LAB 3

Hamming Code

Network and Communication (CSE-1004)

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**Code:**

option=int(input('Enter your choice:--\n'))

if(option==1): # GENERATE HAMMING CODE

print('Enter the data bits') text=input() encoding='utf-8' errors='surrogatepass'

bits = bin(int.from\_bytes(text.encode(encoding, errors), 'big'))[2:] data=list(bits.zfill(8 \* ((len(bits) + 7) // 8)))

data=list(data) data.reverse() c,ch,j,r,h=0,0,0,0,[]

while ((len(text)+r+1)>(pow(2,r))): r=r+1

for i in range(0,(r+len(data))): p=(2\*\*c)

if(p==(i+1)): h.append(0) c=c+1

else:

h.append(int(data[j])) j=j+1

for parity in range(0,(len(h))): ph=(2\*\*ch) if(ph==(parity+1)):

startIndex=ph-1 i=startIndex toXor=[]

while(i<len(h)): block=h[i:i+ph] toXor.extend(block) i+=2\*ph

for z in range(1,len(toXor)): h[startIndex]=h[startIndex]^toXor[z]

ch+=1

h.reverse()

print('Hamming code generated would be:- ', end="") print(int(''.join(map(str, h))))

elif(option==2): # DETECT ERROR IN RECEIVED HAMMING CODE

print('Enter the hamming code received') d=input()

data=list(d)

data.reverse() c,ch,j,r,error,h,parity\_list,h\_copy=0,0,0,0,0,[],[],[]

for k in range(0,len(data)): p=(2\*\*c) h.append(int(data[k])) h\_copy.append(data[k]) if(p==(k+1)):

c=c+1

for parity in range(0,(len(h))): ph=(2\*\*ch) if(ph==(parity+1)):

startIndex=ph-1 i=startIndex toXor=[]

while(i<len(h)): block=h[i:i+ph] toXor.extend(block) i+=2\*ph

for z in range(1,len(toXor)): h[startIndex]=h[startIndex]^toXor[z]

parity\_list.append(h[parity]) ch+=1

parity\_list.reverse()

error=sum(int(parity\_list) \* (2 \*\* i) for i, parity\_list in enumerate(parity\_list[::-1]))

if((error)==0):

print('There is no error in the hamming code received')

elif((error)>=len(h\_copy)): print('Error cannot be detected')

else:

print('Error is in',error,'bit')

if(h\_copy[error-1]=='0'): h\_copy[error-1]='1'

elif(h\_copy[error-1]=='1'): h\_copy[error-1]='0'

print('After correction hamming code is:- ') h\_copy.reverse()

print(int(''.join(map(str, h\_copy))))

else:

print('Option entered does not exist')

# Output:

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