Comparison of two integers

Function

```
int compare(int x, int y)
{
 if(x<y) return -1;
 else if(x==y) return 0;
 else return 1;
}
```

Macro

```
#define COMPARE(x,y)
(((x)<((y))?-1:((x)==(y))?
 0:1)
```

Since the left and right indices keep moving, we will eventually find the element, or the indices will cross. After that, we have nothing to check.

- The full program is on PC.

Recursive implementation of binary search

```
int binsearch(int list[], int searchnum, int left, int right)
{
int middle;
if(left<=right){
 middle=(left+right)/2;
 switch(COMPARE(list[middle],searchnum)){
  case -1: return binsearch(list, searchnum, middle+1, right);
  case 0 : return middle
  case 1: return binsearch(list, searchnum, left, middle-1);
 }
}
return -1;
}
```

Claim: The binsearch function returns a position pos in the array list[] such that if the element searchnum is present in list, then list[pos]= searchnum. Else, if the element searchnum is not present, the function returns -1.

Proof: The proof is by method of strong induction on n, the no. of elements present in the list[].