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**SY Comp Div 1**

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**Question:**

Define an ADT ASCII having a Doubly linked list of nodes of digits.

Write the following functions with suitable prototypes for ADT ASCII

init\_ASCII() // to initialize the list

ASCII\_of( )

/\* This function should take a character as an argument and form a linked list of digits in its ASCII value. For example if 'A' is passed as a parameter, it should generate a list {6,5} \*/

traverse() // to display all the elements of the list.

Destroy() // to destroy the list.

You are free to include more functions.

The skeleton of function main() is given below, use the same by replacing commented statements by actual function calls:

```
int main() {  
  
    ASCII L1;  
  
    //call init_ASCII()  
  
    // call ASCII_of( )  
  
    // call traverse()  
  
    //call Destroy()  
  
    //call traverse()  
  
    return 0;  
  
}
```

## Code:

**1) ascii.h:** This is a header file for the program and contains structure declarations and function prototypes required for the program.

```
typedef struct node {
    int d;
    struct node *next, *prev;
} node;

typedef struct {
    node *head, *tail;
} list;

void init_ascii(list *l);
void ascii_of(list *l, char c);
void traverse(list l);
void destroy(list *l);
```

**2) logic.c:** This file contains all the function definitions of the functions declared in header file and some other helper functions.

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

// Init function to initialize the list
void insert_beg(list *l, int d) {
    node *nn = (node *) malloc(sizeof(node));
    nn->d = d;
    nn->prev = NULL;
    nn->next = l->head;
    if(l->head) {
        l->head->prev = nn;
    }
    if(l->tail == NULL) {
        l->tail = nn;
    }
    l->head = nn;
    return;
}
```

```

// Function to convert the ascii value of a character to a list
void ascii_of(list *l, char c) {
    int temp = (int)c;
    while(temp) {
        int digit = temp%10;
        insert_beg(l, digit);
        temp /= 10;
    }
    return;
}

```

```

// Function to traverse the list
void traverse(list l) {
    node *p = l.head;
    printf("[\t");
    while(p) {
        printf("%d,\t", p->d);
        p = p -> next;
    }
    printf("\b]\n");
    return;
}

```

```

// Function to destroy the list
void destroy(list *l) {
    node *p = l -> head;
    while(p) {
        node *next = p -> next;
        free(p);
        p = next;
    }
    l -> head = NULL;
    l -> tail = NULL;
    return;
}

```

### 3) **Main.c** : Contains main execution of the program

```
#include <stdio.h>
#include "ascii.h"

int main() {
    list l;
    char c;
    printf("Enter a character: ");
    scanf("%c", &c);
    init_ascii(&l);
    ascii_of(&l, c);
    traverse(l);
    destroy(&l);
    traverse(l);
    return 0;
}
```

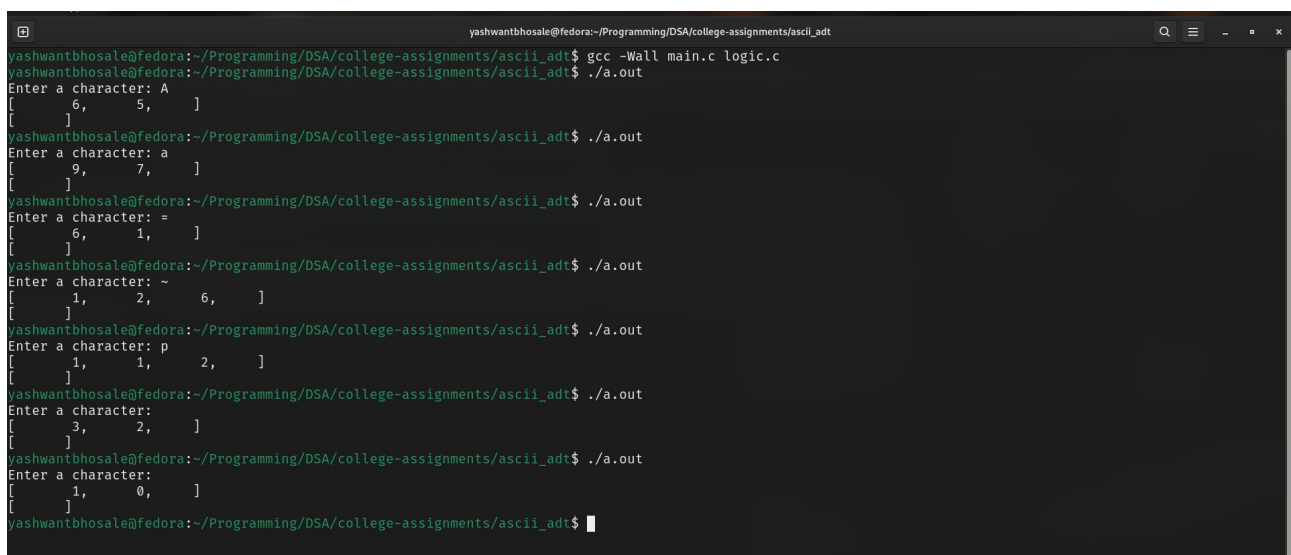
#### OUTPUT:

##### Note:

in last two examples:

32 is the ascii equivalent of white space character i.e ' '

10 is ascii equivalent of new line character '\n'



```
yashwantbhosale@fedora:~/Programming/DSA/college-assignments/ascii_adt
yashwantbhosale@fedora:~/Programming/DSA/college-assignments/ascii_adt$ gcc -Wall main.c logic.c
yashwantbhosale@fedora:~/Programming/DSA/college-assignments/ascii_adt$ ./a.out
Enter a character: A
[
  6,      5,      ]
]
yashwantbhosale@fedora:~/Programming/DSA/college-assignments/ascii_adt$ ./a.out
Enter a character: a
[
  9,      7,      ]
]
yashwantbhosale@fedora:~/Programming/DSA/college-assignments/ascii_adt$ ./a.out
Enter a character: =
[
  6,      1,      ]
]
yashwantbhosale@fedora:~/Programming/DSA/college-assignments/ascii_adt$ ./a.out
Enter a character: ~
[
  1,      2,      6,      ]
]
yashwantbhosale@fedora:~/Programming/DSA/college-assignments/ascii_adt$ ./a.out
Enter a character: p
[
  1,      1,      2,      ]
]
yashwantbhosale@fedora:~/Programming/DSA/college-assignments/ascii_adt$ ./a.out
Enter a character:
[
  3,      2,      ]
]
yashwantbhosale@fedora:~/Programming/DSA/college-assignments/ascii_adt$ ./a.out
Enter a character:
[
  1,      0,      ]
]
yashwantbhosale@fedora:~/Programming/DSA/college-assignments/ascii_adt$
```