CS 170 Homework 3

Due **2025/3/1, at 10:00 pm (grace period until 11:59pm)**

1   Study Group

List the names and SIDs of the members in your study group. If you have no collaborators, you must explicitly write "none".

Solution: I worked on this homework with the following collaborators:

- none,which is only me,Sillycheese

2   Depth First Search

(a) (4 points) In each of the following cases, PreVisit and PostVisit have been defined for you. After execution, the array A[v] will hold a value for each vertex v. Describe in words what A[v] represents.

　　i. Describe in words what A[v] represents.

　　　　Solution: this is the lognest path form root of subtrees to leaf.

　　ii. Describe in words what A[v] represents.

　　　　Solution: this is maximum degree.

(b) (6 points) In each of the following cases, write down pseudocode for PreVisit and PostVisit routines to perform the computation needed.

　　i. For each vertex v, compute the maximum weight of an edge along the path from root r to vertex v and store it in array A[v].

　　　　Solution:

　　　　procedure PreVisit(u, v)
　　　　A[v] ← max(A[u], w(u, v))

　　　　procedure PostVisit(u, v)
　　　　return

　　ii. For each vertex v, compute the maximum weight of any edge in the subtree rooted at vertex v and store it in array A[v].

　　　　Solution:

　　　　procedure PreVisit(u, v)
　　　　return

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procedure PostVisit(u, v)
A[u] ← max(A[u],A[v],w(u, v))

iii. For each vertex v, compute the maximum pre-order number of any of its children and store it in array A[v]. If v has no children, then A[v] should be 0.

Solution:

procedure PreVisit(u, v)
t← t+1
A[u] ← t

procedure PostVisit(u, v)
t← t+1