Problem set 4.

11.2-6

Assume the while Probabilities combine is 1 (Actually, no need to assume here), there are m slots in the hash table. the Probability of each slot is $\frac{1}{m}$. the Probabilities that one element Picking then be Picked from the chaintic linklist is $\frac{1}{mL}$.

Let $a = \frac{n}{m}$, we would expect to take $1+a$ steps to reach an element on list

$E(x) = P(1+a) + (1-P)[1+E(x)] = P + Pa + (1-P) + E(x) - PE(x)$

$E(x) = \frac{Pa+1}{P} = a + \frac{1}{P}$

the Probability of steping at this step

$P = \frac{a}{L}$. $E(x) = a + 1/a = L(a/L + \frac{1}{a})$

$= O(L(1+\frac{1}{a}))$.

11.4-2

```
HASH-DELETE(T,k)
  i=0
  repeat
    j=h(k,i)
    if T[j]==k:
        T[j]=DELETE (NIL there if we want re-insert sth)
    else i=i+1
  until T[j]==NIL or i==m.
Modified-Insert(T,k)
  i=0
  repeat
    j=h(k,i)                    ↓ this is the only part we change
    if T[j]=NIL or T[j]==DELETE:
                    ↓ same as before
```

11.4-3

$a = 4^3$

unsuccessful is $\frac{1}{\frac{1}{4}} = 4$.

And successful is $\frac{1}{4^3} \ln \frac{1}{\frac{1}{4}} = \frac{4}{3} \ln 4$.

Same as above

unsuccessful is $\frac{1}{1-\delta^3} = \delta$ Probe

successful is $\frac{1}{\delta^3} \ln \frac{1}{\delta} = \frac{\delta}{3} \ln \delta$