CPSC 6109 Algorithms Analysis and Design

Assignment 01: Analysis of algorithms and Big-oh notation.

Possible points: 60

1. Big-Oh: Determine the Big-Oh of the growth functions below: **20 points**

   I. $5N + 4$
   II. $9N^2 + 8N - 7$
   III. $2 \log N$
   IV. $3N \log 4N$
   V. $6*2^{7N}$
   VI. $3N! + 1/2*N^3$
   VII. 42
   VIII. $2*N^3 + 999 * N^2 + 123456789*N$

   Stuck? Plug in some numbers to get a better idea.

2. What does the following algorithm do? Analyze (provide detail explanation) its worst-case running time, and express it using "Big-Oh" notation. **20 points**

Algorithm Foo (a, n):
  Input: two integers, a and n
  Output: ?
$k \leftarrow 0$
$b \leftarrow 1$
while $k < n^2$ **do**
  $k \leftarrow k + 1$
  $b \leftarrow b * a$
return b

3. What does the following algorithm do? Analyze (provide detail explanation) its worst-case running time, and express it using "Big-Oh" notation. **20 points**

Algorithm Bar (a, n):

Input: two integers, a and n
Output: ?

$k \leftarrow n^2$
$b \leftarrow 1$
$c \leftarrow a$
while k > 0 **do**
  $k \leftarrow k/2$
  $c \leftarrow c*c$
  $b \leftarrow b*c$
return b

Submission: Please submit a single PDF containing all the answers.