CS526
Homework Assignment 4

Due: 10/11

Problem 1 (10 points)

Consider the following five code segments, which are written in a pseudocode format:

(1).

```
for i = 1 to n {
   a = a + 1;
   b = a + i;
}
```

(2).

```
for i = 1 to n {
   for j = 1 to 2n
      a = a / 2;
}
```

(3).

```
i = n
while (i >= 1) {
   a = a + 1;
   i = i / 2;
}
```

(4).

```
i = n
while (i >= 1) {
   for j = 1 to n {
      a = a + 1;
   }
   i = i / 2;
}
```

(5).

```
for i = 1 to n {
   for j = 1 to n {
      if j is even {
         a = a + 1;
      }
   }
}
```

Express the running time of each code segment as a function of *n* using the *big-Oh* notation. You need to justify your answers. If you show only answers without justification, no points will be given even though your answers are correct.

Problem 2 (10 points).

(1). Prove the following statement using the *mathematical induction* method that we discussed in the class: $n^2 > 3n$ for $n \geq 4$

(2). Prove the following equation using the *proof by contradiction* method that we discussed in the class: If a number added to itself gives itself, then the number is 0.

Grading

Problem 1 (10 points):

- Up to 2 points will be deducted for each wrong answer.

Problem 2 (10 points):

- Up to 4 points will be deducted for each wrong answer.

Deliverable

Include all your answers in a single word file or pdf file and name it *LastName_FirstName_hw4.docx* or *LastName_FirstName_hw4.pdf*.