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] ||
                cache[(i-1)%2, j - s[i]])
            end //if
        end //for
    end //for
    return cache[n, S]
```