

Name: _____

Student ID number: _____

Quiz 3 – 26 points possible

1. (2pts) Briefly describe what the Big-Oh running time of an algorithm tells you.

2. (4pts) List 2 factors that affect the running time of an algorithm.

3. (5pts) Give the Big-Oh running time for the following:

a) Inserting at the head of a linked list.

b) Inserting into a sorted array

c) Removing an item from a sorted array (find the item and remove it)

d) Enqueuing into a circular array implementation of a queue.

e) Performing binary search on a sorted array

4. (4 pts) Perform selection sort on the following numbers: 5, 1, 8, 23, 2, 9, 8, 100, 55, 78. Show the array at each pass. Give the Big-Oh notation running time of selection sort.

5. (8 pts) Give the Big-Oh running times for the following pieces of code. (N is a constant defined elsewhere in the code) Make sure to read the code **carefully**.

a) Run Time =

```
int A[N][N] = .... ;
int B[N] = .... ;
for ( int x = 0; x < N; x++ ) {
    if ( N < 5 ) {
        cout << B[x] << " " << endl;
    }
    else
        for ( int y = 0; y < N; y ++ ) {
            cout << A[x][y] << " " << endl;
        }
}
```

b) Run Time =

```
int A[N][N][N] = .... ;
for ( int x = 0; x < N; x++ )
    for ( int y = 0; y < N; y ++ )
        for ( int z = 0; z < N; z ++ )
            cout << A[x][y][z] << " " << endl;
```

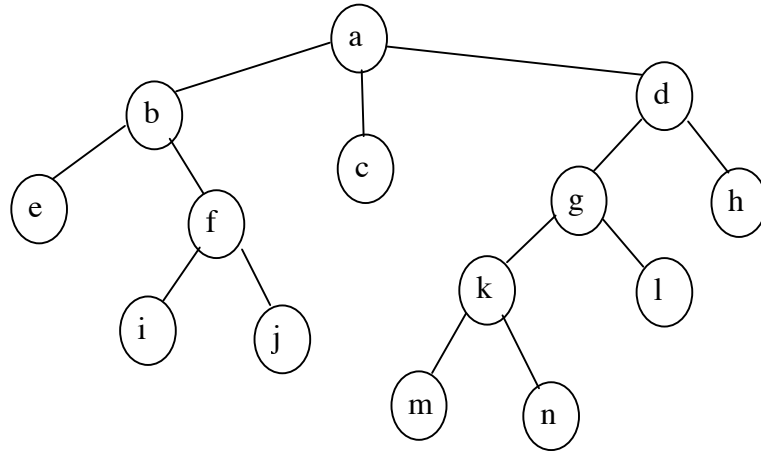
c) Run Time =

```
for ( x = 0; x < N * N; x ++ )
    cout << x << endl;
```

d) Run Time =

```
int A[N][N] = .... ;
int B[N] = .... ;
for ( int x = 0; x < N; x++ ) {
    if ( x == N ) {
        for ( int y = 0; y < N; y ++ ) {
            cout << A[x][y] << " " << endl;
        }
    }
    else
        cout << B[x] << " " << endl;
}
```

6. (3 pts) Given the following tree:



a) List all of the leaf nodes.

b) Which node is the root?

c) What are the siblings of node c?

+1 point Extra Credit

Why does a tree with N nodes have exactly $N-1$ edges?

** The “happy Friday the 13th” fun question....

Who was the killer in the movie Friday the 13th?