urn

syntax: `urn( prob1, value, prob2, value2, ...)`

purpose: Constructs a compound probability distribution for use in SAMPLE.

Each of the values can itself be an urn, or a vector or matrix as described in SAMPLE. See NORMAL, UNIFORM, EXPONENTIAL for examples of how to create simple urns.

Examples:: `≫ ex1 = urn( .5, [0 1], .5, [1 2 3 4 5 6]);`
Sampling from `ex1` simulates a situation where you are either flipping a coin or rolling a die, each with probability 1/2.

`≫ ex2 = urn( .25, ex1, .75, normal(10,1) );`
With prob. 1/4, generate a sample from `ex1`. Otherwise, generate a normally distributed random variable with mean 10 and std. 1. (Note that the urn form of normal() is being used.)

```
≫ a = normal(10,1);
≫ b = normal(20,2);
≫ c = uniform(4,6);
≫ ex3 = urn( .1, a, .2, b, .7, c );
```

Sample from either of two different normal distributions or from a uniform distribution. To show what this compound distribution looks like, we'll sample from it and then plot a histogram.

```
≫ data = sample(10000,ex3);
≫ histogram(100,data,'A compound distribution using urn.');
```

Note that the area of the leftmost peak, which corresponds to `uniform(4,6)` is seven times larger than the area of the middle peak (corresponding to `normal(10,1)`) and 3.5 times greater than that of the rightmost peak (corresponding to `normal(20,2)`). This matches the relative probabilities, which were set to .7, .1, and .2.

Caution: You cannot use RESAMP or SHUFFLE to take samples from an urn. An urn represents a probability distribution, and not a fixed set of data. RESAMP and SHUFFLE deal only with fixed sets of data.

See also: SAMPLE, RESAMP, NORMAL, UNIFORM, EXPONENTIAL