

Handwritten Problem

To practice DP, we would like you to try to come up with the DP solution to the 0-1 Knapsack Problem, as described in lecture. Don't just copy it from the slides, try to build it up yourself!

You have a bag of weight capacity (**cap**) and a selection of N items, which each have a value and a weight. Values and weights are passed in as vectors, where the i^{th} item has value of **value[i]** and weight of **weight[i]**.

Choose which items to put in your bag so that you maximize the combined value of all the items in your bag without going over the weight capacity. Return this maximum value.

```
int knapsack(int cap, vector<int> value, vector<int> weight);
```