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1. Linux Scripting

(a) Your friend try to use the command ls *, it instead removes the file in your current working directory. Your friend is asking you to fix it such that he/she can just type in ls and it will list the current directory. (2.5 points)

ANS : export PATH=$PATH:~/bin/ls

(b) What does the following wildcard in shell match to: a*b. (2.5 points)

ANS : all object that begin with lowercase a and end with lowercase b

(c) What does the following regular expression match to: a*b. (2.5 points)

ANS : match a string that has a by zero or more and followed by b

(d) Write a regular expression that will matches any Integer. (2.5 points)

ANS : [-?\d*]

(e) Let's say I created 5 test files called textN.in, where N is the test file number from 1 to 5, and these test files are for the determinant question from assignment 2. Write a bash script to run them all so that you can it prints all the results on the screen when the bash file is run. (10 points)

3. Linked List Redux

(a) Is there anything wrong with insertion? If so, what is wrong and please explain how to fix it. (5 points)

ANS : there are no special if case for when front is null (i.e. no node) so we need to have if case and assign new node to front if front is NULL. Another mistake is that those temp2 code should be outside of the loop because we want to insert to the end of node.

(b) Is there anything wrong with deletion? If so, please explain how to fix it. (5 points)

ANS : we need to put those if block in for loop outside a loop because we won't reach that temp->my_data == data with some stop condition that said stop before we get into node temp.data = data. and also we need to assign previous to temp node inside loop too otherwise previous is just NULL

(c) Please write the code so that our print function can print a sorted version of our linked list to the output. (10 points)

```c
void print(){
    Node *temp=front;
    int min = temp->my_data;
    int size = 0;
    // to find size of linked list first
    for(temp; temp!=NULL; temp=temp->next){
        size++;
        if(temp->my_data < min) {min = temp->my_data;}
    }
    // make array and put all number in array;
    int *arr = malloc(sizeof(int) * size);
    temp=front;
    int i=0;
    for(temp; temp!=NULL; temp=temp->next){
        arr[i] = temp->my_data;
        i++;
    }
    // sorting the array (bubble sort)
    for(int i=0; i<size-1; i++){
        for(int j=0; j<size-i-1; j++){
            if(arr[j] > arr[j+1]){
                int temp = arr[j+1];
                arr[j+1] = arr[j];
                arr[j] = temp;
            }
        }
    }
    // print a sorting linked list without changed origin
    printf("{");
    for(int i=0; i<size-1; i++){
        printf("%d, ", arr[i]);
    }
    printf("%d", arr[size-1]);
    printf("}\n");
    free(arr);
}
```

(d) Please write a function called void insertAt(int data, int index), which insert the data at the location pointed to by index. Please note that our list starts with index 0. (15 points)

```
void insertAt(int data, int index){
    Node *temp;
    Node *temp2;
    Node *previous;
    if(index == 0)
    {
        temp = malloc(sizeof(Node));
        temp->my_data = data;
        temp->next = front;
        front = temp;
        return;
    }
    for(temp=front; index > 0 && temp->next!=NULL; temp=temp->next){
        index--;
        previous = temp;
    }
    temp2 = malloc(sizeof(Node));
    temp2->my_data = data;
    temp2->next = temp;
    previous->next = temp2;
}
```

4. Where Is My Data

(a) What is the size of the array a in bytes? (5 point)

type of A = 3 * 2 = 6
type of B = 6 * 2 = 12

ANS ： 120000 bytes

(b) What is the value of each byte of a+2 in hex? (2.5 point)

ANS : 00 01 02 03 04 05 06

(c) What is the value of *(a+2) in decimal number? (2.5 point)

ANS : 21

(d) What is the value of each byte of b+2 in hex? (2.5 point)

ANS : 00 01 02 03 04 05 06 07 00 01 02 03

(e) What is the value of *(b+2) in decimal? (2.5 point)

ANS : 27

(f) What is the value of c+2 in hex? (2.5 point)

ANS : 02

(g) What is the value of *(c+2) in decimal? (2.5 point)

ANS : 2