Example 2
- Newspaper Seller's Problem

- Assume there exists a paper seller who buys papers for 33 cents each, sells them for 50 cents and recycled for 5 cents

- Papers may be purchased in bundles of 10 (40, 50, 60, etc.)

- There are three types of newsdays: good, fair and poor with probability of 0.35, 0.45, and 0.20 respectively.

- The distribution of papers demands on each of these days is given.

Demand Probability Distribution

Demand	Good	Fair	Poor
40	0.03	0.10	0.44
50	0.05	0.18	0.22
60	0.15	0.40	0.16
70	0.20	0.20	0.12
80	0.35	0.08	0.06
90	0.15	0.04	0.00
100	0.07	0.00	0.00

Types of Newsday Probability Distribution

Types of Newsday	Probability	Cumulative Probability	Random Digit Assignment
Good	0.35	0.35	01-35
Fair	0.45	0.80	36-80
Poor	0.2	1.0	81-00

• For each day, we need a random number to determine the type of newsday as well as the demand for the day.

Simulation Table

70 x 0.33

70

60 x 0.50

30 - (70 x 0.33) + 0.5 =

70   60 →   10 x 0.05

Day (70 papers)	Types of Newsday	Demand	Sales Revenue	Lost Profit	Recycle	Profit
1	Poor	60	$30	-	$0.50	$7.40
2	Fair	50	25.00	-	1.00	2.90
3	Good	80	$35	1.7	0	

80   70 x 0.50   35   10 x 0.17

Profit

35   — $70 \times 0.33 \sim 1.7$

Profit = Sales Revenue - Newspaper Cost

- Lost Profit + Recycle

If (demand< number of paper bought)

    Recycle = (paper bought - demand)$\times$\$0.05

Else

    Lost Profit = (demand - paper bought)$\times$\$0.17

0.05×10 65   50

$15 \times 0.17 = \$2.56$

Good = 0.35   Fair = 0.45   Poor = 0.20

$$0 < r < 1$$

PDF

$Pr[X=1] = 0.35$

$Pr[X=2] = 0.45$

$Pr[X=3] = 0.20$

← Pdf

$Pr[X=1] = 0.35$

Output = $\{1, 2, 3\}$

Good   Fair   Poor

CDF

$Pr[X \leq 1] = 0.35$

$Pr[X \leq 2]$

$Pr[X \leq 3]$

← cdf

$Pr[X \leq 1]$

Good   Fair   Poor
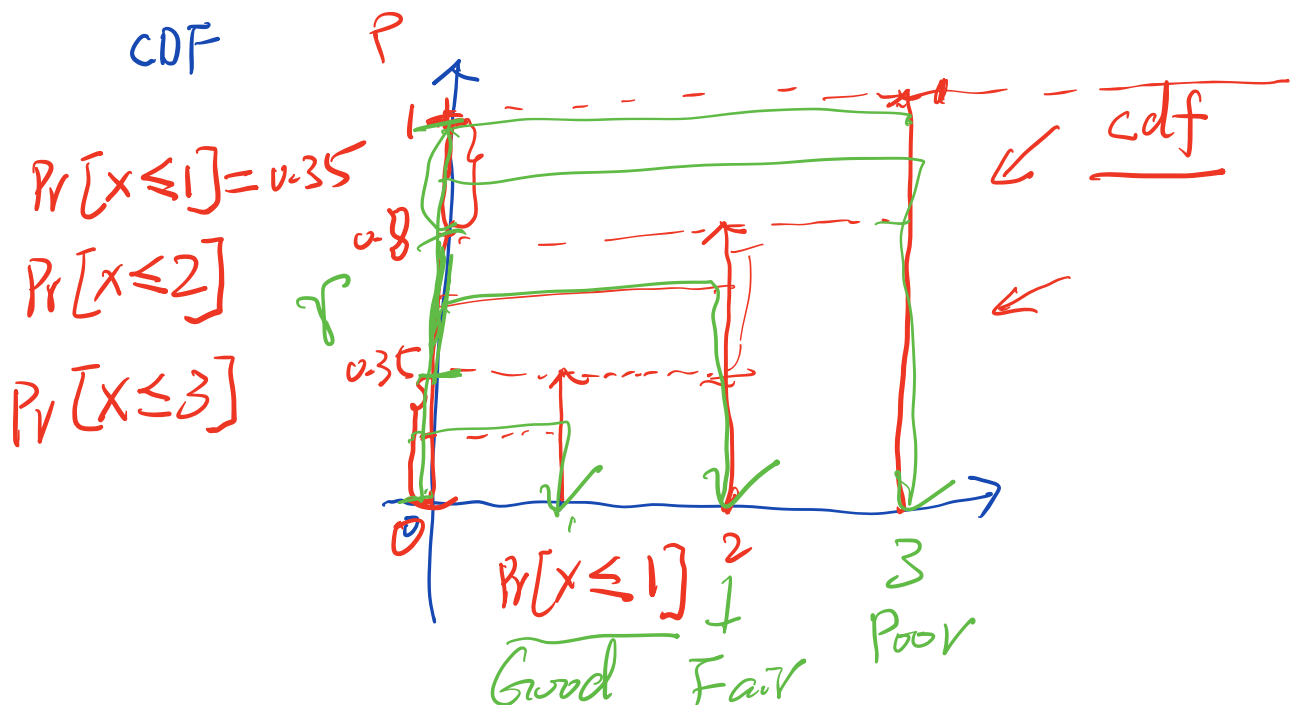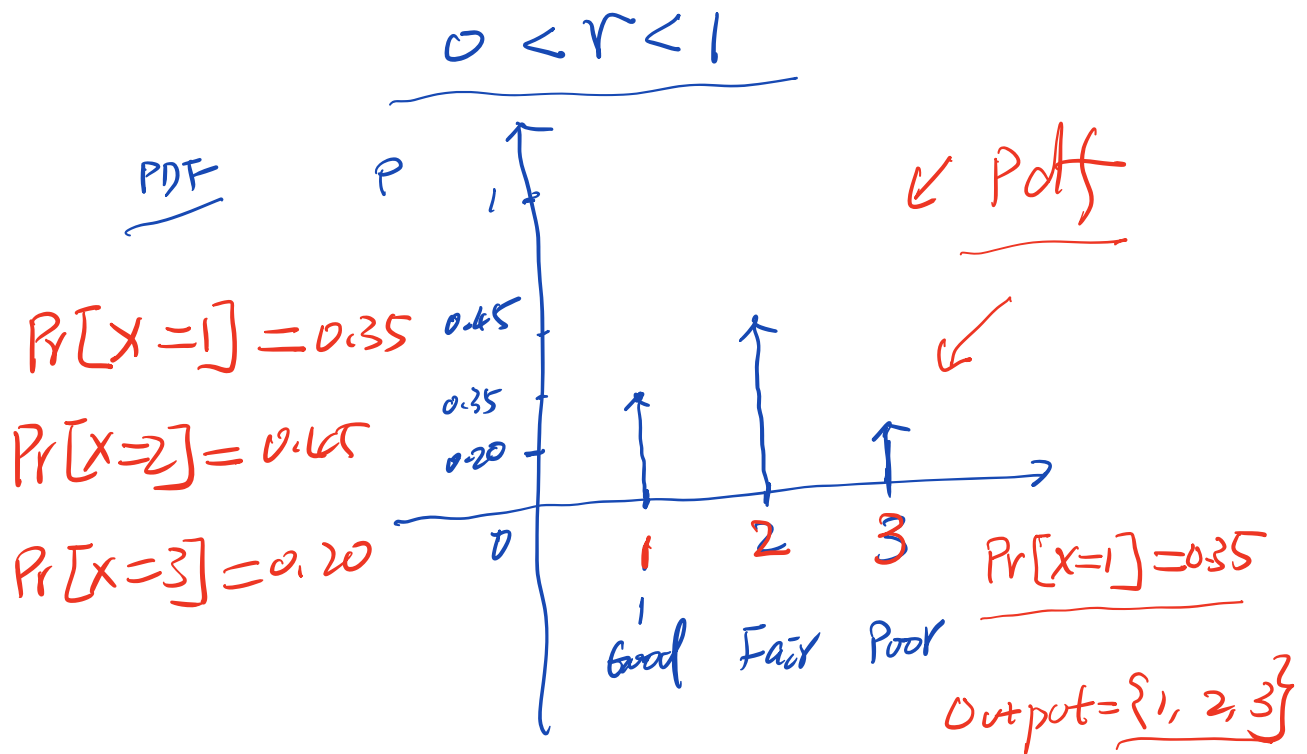
$0 < r < 1$ uniformly

If $0 < r \leq 0.35$

Then Type of Day = Good.

Else $r \leq 0.8$

Type of Day = Fair

Else   Type of Day = Poor

Profit

Profit

0   10   20   30   40   50   60   70   80

Papers bought
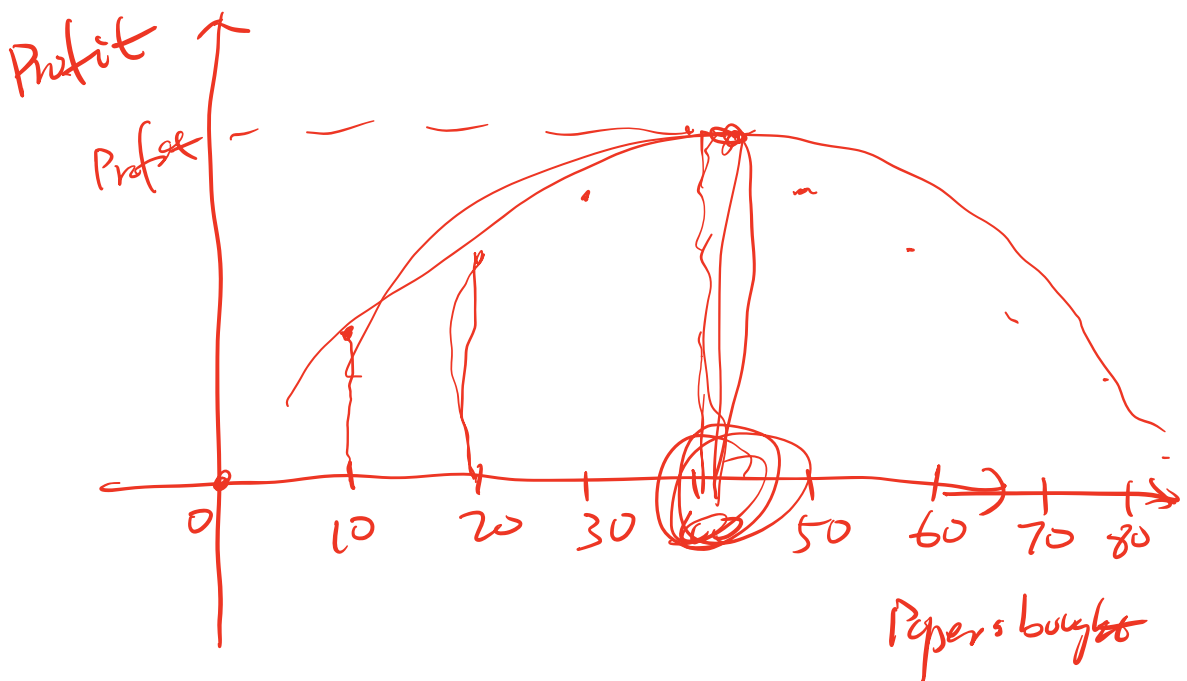
NoPaperboughts = 10

For $(i=0, i \leq 1000, i++)$
{

    r = Random( ) $(0 \leq r < 1)$

Type of Day
    If ($r \leq 0.35$)

                Type of Day = Good

      Else $r \leq 0.80$

                Type of Day = Fair

      Else   Type of Day = Poor

If Type of Day = Good

Then {

          s = rand( )

        ~~Demand~~ = ?

        4   r <

                     }

Else
&

Type of Day = Fair

Demand = ?

&

Else
&

Type of Day = Poor

Demand

&

Profit =

Total Profit =