6.00 Introduction to Computer Science and Programming
Fall 2008

Lecture 8 handout
6.00 Fall Term 2008

```
def exp1(a,b):
    ans = 1
    while (b>0):
        ans *= a
        b -= 1
    return ans

def exp2(a,b):
    if b == 1:
        return a
    else: return a*exp2(a,b-1)

def exp3(a,b):
    if b == 1:
        return a
    if (b%2)*2 == b:
        return exp3(a*a, b/2)
    else: return a*exp3(a,b-1)

def g(n):
   x = 0
   for i in range(n):
      for j in range(m):
         x += 1
   return x



def Towers(size,fromStack,toStack,spareStack):
    if size == 1:
        print 'Move disk from ',fromStack, 'to ',toStack
    else:
        Towers(size-1,fromStack,spareStack,toStack)
        Towers(1,fromStack,toStack,spareStack)
        Towers(size-1,spareStack,toStack,fromStack)



def search(s, e):
   answer = None
   i = 0
   numCompares = 0
   while i < len(s) and answer == None:
      numCompares += 1
```

```
      if e == s[i]:
         answer = True
      elif e < s[i]:
         answer = False
      i += 1
   print answer, numCompares


def bsearch(s, e, first, last):
    print first, last
    if (last - first) < 2: return s[first] == e or s[last] == e
    mid = first + (last - first)/2
    if s[mid] == e: return True
    if s[mid] > e: return bsearch(s, e, first, mid - 1)
    return bsearch(s, e, mid + 1, last)

def search1(s, e):
   print bsearch(s, e, 0, len(s) - 1)
   print 'Search complete'


def testSearch():
    s = range(0,1000000)
    raw_input('basic, -1')
    print search(s,-1)
    raw_input('binary, -1')
    print search1(s,-1)
    raw_input('basic, end')
    print search(s,1000000)
    raw_input('binary, end')
    print search1(s,1000000)
    s = range(0,10000000)
    raw_input('basic, partway')
    print search(s,1000000)
    raw_input('basic, larger end')
    print search(s,10000000)
    raw_input('binary, partway')
    print search1(s,1000000)
    raw_input('binary, larger end')
    print search1(s,10000000)
```