P(1)=0.1; P(2)=0.1; P(3)=0.15; P(4)=0.15
P(5)=0.2; P(6)=0.3

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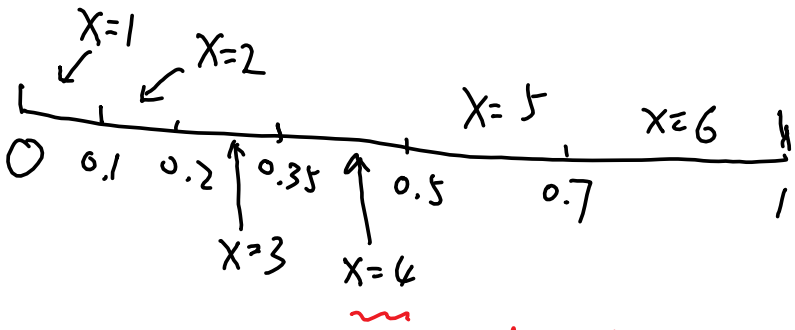
```
X = zeros(1, 1000);
for i = 1 : 1000,
    U = rand;
    if U < 0.1, X(i) = 1;
    else if U < 0.2, X(i) = 2;
    else if U < 0.35, X(i) = 3;
    else if U < 0.5, X(i) = 4
    else if U < 0.7, X(i) = 5
    else X(i) = 6
end
```



U = 0.41

P(X = 20) :=

P(X ≥ 20) = last bracket

$y = f(x) \Longrightarrow x = g(y) = f^{-1}(y)$

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exp. distr. $\Rightarrow$ $F^{-1}(U) = -\ln(1-U)/\lambda$

Q: generate 1000 samples of exp. dist $\lambda = 20$

```
X = zeros(1000,1)
for i = 1:1000,
    U = rand;
    X(i) = -log(1-U)/λ;
end
```

$\Rightarrow$ `X = -log(1-rand(1000,1))/λ;`

$E[X] = \frac{1}{\lambda}$

permute (10, 20, 30, 40, 50)

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$n = 5$

$k=5$	①	$U \rightarrow I \in [1,5]$	suppose	$I=3$
$k=4$	②	$U \rightarrow I \in [1,4]$	✓	$I=4$
$k=3$	③	$U \rightarrow I \in [1,3]$	✓	$I=1$
$k=2$	④	$U \rightarrow I \in [1,2]$	✓	$I=1$

(10, 20, 50, 40, 30)

(10, 20, 50, 40, 30)

(50, 20, 10, 40, 30)

(20, 50, 10, 40, 50)