def kl\_divergence(p, q):

return sum(p[i] \* log2(p[i]/q[i]) for i in range(len(p)))

# calculate the js divergence

def js\_divergence(p, q):

m = 0.5 \* (p + q)

return 0.5 \* kl\_divergence(p, m) + 0.5 \* kl\_divergence(q, m)

1 Find with the help of Information Theory the mapping between original and ciphered texts. It's a bijection. In your answer form print out mappings un terms of text number.

2 Find the table of alphabet mapping between original and ciphered texts. The table is the only one for all texts. In your answer form print out alphabets' mapping bewtween orginal and ciphered texts.

Original text:

**1.** the star, whose popularity has brought the brilliant performance of the role of hurrem, is now in her sixth month of pregnancy.

**2**. after fans of fakhriye evgen saw her 10-year-old photographs, it became clear to everyone that there was a need for aesthetic medicine.

**3**. turkish media reported that burak ozchivit and fahriye evcen are getting divorced

**4**. hollywood actress jennifer lawrence is pregnant

**5.** britney spears announced her engagement to sam asgari

**6**. nazym abildina got married according to muslim traditions and showed the chosen one

**7**. britney spears named time's most influential person of the year

**8**. member of the duet baccara maria mendiola died

**9**. toregali toreali with a little son in his arms touched kaznet

**10**. aysaule bakytbek, angry with subscribers for advice about children, announced pregnancy

**11**. tamara asar with her newborn daughter arranged a bright discharge from the hospital

**12**. madina sadvakasova bought a luxurious apartment by the sea

**13**. 45-year-old tamara asar became a mother for the second time

**14**. saltanat bakaeva and her husband held a gender party

**15**. kylie jenner announced her pregnancy

**16**. maksim was first published after an illness

**17**. britney spears says her father extorted money from her

**18**. nazym abildina told when her wedding will take place

**19**. "enough plastic": madonna's new selfie scared some of her fans

**20**. the actress who played mrs. hudson in "sherlock" dies

**21**. singer berkut was fined for participating in the opening of timati burger in almaty

**22**. aikyn and zhuldyz omirgali flew to russia

**23**. say mo tried on incredible looks in new music video

**24**. rihanna officially became a billionaire

**25**. kate middleton and queen elizabeth ii congratulate meghan markle on her birthday

**26**. “people” magazine published, and celebrities confirmed, actors diane kruger and norman reedus are engaged.

**27**. scarlett johansson gave birth to her second child

**28**. ben affleck celebrated his birthday without jennifer lopez

**29**. michael kors: "you don't have to be famous to be a good designer."

**30**. kate middleton and prince william went on vacation to their favorite islands

Ciphered text:

**1**. jvzucgxxruzqsvsxoeuusurgzvhuzhmqsilvzervzucuibvscvljruqsbulhglzbxvp

**2**. hlgzsugnyuvlnvssqesmuxbulusiaiucuszzqnvcvnivlg

**3**. svtpcvhgrxgsviqzcvllguxvmmqlxgsizqcenrgczlvxgzgqsnvsxnbqfuxzbumbqnu

**4**. hlgzsugnyuvlnsvcuxzgcuncqnzgswreuszgvryulnqsqwzbu

**5**. cuchulqwzbuxeuzhvmmvlvcvlgvcusxgqrvxgux

**6**. zqluivrgzqluvrgfgzbvrgzzrunqsgsbgnvlcnzqembuxhvts

**7**. vpnveruhvjpzhujvssqesmuxyluisvsmo

**8**. zvcvlvvnvlfgzbbulsufhqlsxveibzulvllvsiuxvhllvsiuxvhlgibzxgnmbvliuwlqczbubqnygzvr

**9**. cvxgsvnvxavjvnqavhqeibzvredelgqenvyvlzcuszhpzbunu

**10**. puvlqrxzvcvlvvnvlhumvcuvcqzbulwqlzhunumqsxzgcu

**11**. nvrzvsvzhvjvuavvsxbulbenhvsxburxviusxulyvlz

**12**. jprgukussulvssqesmuxbulyluisvsmo

**13**. yuqyrucvivtgsuyehrgnbuxvmzqlnxgvsujleiulvsxsqlcvsluuxenvluusiviux

**14**. nmvlruzzkqbvsnnqsivauhglzbzqbulnumqsxmbgrx

**15**. husvwwrumjmuruhlvzuxbgnhglzbxvpfgzbqezkussgwulrqy

**16**. cgmbvurjqlnpqexqszbvauzqhuwvcqenzqhuviqqxxungisul

**17**. jvzucgxxruzqsvsxylgsmufgrrgvcfuszqsavmvzgqszqzbuglwvaqlgzugnrvsxn

**18.**

zbunzvlfbqnuyqyervlgzpbvnhlqeibzzbuhlgrrgvszyulwqlcvsmuzbulqruqwbellucgnsqfgsbulngdzbcqszbqwyluisvsmp

**19.** vwzulwvsnqwwvjblguuaiusnvfbulpuvlqrxybqzqilvwngzhumvcumruvlzquaulpqsuzbvzzbulufvnveuuxwqlvunzbuzgjcuxgmgsu

**20**. zeljgnbcuxgvluyqlzuxzbvzhelvjvsxwvjblguvluiuzzgsixgaqlnux

**21**. bqrrpfqqxvmzlunnkussgwulrvflrusmugnyluisvsz

**22**. cvjnggcfvnwglnzyehrgnuxvwzulvsgrrsunn

**23**. hlgzsupnyuvlnnvpnbulwvzbuludtqlzuxcqsupwlq

**24**. svtpcvhgrxgsvzqrxfbusbulfuxxgsifgrrzvjuyrv

**25**. usqeibyrvnzgmcvxqssvnsufnurwgunmvluxnqcuqw

**26**. zbuvmzlunnfbqyrvpuxclnbexnqsgsnbulrqmjxgun

**27**. ngsiulhuljezfvnwgsuxwqlyvlzgmgyvzgsigszbuqyusgsiqwzgcvzgheliulgsvrc

**28**. vgjpsvsxtberxptqcglivrgwrufzqlenngv

**29**. nvpcqzlguxqsgsmluxghrurqqjngssufcen

**30**. lgbvssvqwwgmgvrrphumvcuvhgrrqsvglu

c : m

u : e

h : b

l : r

q : o

w : f

z : t

b : h

x : d

e : u

v : a

m : c

g : i

s : n

r : l

p : y

n : s

f : w

y : p

j : k

t : z

i : g

k : j

a : v

jvzucgxxruzqsvsxoeuusurgzvhuzhmqsilvzervzucuibvscvljruqsbulhglzbxvp

hlgzsugnyuvlnvssqesmuxbulusiaiucuszzqnvcvnivlg

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hlgzsupnyuvlnnvpnbulwvzbuludtqlzuxcqsupwlq

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usqeibyrvnzgmcvxqssvnsufnurwgunmvluxnqcuqw

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nvpcqzlguxqsgsmluxghrurqqjngssufcen

lgbvssvqwwgmgvrrphumvcuvhgrrqsvglu