Pseudocode for Sampling Algorithm

```
procedure Distance(pdf, overallpdf)
    Deviation = 0
    normalize pdf, overallpdf
    deviation = distance between the normalized pdfs based on whatever metric you choose
    return deviation
```

Now, we define some global variables:
domain = domain of the pdfs, stored as a vector of vectors of endpoints for each dimension,
jumpSize = vector of values, each of which is the amount of distance between points considered in the respective dimension,
numJumps = vector of values, each of which is the number of points considered in the respective dimension,
indices = a list of all possible indices corresponding to all points considered in the multidimensional space. We calculate this as a global variable so we don't have to create a list every time we need to iterate over it.
overallPDF is the PDF over all objects,
sampleProportion = proportion of knapsack filled by the SRS and
α = maximum proportion of new distance to old distance that is still accepted into the knapsack.

```
procedure Sampling Algorithm(w, n, p, maxWeight)    ▷ w = vector of weights, n = number of elements, p = vector of pdfs, maxWeight = maximum weight that can be put in knapsack
    currentWeight = 0
    currentPDF = array of 0s, the size of the ith dimension is numJumps[i] for every dimension.
    contents = empty dictionary
    generate a simple random sample of elements, add their PDFs to currentPDF and their indices to contents
```

```
currentDeviation = distance(currentPDF, overallPDF)
objectAdded = True
while objectAdded do
    counter = 0
    for i in range(n) do
        if  i is not in contents and $totalWeight + w[i] \leq maxWeight$ then
            tempPDF = copy of currentPDF
            tempPDF += p[i]
            if  $distance(tempPDF, overallPDF) \leq \alpha * currentDeviation$ then
                currentPDF = tempPDF
                currentDeviation = tempDeviation
                add i to contents
                currentDeviation = tempDeviation
                counter += 1
    if counter == 0 then pairAdded = False
return contents, currentDeviation, currentPDF, totalWeight
```