

Addition of 2 long integers

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

struct NODE {
    int info;
    struct NODE *link;
};

typedef struct NODE *node;

node getnode() {
    node x;
    x = (node) malloc (sizeof (struct NODE));
    if (x == NULL) {
        printf ("out of memory\n");
        exit(10);
    }
    return x;
}

node ins_front (node first, int item) {
    node temp;
    temp = getnode();
    temp->info = item;
    temp->link = first;
    return temp;
}
```

← 0 ← 0 ← 0
↑ h/t insert front

```
node extract (char *s, node head) {
```

```
    int i, n;
```

```
    for (i=0; i<strlen(s); i++) {
```

```
        n = s[i] - '0';
```

```
        head = ins_front(head, n);
```

```
    }
```

```
    return head;
```

```
}
```

```
node addlong (node head1, node head2, node head3) {
```

```
    int temp, sum, carry = 0;
```

```
    node cur1, cur2;
```

```
    cur1 = head1;
```

```
    cur2 = head2;
```

```
    while (cur1 != NULL || cur2 != NULL) {
```

```
        temp = cur1->info + cur2->info + carry;
```

```
        if (temp > 9) {
```

```
            sum = temp / 10;
```

```
            carry = temp / 10;
```

```
        }
```

```
    else {
```

```
        sum = temp;
```

```
        carry = 0;
```

```
    }
```



```
head3 = ins_front (head3, sum);
```

```
cur1 = cur1 → link;
```

```
cur2 = cur2 → link;  
}
```

```
while (cur1 != NULL) {
```

```
temp = cur1 → info + carry;
```

```
if (temp > 9) {
```

```
sum = temp % 10;
```

```
carry = temp / 10;  
}
```

```
else {
```

```
sum = temp;
```

```
carry = 0;
```

```
}
```

```
head3 = ins_front (head3, sum);
```

```
cur1 = cur1 → link;
```

```
}
```

```
while (cur2 != NULL) {
```

```
temp = cur2 → info + carry;
```

```
if (temp > 9) {
```

```
sum = temp % 10;
```

```
carry = temp / 10; }  
}
```

```
else {
```

```
    sum = temp;
```

```
    carry = 0;
```

```
}
```

```
head3 = ins_front(head3, sum);
```

```
cur2 = cur2 → link;
```

```
}
```

```
if (cur1 != NULL || cur2 == NULL) {
```

```
    if (carry == 1)
```

```
        head3 = ins_front(head3, carry); }
```

```
return head3; → points at beginning of result
```

```
}
```

sum = 7 8 4

↑ h3

```
void display (node first) {
```

```
    node cur;
```

```
    if (first == NULL) {
```

```
        printf ("Empty\n");
```

```
        return; }
```

```
    cur = first;
```

```
    while (cur != NULL) {
```

```
        printf ("%d\t", cur → info);
```

```
        cur = cur → link;
```

```
    }
```

```
}
```



```
void main() {  
    int ch;  
    node head1 = NULL;  
    node head2 = NULL;  
    node head3 = NULL;  
    char s1[30], s2[30];  
    printf("Enter 1st integer\n"); scanf("%s", s1);  
    head1 = extract(s1, head1);  
    display(head1);  
    printf("Enter 2nd integer\n"); scanf("%s", s2);  
    head2 = extract(s2, head2);  
    display(head2);  
    head3 = addlong(head1, head2, head3);  
    printf("The result is\n");  
    display(head3);  
    getch();  
}
```