In [1]:
```
import numpy as np
```

q4p1

In [2]:
```
#Prize table values
p1s1 = 150
p1s0 = 1000
p0s1 = 10
p0s0 = 15000
```

In [3]:
```
#N values
pN = p1s1 + p1s0 + p0s1 + p0s0
pN0_ = p0s1 + p0s0
pN_0 = p1s0 + p0s0
pN1_ = p1s1 + p1s0
pN_1 = p1s1 + p0s1
```

In [4]:
```
#hello table values
h1s1 = 145
h1s0 = 11000
h0s1 = 10
h0s0 = 5000
```

In [5]:
```
#N values
hN = h1s1 + h1s0 + h0s1 + h0s0
hN0_ = h0s1 + h0s0
hN_0 = h1s0 + h0s0
hN1_ = h1s1 + h1s0
hN_1 = h1s1 + h0s1
```

In [6]:
```
def IUC(N11, N10, N01, N00, N, N0_, N_0, N1_, N_1):
    t1 = (N11 / N) * np.log2((N * N11) / (N1_ * N_1))
    t2 = (N01 / N) * np.log2((N * N01) / (N0_ * N_1))
    t3 = (N10 / N) * np.log2((N * N10) / (N1_ * N_0))
    t4 = (N00 / N) * np.log2((N * N00) / (N0_ * N_0))
    tot = t1 + t2 + t3 + t4

    return tot
```

In [7]:
```
prize_iuc = IUC(p1s1, p1s0, p0s1, p0s0, pN, pN0_, pN_0, pN1_, pN_1)
hello_iuc = IUC(h1s1, h1s0, h0s1, h0s0, hN, hN0_, hN_0, hN1_, hN_1)

print("Prize Mutal Information Value:", prize_iuc)
print("Hello Mutal Information Value:", hello_iuc)
```

```
Prize Mutal Information Value: 0.032960118763953966
Hello Mutal Information Value: 0.002560350473205207
```