KEY

Quiz Two: cs5050, 10 points

Name: **Anumber:**

Consider the following simple solution of the Knapsack decision problem
size[i]> 0, 1<= i<= n, initial call **knapFit(n,S)**

```
Bool knapFit(int i, int s) // i is item index <= n, s is the current capacity of knapsack

    If(s==0) return true;
    If(i==0 && s>0) return false;
    If(s<0) return false;
    return(knapFit(i-1, s-size[i]) || knapFit(i-1, s) // use or don't use the item
```

Write the pseudo code for a dynamic programming solution that will determine if **knapFit(n, S)** is true using only space that is linear in S. The solution needed here does NOT need to report the objects used and so can be implemented as a single forward scan through the array.

```
bool knapFit(n,S)
    cache = bool array 2 x S //assume false
    cache[0,0] = true
    for i = 1 to n
      for j = 0 to S
        if (j - s[i] < 0)
            cache[i%2,j] = cache[(i-1)%2, j]
        else cache[i%2,j] =
                (cache[(i-1)%2,j] ||
        endif cache[(i-1)%2, j-s[i]])
      endfor
    endfor
    return cache[n,S]
```