Homework #1 for Computing for Bioinformatics I

Due: Friday, Sept. 7, 2007

Chapter 2 problems: 2.1, 2.3, and the following problems:

(Hint: Use the results from problems 2.10 and 2.11 in analyzing the below algorithms, but you don’t need to prove 2.10 and 2.11)

A) Analyze the below algorithm to determine the obvious big-oh (upper-bound), then trace the algorithm to determine its theta notation, $\theta()$.

i := n
while i > 0 do
    j := 1
    while j < i do
        < something of $\theta(1)$>
        j := j * 2
    end while
    i := i / 2
end while

B) Analyze the below algorithm to determine the obvious big-oh (upper-bound), then trace the algorithm to determine its theta notation, $\theta()$.

for i := 1 to n do
    for j := 1 to i do
        for k := j to (i + j) do
            some code that takes $\theta(1)$ time
        end for k
    end for j
end for i

C) Analyze the below algorithm to determine the obvious big-oh (upper-bound), then trace the algorithm to determine its theta notation, $\theta()$.

i := n
while (i >= 1) do
    for j := 1 to i do
        for k := 1 to n do
            something that takes $O(1)$
        end for k
    end for j
    i := i / 2
end while