CS2223
HW#2 Solutions

1. Measuring time in seconds
(a) $t=1=cn^2=c(1000)^2=c10^6$, so $c=10^{-6}$. When n=10,000, $t=cn^2=10^{-6}(10^4)^2=10^2=100$
(b) $t=1=cn\log n=c(10^3)\log(10^3)=c*3*10^3$, so $c=.00033$ When n=10,000,
$t=1=cn\log n=.00033*10^4 \log(10^4)=13.2$

2. (a) typedef int element;

```
typedef struct{
  int num_elements;
  element data[MAX_SIZE];
} set;

int member1 (element x, set A)
{  int i=0;
   while (i<A.num_elements)
      if (A.data[i++]==x) return 1;
   return 0;
}
```

(b) Since every element of A will be examined, and each examination takes a constant amount of time, the expected execution time of *Member?* is in $\Theta(n)$.

(d) int member (element x, set A)

```
{  int i=0;
   A.data[A.num_elements]=x;
   while (A.data[++i]!=x);
   return i<A.num_elements;
}
```