**CMSC 341 Homework 2 – Version A**

***Proof by Induction and Code Complexity***

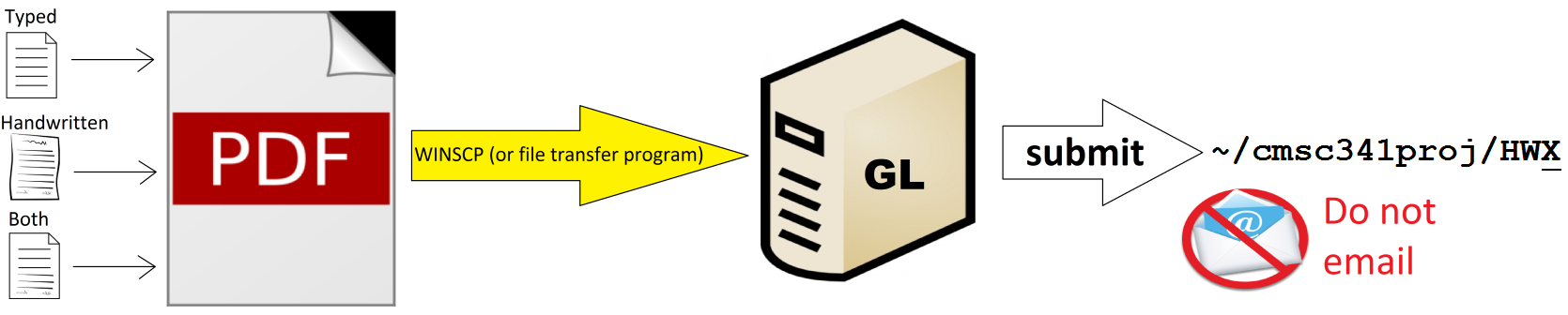
**Name:**

**Section:**

**HW #:**

**Version:**

**Username:**

To see how this is done, watch the video [here](https://www.youtube.com/watch?v=_BaZ_X44kMI).

It is HIGHLY suggested that this is completed by ***typing*** your answer. If you submit this on paper, PLEASE write clearly. The grader WILL not guess what your intention or answer was. This assignment ***MUST*** be PRINTED and given to YOUR instructor BEFORE the due date. If you do not have class on the day due, you must take that into consideration.

***Proof by Induction***

**You must show ALL work to be given credit. (Think of it as proving to us you know how to do this!!)**

#1 2n > n2 for every positive integer n when n >= 5

#2 4n – 1 = 3k (k is legit and not “n”. This results of this equation will always be divisible by 3)

#3 + … + =

***Code Complexity***

Identify the unit count for each portion of the code given below to identify the overall Big Oh speed. Use the example below as a template for your answer, or some classes may use summations. **The table answers below are NOT correct!! But the overall setup is. Partial credit will be given if some portion of the work shown is correct.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Cost** | **# of Times** | **Total** |
| **int** sum1(**int** N)  {  **int** s = 0;  **for**(**int** i = 1; i <= N; i++)  {  s = s + i;  }    **return** s;  } | **-** | **-** |  |
| **1** | **1** | **1** |
| **-** | **-** |  |
| **1** | **1** | **1** |
| **1 (int i) + 1 (<=) + 1 (++)** | **1 + 2(n + 1)** | **2n + 3** |
| **-** | **-** |  |
| **2** | **n** | **2n** |
| **-** | **-** |  |
| **-** | **-** |  |
| **1** | **1** | **1** |
| **-** | **-** |  |
| **Final** | | | **4n + 6** |
|  | | | **O(n)** |

#4

sum = 0;

for ( i = 0; i < n; i++ )

for (j = 0; j < n; j++ )

++sum;

#5

sum = 0;

for( i = 0; i < n; i += 2 )

for( j = 0; j < n; j++ )

++sum;

#6

sum = 0;

for( i = 1; i < n; i \*= 2 )

for( j = 0; j < n; j++ )

++sum;

#7

sum = 0;

for( i = 0; i < n; i++ )

for( j = 0; j < i \* i; j++ )

for ( k = 0; k < j; k++ )

++sum;

***Please write your username, instructor and version on your answer sheet!!!***