Ain: Write a program to implement error delection and correction using Hamming code correct. Make a test correction using Hamming code correct error coorection our to input data stream and verify error coorection.

Essos Cossection at Data Link Layer:

Hamming code is set of everor coosection codes that can be used to detect and coosect the everors that can when the data is trasmitted from the runder to the receiver. It is a technique developed by R.W. Hamming for onor correction.

Create sender poogram with below features:

1) Input to sender fulle should be a text any length Program should convert the text to ben'any.

2) Apply humining code concept on the burary data and add redundant bits to it.

breate a receives program with below features:

- 1) Receives poogram should read the enput from Charnel file 2) Apply hamming code on the benary dates to dresh for evisors.
 - 3) If there is an error, display the parties of error.
- 4) The remove the redeendant bits and convert the buriary data to axiii and display the output.

Student Obseration: الله (الله (الله (الله والله) : of posts or poster (duta). Program: poit ("Irrelia probin !") dif cake o(l): return data for i in runge (l): data list = list (data) if (2**i>=!+i+1): data - hit Eros-13 - 11 of data octurn i odew . jan (data - list) def par red bits (b,o): let bin-to-dec(6): j,k =0,1 roturn wit (b, 2) bets = " " for i in range (1, len (b) + o +1). if (i==2**j). (12 bits + = 00 (3) (1) = . [.] ((3) (a) 6af]) ini." = lov-ind it = 1 por and i colo of notation of the fine of the (-len (bin val) bils t = b [-1*k] point (& "Member of reductions) oction bits [::-1] Co, bu-ind) abd-base-eag con def cake-painty (ans, o): en data - care painty (pos, 5) n=len (aus) for i in sunge (v): part (f Late with colored to Val =0 for j in surge (1, n+1): 4 (j4(2**i) = = (2**i)): ral = ral 1 int (ann [-1 * j]) 2007 = apr [:n-(2**i)] + sto(val) + apr [n-(2**i)+1:]

def flip (data, pos): if poszi or posslen (data): point ("Irnalis position!") (2) spece in a soft return data 1 (9 miles 11); data_list = list (data) data-list [pas-13='1' if data-list [pos-13=='0' else 'o' odurn 1. jain (duta-list) of per red oto (by). def bin-to-dec(b): return int (b, 2) s = input ("Enter a steing to encode:") bin-val = ". join ([hen (ord (c))[2:3. zfill (8) for (in s]) paint (f" Biray representation of 'Esz': Ebein-val z") l=len (bin_val) priper = P[14 F] 8 = col-8(1) paint (f" Number of redundant but: (83") pos = pos_red_bila(bin_val, v) sof case fainly (au, 2). enc-data = cale-printy (pos, o) n - lan (can) point (f" Lata with sedundard bits " Eine-data 3") while Force: ever-pos= int (input () firster the parition of the bit to flip (1- based index, 1 to (her (one data) ?:):")

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if en-pos in [2**i for i in range (8)]:
  point (" learnot flip a redundant bit position. Please
       enter a valid purition: ")
   Continue
                        Humber of reducedant below 5
 else:
                          Fold with reducted but to
   enc_data_en = flip (enc_data, en-pos)
   point (f" Duta with coops into duced - forc-duta - en 3")
  boeak
en-deterted = detert=en (enc-dutu-en, o)
if en-deterted ==0.
                   Date with oney introduced coronio
  point ("No error detected in the received data.")
  en-pus-detuted = en-detuted.
  en_pos_left = len (enc-data_en ). - en_pos_detected +1
  bûn-en-pas = bûn (en-pas-lift) [2:]. z fill (4)
  dec-en-pos= bin-to-dec (bin-en-pos)
  paint (f" Erroso detected at paintion: (crr-pos-left 3")
  paint (f" Binary error position: Ebin-en -posit,
      Deumal position: Edec_000-posy")
 corect = enput ("Do you want to corect the evicor? (yes/re))
      . stap (). lover ()
  if coood = 'yes':
      tooo ested-datu = flip (enc-datu-en, en-pos_lift)
  ellose Paid (f" (oos etid duta: (coosected - data &")
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point ("Good was not cosserted.").

Output! Center a string, bo emode: Hi Buriary representation of Hi': 0100100001101001 Number of redundant bets: 3 Pota with redundant buts: 0100 100000 11 001000100 Enter the parition of the bit to flip (1. to 21): 4 Cannot flip a redundant bit parition. Please enter a valid position. Enter the parition of the bit to Plip (17021):6 Date with error introduced :010011000011001000100 Entro deluted at partion: 6 Berary error partion : 0110, Decimal Portion - 6 Do you want to coosed the wros? (gos/no): yes Corrected duta:0100 1000000 11001000100 = = = Code Beeution Succentral = = = it (toges detelet at position loss p part (& Person som portion: Elin on pass

Thurs, the error detection and correction using Hamming who concept was examplely implement and executed.

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