

0-1 Knapsack : DP algorithm

The dynamic programming algorithm is now (more or less) straightforward.

```
function 0-1-Knapsack( $w, v, n, W$ )  
  int  $K[n, W + 1]$ ;  
  for( $i = 1; i \leq n; i++$ )  $K[i, 0] = 0$ ;  
  for( $j = 0; j \leq W; j++$ )  
    if ( $w[1] \leq j$ ) then  $K[1, j] = v[1]$ ;  
    else  $K[1, j] = 0$ ;  
  for ( $i = 2; i \leq n; i++$ )  
    for ( $j = 1; j \leq W; j++$ )  
      if ( $j \geq w[i] \ \&\& \ K[i - 1, j - w[i]] + v[i] > K[i - 1, j]$ )  
         $K[i, j] = K[i - 1, j - w[i]] + v[i]$ ;  
      else  
         $K[i, j] = K[i - 1, j]$ ;  
  return  $K[n, W]$ ;
```