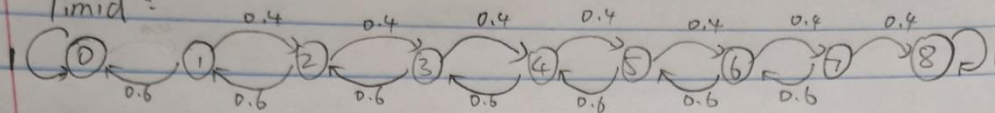
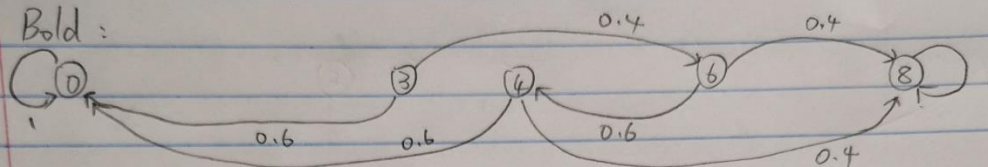


STMATH 381

1. Timid:



Bold:



2.  $P_{\text{timid}} =$

	1	2	3	4	5	6	7	0	8	← previous
1	0	0.6	0	0	0	0	0	0	0	
2	0.4	0	0.6	0	0	0	0	0	0	
3	0	0.4	0	0.6	0	0	0	0	0	
4	0	0	0.4	0	0.6	0	0	0	0	
5	0	0	0	0.4	0	0.6	0	0	0	
6	0	0	0	0	0.4	0	0.6	0	0	
7	0	0	0	0	0	0.4	0	0	0	
0	0.6	0	0	0	0	0	0	1	0	
current → 8	0	0	0	0	0	0	0.4	0	1	

$P_{\text{bold}} =$

	3	4	6	0	8	← previous
3	0	0	0	0	0	
4	0	0	0.6	0	0	
6	0.4	0	0	0	0	
0	0.6	0.6	0	1	0	
current → 8	0	0.4	0.4	0	1	

As the situation described, from the graph we can see the only possible states and path showing.

3. By computing a large number of  $P$ , from starting state 3, the possibility of winning to 8 is around 0.0964.

4. By computing  $B_p$ , the probability of reach state 8 from State 3 is  $\frac{608}{6305}$ .

5. The probability will be 0.256 to win.

6. By computing  $B_p$ , the probability of reach state 8 from state 3 is  $\frac{32}{125}$ .

7. The best strategy is Bold. Since the probability of winning is lower than losing, keep timid strategy will keep you away from winning. Using Bold strategy can be quickly get the result and in less steps. The more playing, the better chance of, losing because of the unequal ratio.



```

Pbold = matrix(5,5,[0, 0, 0, 0, 0, 0, 0, 3/5, 0, 0, 2/5, 0, 0, 0, 3/5, 3/5, 0, 1, 0, 0, 2/5, 2/5, 0, 1])
Qbold = matrix(3,3,[0, 0, 0, 0, 0, 3/5, 2/5, 0, 0])
Rbold = matrix(2,3,[3/5, 3/5, 0, 0, 2/5, 2/5])
Ibold = matrix(3,3,[1, 0, 0, 0, 0, 1, 0, 0, 0, 1])
Nbold = (Ibold-Qbold)^-1
Bbold = Rbold * Nbold
p = matrix(3,1, [1, 0, 0])
print 'P of Bold = ', Pbold
print
print 'After many time, the probability p will be ', n(Pbold^100)
print
print 'Q of Bold = ', Qbold
print
print 'I of Bold = ', Ibold
print
print 'R of Bold = ', Rbold
print
print 'N of Bold = ', Nbold
print
print 'B of Bold = ', Bbold
print
print 'Np = ', Nbold*p
print
print 'Bp = ', Bbold*p
print

P of Bold = [ 0 0 0 0 0 0]
[ 0 0 3/5 0 0]
[2/5 0 0 0 0]
[3/5 3/5 0 1 0]
[ 0 2/5 2/5 0 1]

After many time, the probability p will be [0.000000000000000 0.000000000000000 0.000000000000000 0.000000000000000 0.000000000000000]
[0.000000000000000 0.000000000000000 0.000000000000000 0.000000000000000 0.000000000000000]
[0.000000000000000 0.000000000000000 0.000000000000000 0.000000000000000 0.000000000000000]
[0.740000000000000 0.600000000000000 0.360000000000000 1.000000000000000 0.000000000000000]
[0.256000000000000 0.400000000000000 0.640000000000000 0.000000000000000 1.000000000000000]

Q of Bold = [ 0 0 0]
[ 0 0 3/5]
[2/5 0 0]

I of Bold = [1 0 0]
[0 1 0]
[0 0 1]

R of Bold = [3/5 3/5 0]
[ 0 2/5 2/5]

N of Bold = [ 1 0 0]
[6/25 1 3/5]
[ 2/5 0 1]

B of Bold = [93/125 3/5 9/25]
[32/125 2/5 16/25]

Np = [ 1]
[6/25]
[ 2/5]

Bp = [93/125]
[32/125]

```