CSE 250A

Prob 1

Prob

a) When $t = 1$

$P(X_2 = i \mid X_1$

while sw

we get

is basically

$A^{t} \cdot A$

So it is

$(1 \times m)(m \times$

$= m^2($

e) [redacted]

$P(X_1 = i$

$(1, m) \cdot (m,$

Bayes $= P(X_{t+1}$

$P(X$

Prob 3.2

a) $P(Y_1 / X_1) =$

Since $E = \{$ ~~$\emptyset$~~ y .

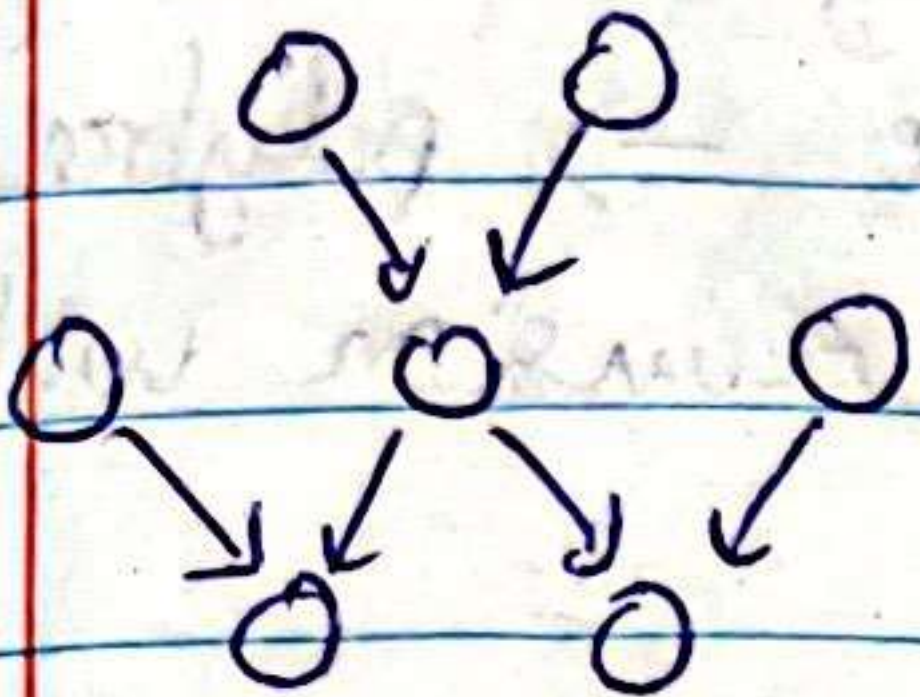
$P(X_0 | X_1) = P(X_0)$

$= \sum_{x_{n-1}} P(y$

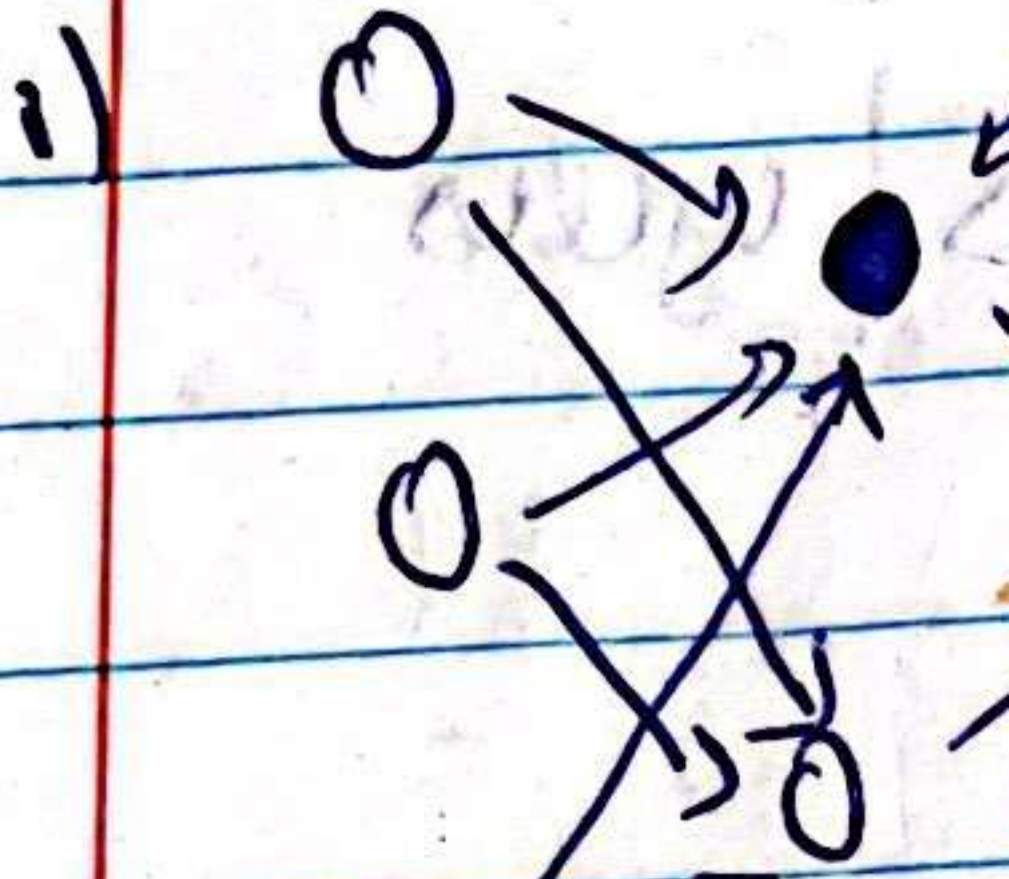
c) $P(y_n |$

$= \{ \{$

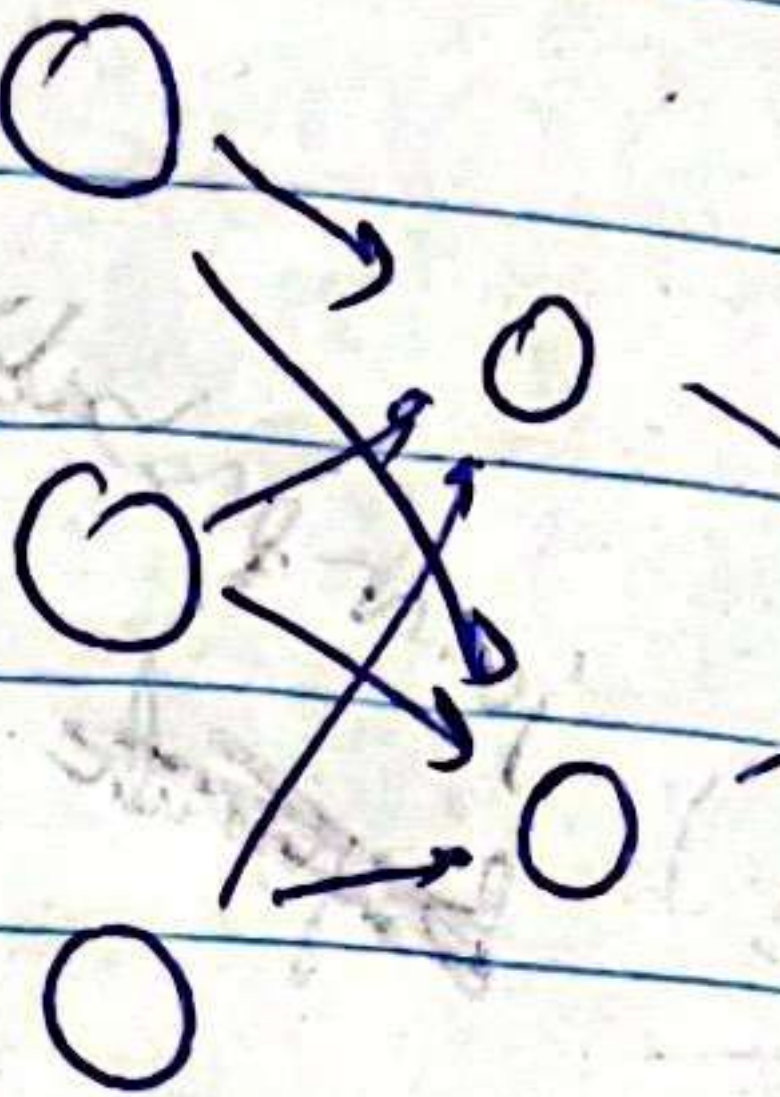
Prob 3.3



Problem 3.4



5)



Problem 3.5

Problem 5:

b) Now

$P(B_i = 1 \mid Z$

$\alpha = 0.1$

$$\Rightarrow \sum_{k=1}^{N} I($$

$$\frac{}{N \sum}$$

~~b)~~

3.6)

a) $P(B|A,$

$$= \sum_{B} P(D|$$

$$= \sum_{B} P(D|$$

$$\Rightarrow \underline{(a)} \Rightarrow P(B|$$

(c) become

P(B, E,

. $E_2 \perp \{e_1\}$

. $E_1 \perp e_2$

$\Rightarrow$ we set:

```
alpha = 0.1 # alpha
N = 1000000 #number of samples
K  = 10 #
import random as rd

i2 = []
i5 = []
i8= []
i10 = []
Nar = []
for i in range(1,N+1):
  Nar.append(i)
print(Nar)
i = [2,5,8,10]
```

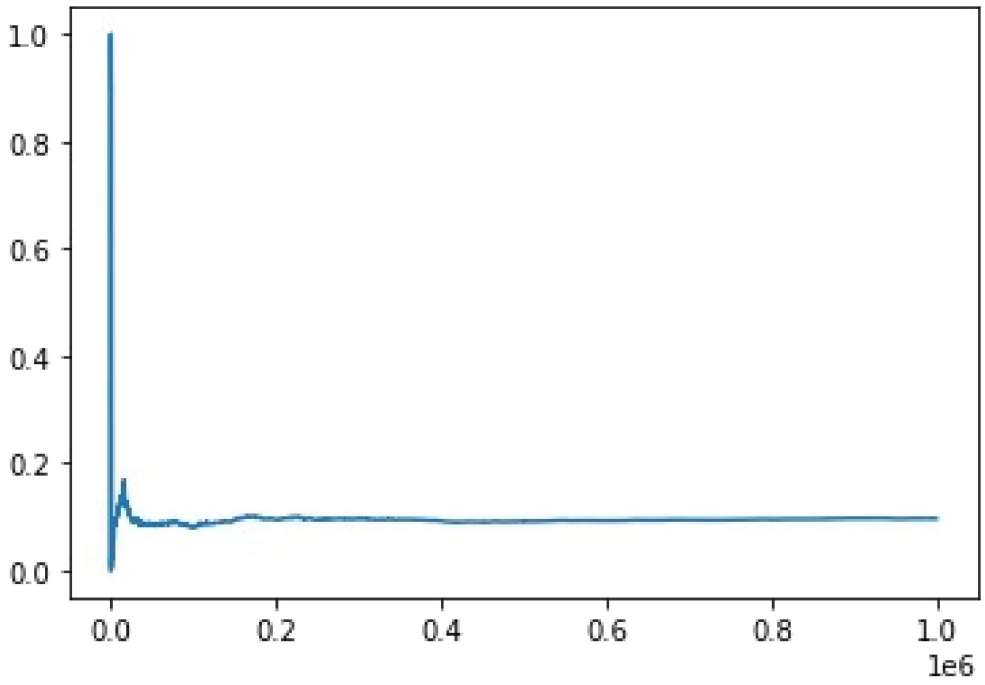
```
IOPub data rate exceeded.
The notebook server will temporarily stop sending output
to the client in order to avoid crashing it.
To change this limit, set the config variable
`--NotebookApp.iopub_data_rate_limit`.

Current values:
NotebookApp.iopub_data_rate_limit=1000000.0 (bytes/sec)
NotebookApp.rate_limit_window=3.0 (secs)
```

```
i2 = []
i5 = []
i8= []
i10 = []
for elem in i:
  num = 0.0
  denum = 0.0
  for k in range(1,N+1):
    randombit = []
    for j in range(K):
      randombit.append(rd.randint(0,1))
    Ind = randombit[elem-1]
    total = 0
    for j in range(K):
      tmp = pow(2,(j))*randombit[j]
      total += tmp
    total = 128-total
    total = pow(0.1,abs(total))
    denum += total
    total2 = Ind*total
    num += total2
    if(denum == 0):
      if (k !=1 ):
```

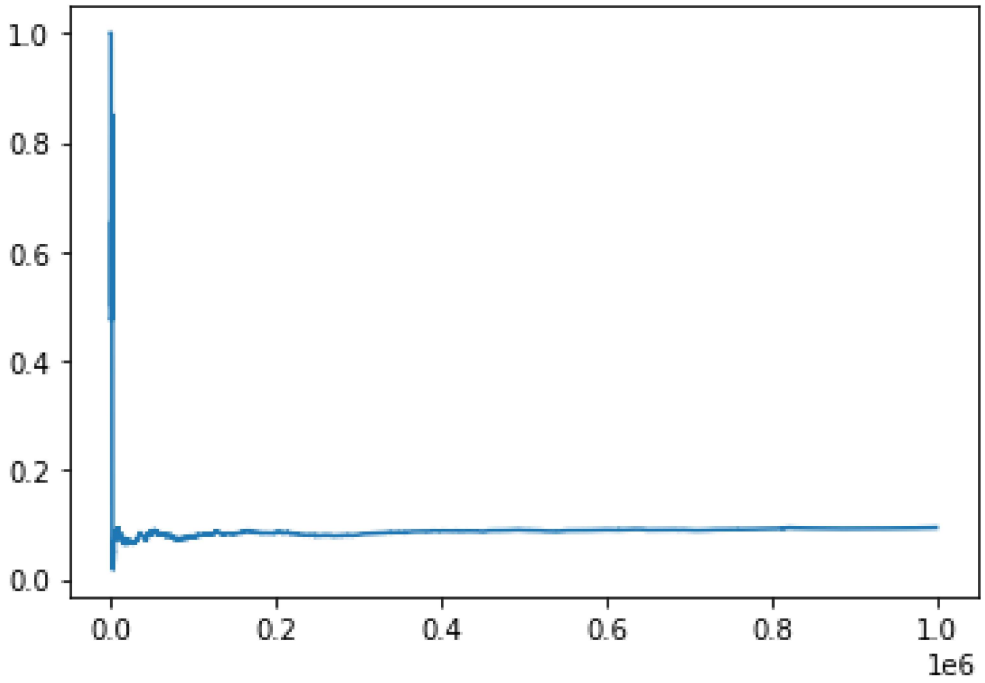
```
        eval("i"+str(elem)).append(eval("i"+str(elem))[-1])
      else:
        eval("i"+str(elem)).append(0)
    else:
      eval("i"+str(elem)).append(num/denum)
```

```
from matplotlib import pyplot as plt
for k in i:
  print("i = " + str(k))
  plt.plot(Nar,eval("i"+str(k)))
  print("Probability is" , eval("i"+str(k))[-1])
  plt.show()
```

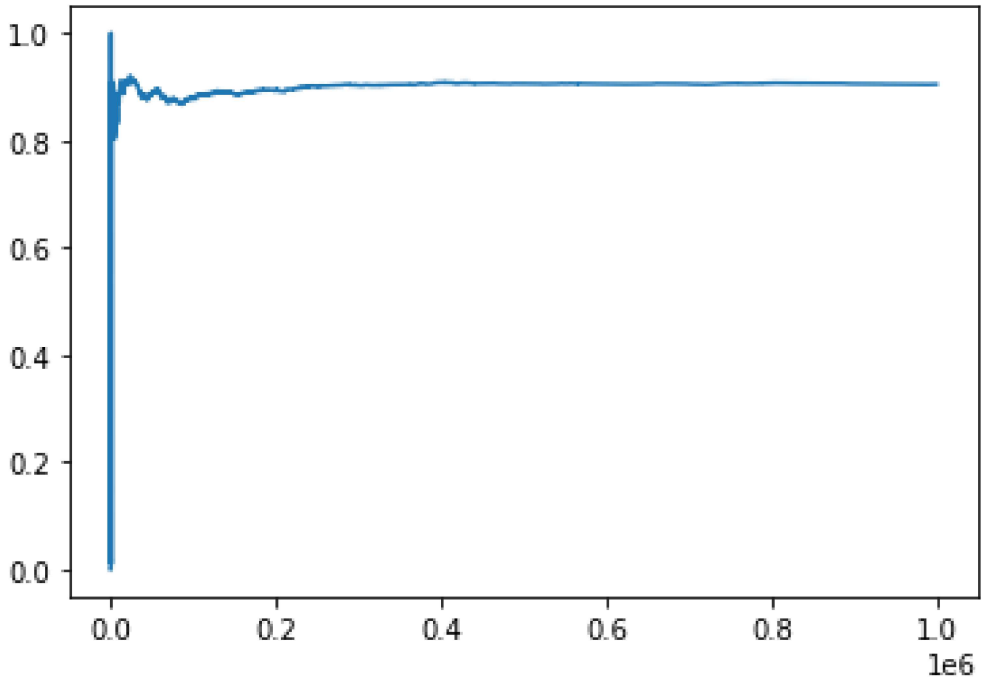
```
i = 2
Probability is 0.09659953725899915
```



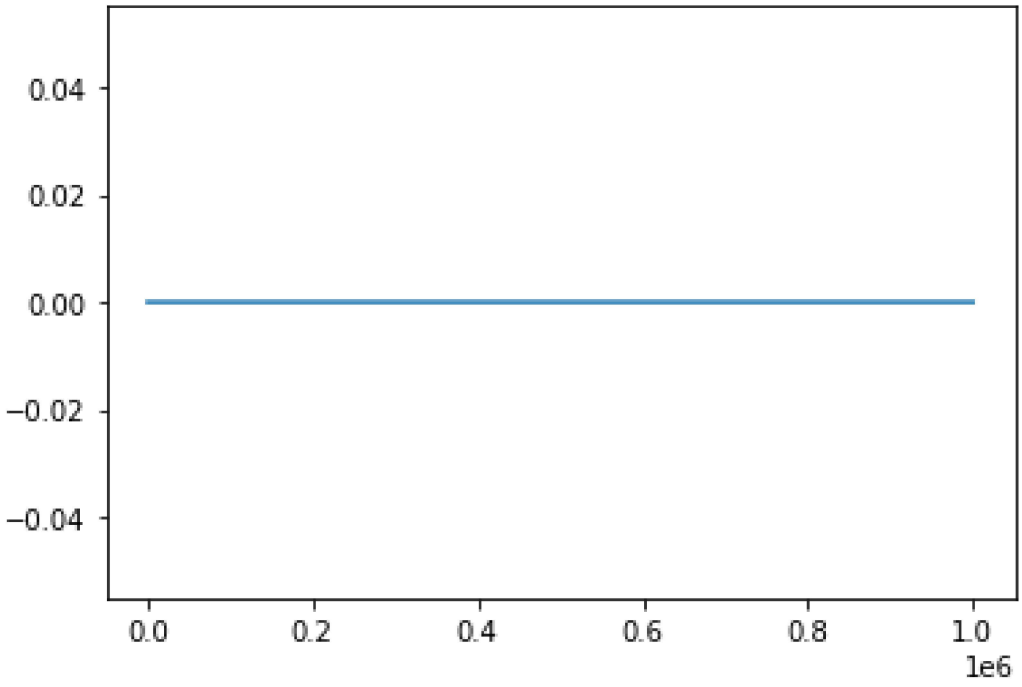

```
i = 5
Probability is 0.09473495765444159
```




```
i = 8
Probability is 0.9045313112953837
```




```
i = 10
Probability is 0.0
```


0.04
0.02
0.00
−0.02
−0.04
0.0
0.2
0.4
0.6
0.8
1.0
1e6