CSC152 Algorithm and Complexity

Quiz 2

Student Name:_____ Student Number:_____ Mark:_____

1. Give a formula for $\sum_{i=a}^{n} i$ where a is an integer between 1 and n.

if a $=1$, $\sum_{i=a}^{n} i = \sum_{i=1}^{n} i = \frac{n(n+1)}{2}$

if a >1, $\sum_{i=a}^{n} i = \sum_{i=1}^{n} i - \sum_{i=1}^{a-1} i = \frac{n(n+1)}{2} - \frac{a(a-1)}{2}$

Therefore, $\sum_{i=a}^{n} i = \frac{n(n+1)}{2} - \frac{a(a-1)}{2}$

2. Write a function (pseudocode is fine) to find $\lceil \lg(n+1) \rceil$, where n is a nonnegative integer, by repeatedly dividing n by 2. Hand calculate a table of the first ten values to check your function.

```
Function x=findLgCeiling(n)
x=0;
twoToTheX=1;
while (twoToTheX<n+1)
x=x+1;
twoToTheX=twoToTheX*2;

return x
```

n	lg(n+1)	x
0	0	0
1	1	1
2	1.584963	2
3	2	2
4	2.321928	3
5	2.584963	3
6	2.807355	3
7	3	3
8	3.169925	4
9	3.321928	4
10	3.459432	4

Note: $\lceil x \rceil$ is the ceiling of x, the smallest integer greater than or equal to x.