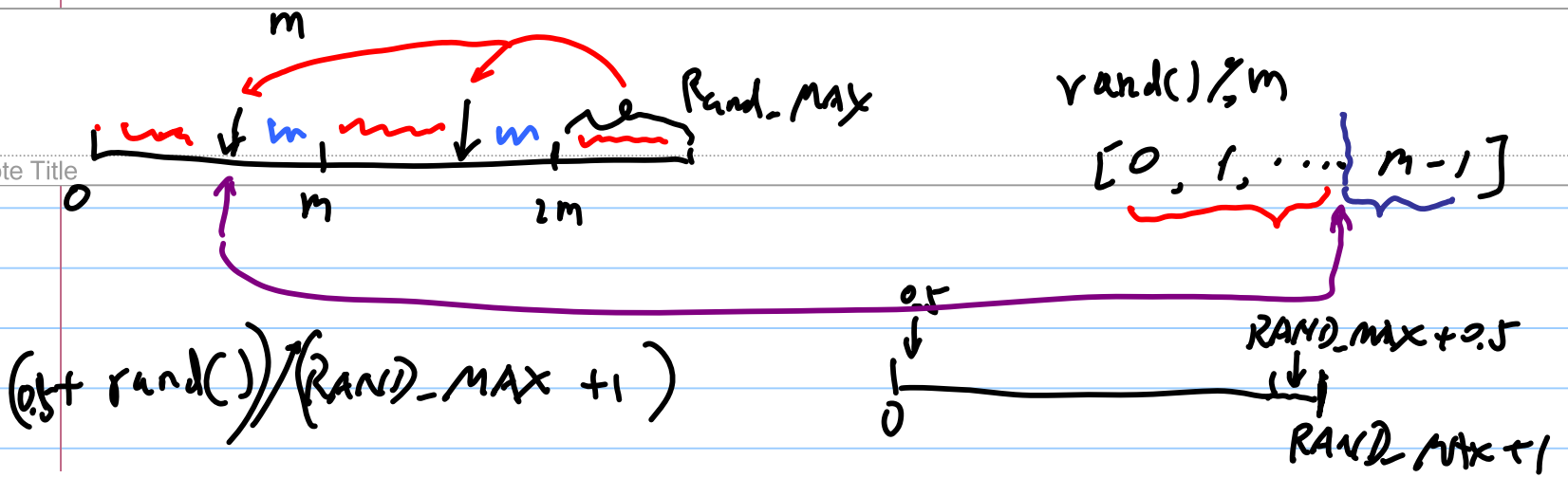
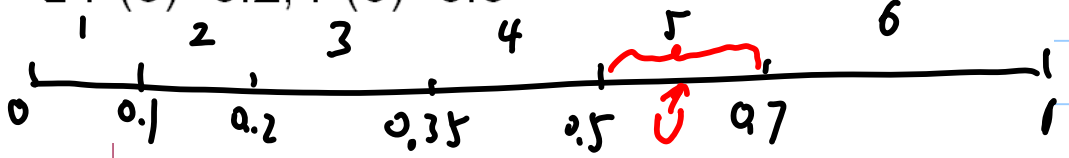
Note Title 9/18/2012



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



$$X = \begin{cases} x_0 & \text{if } U < p_0 \\ x_1 & \text{if } p_0 \le U < p_0 + p_1 \\ \vdots & \\ x_j & \text{if } \sum_{i=0}^{j-1} p_i \le U < \sum_{i=0}^{j} p_i \\ \vdots & \end{cases}$$

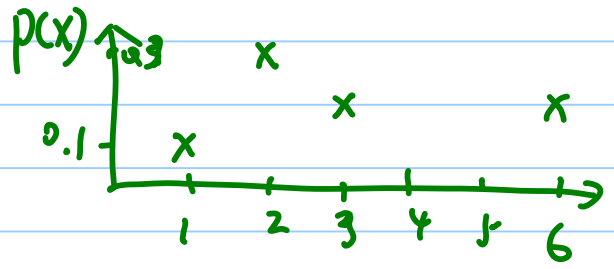
```
X = zeros(1, 1000);
for i = 1:1000,
    u = rand;
    if (u < 0.1) x = 1;
    else if (u < 0.2) x = 2;
    else if (u < 0.35) x = 3;
    else: x = 6;
    X(i) = x;
end
```

avg = mean(X);

[1, 2, 2, 4, 6, 5, 6, 2, 3, 3] simulate to sample

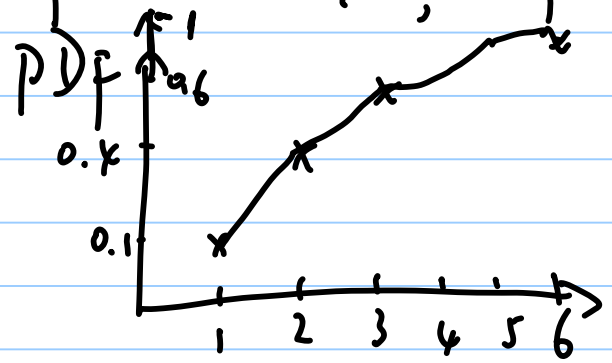
$P(X=1) = ?$ $P(X=1) = \frac{1}{10}$, $P(X=6) = \frac{2}{10}$

$P(X=2) = \frac{3}{10}$



PDF? $P(X \le x)$

$P(X \le 1) = \frac{1}{10}$, $P(X \le 2) = \frac{4}{10}$, $P(X \le 3) = \frac{6}{10}$, $P(X \le 6) = 1$



$p_0, p_1, \ldots, p_{250} \approx \varepsilon = 0.0000001$

if $(U > \sum_{i=0}^{249} p_i)$ $x = 250;$

$$F(x) = 1 - e^{-\lambda x}$$

$$F^{-1}(U) = -\ln(1-U)/\lambda$$

```
X = zeros(1, 1000);
for i = 1:1000,
    u = rand;
    x = -log(1-u)/lambda;
    X(i) = x;
end
```