Computer Science I – Spring 2012
Lab: Linked Lists, Part I (Solutions)

For each question use the following struct definition:

```
struct ll {
    int data;
    struct ll* next;
};
```

1) Write a function that takes a pointer to the front of a linked list and changes the list by adding an integer n (passed in as a parameter) to each node of the list.

```
void addN(struct ll* list, int n) {
  while (list != NULL) {
    list->data += n;
    list = list->next;
  }
}
```

2) Write a function that deletes the first node in a linked list and returns a pointer to the new front of the list. If there are no items in the original list, NULL should be returned.

```
struct ll* deleteFirst(struct ll* list) {

  if (list == NULL) return NULL;
  struct ll* newFront = list->next;
  free(list);
  return newFront;
}
```

3) Write a function that makes a copy of an input list and returns a pointer to it. Note: This function should call malloc once for each node in the original list.

```
struct ll* copy(struct ll* list) {

  struct ll* newList = NULL;
  struct ll* curEnd = NULL;
  while (list != NULL) {
    struct ll* newNode = (struct ll*)malloc(sizeof(struct ll));
    newNode->data = list->data;
    newNode->next = NULL;
    if (newList == NULL) {
      newList = newNode;
      curEnd = newNode;
    }
    else {
      curEnd->next = newNode;
      curEnd = curEnd->next;
    }
    list = list->next;
  }
  return newList;
}
```

4) p contains the elements 66, 9, 14, 52, 87, 14 and 17, in that order. Consider running the following line of code:

```
p = question4(p);
```

where question4 is the function defined below. Show the contents of p ***after*** the function call.

```
struct ll* question4(struct ll *list) {

       struct ll* a = list;
       struct ll* b = list;
       struct ll* c;

       if (a == NULL) return NULL;

       while ( a->next != NULL)
           a = a ->next;
       a->next = b;
       c = b->next;
       b->next = NULL;
       return c;
}
```

Contents of p afterwards: 9, 14, 52, 87, 14, 17, and 66. (Moves first element to end.)