EECE.2160: ECE Application Programming

Summer 2017

Lecture 12: Key Questions
June 15, 2017

1. Explain the use of general data structures and pointer-based data structures in particular.

2. Describe the general design of a linked list.

3. Describe the structure used for each node in the list.

4. Explain the operation of the following function, which adds a node to the beginning of the list and returns a pointer to that node.

```
LLnode *addNode(LLnode *list, int v) {
  LLnode *newNode;
  // Allocate space for new node; exit if error
  newNode = (LLnode *)malloc(sizeof(LLnode));
  if (newNode == NULL) {
    fprintf(stderr,
            "Error: could not allocate new node\n");
    exit(0);
  }
  newNode->value = v;    // Copy value to new node
  newNode->next = list;  // next points to old list
  return newNode;
}
```

5. Write each of the following functions:
a. Finding item in list (Function should return pointer to node if found and return NULL
    otherwise)

```
LLnode *findNode(LLnode *list, int v) {




}
```

b. Write the following function used to remove a node from list:
   - Must deallocate space for deleted node
   - Function should return pointer to start of list after it has been modified
     - No modifications should be made if value v is not in list
     - Hint: you can use the `findNode()` function in this function, but you may not want to!
   - Note: removing first element in list is special case

```
LLnode *delNode(LLnode *list, int v) {
```

```
}
```

6. Describe how to maintain a sorted linked list.

7. Write each of the following functions:
a. Adding an item to a sorted linked list
   - Use **addNode()** as a starting point
   - Instead of adding node at beginning, find appropriate place in list and then add
   - Function should return pointer to start of list after it has been modified

```
LLnode *addSortedNode(LLnode *list, int v) {




}
```

b. Finding an item in a sorted linked list
    - Use **findNode()** as starting point—should perform same operation, but more efficiently
    - Function should return pointer to node if found
    - Return NULL otherwise

```
LLnode *findSortedNode(LLnode *list, int v) {




}
```