

## CMPE 312 - Operating Systems

### Exercise 5A (Monday 9-11)

**Q1-)** Please firstly try to make a guess for each line's results, then check your guesses with the result of the program.

```
#include <stdio.h>
int main()
{
    int* ptr, x;

    x = 30;
    printf("%u\n", &x);
    printf("%d\n\n", x);

    ptr = &x;
    printf("%u\n", ptr);
    printf("%d\n\n", *ptr);

    x = 45;
    printf("%u\n", ptr);
    printf("%d\n\n", *ptr);

    *ptr = 4;
    printf("%u\n", &x);
    printf("%d\n\n", x);
    return 0;
}
```

**Q2-)** In this question, there is a struct called as node, and using this struct there is a function called as BuildElements. You are expected to implement a function that returns the length of this list of nodes. After that, you also need to test this function's result.

```
#include <stdio.h>
#include <stdlib.h>

struct node {
    int data;
    struct node* next;
};

/*
    Build the list {1, 2, 3} in the heap and store
    its head pointer in a local stack variable.
    Returns the head pointer to the caller.
*/

struct node* BuildElements() {
    struct node* head = NULL;
    struct node* second = NULL;
    struct node* third = NULL;
    head = malloc(sizeof(struct node)); // allocate 3 nodes in the heap
    second = malloc(sizeof(struct node));
    third = malloc(sizeof(struct node));
    head->data = 1; // setup first node
    head->next = second; // note: pointer assignment rule
    second->data = 2; // setup second node
    second->next = third;
    third->data = 3; // setup third link
    third->next = NULL;
    // At this point, the linked list referenced by "head"
    // matches the list in the drawing.
    return head;
}
```

```
/*
    Given a linked list head pointer, compute
    and return the number of nodes in the list.
*/
int Length(struct node* head) {
    struct node* current = head;
    int count = 0;
    /*YOU NEED TO FILL IN HERE. */
    return count;
}
int main(void) {
    return 0;
}
```