4) + 1
2 + 4n
n

n

O(n) = Linear

HANOI

Part 2 (Tower of Hanoi Problem):

$$hanoi(n) = \begin{cases} 1 & n=1 \\ 2xhanoi(n-1)+1 & n>1 \end{cases}$$

```
int hanoi(int n) {
	while(n!=1) {
		if(n>1) {
			return 2*hanoi(n-1)+1;
		}
	}
	return 1;
}
```

Big O notation

n (1 + 1) + 1

n (2) + 1

2n

n

O(n) = Linear