CP3404 Assignment 2

Aim: This assignment is designed to help you improve your critical thinking and problem solving skills, as well as your information literacy skills (i.e. the ability to select and organise information and to communicate it effectively and ethically).

Requirements, Method of Submission, and Marking Criteria:

- Answer all of the questions in a single document. Each question should begin on a new page.
- Include your name on the first page.
- Include list of references for each question with proper in-text citations.
- In your answer to question 2 (i.e., cryptanalysis), show all your work. *Note that using the Internet for deciphering the cryptogram and/or learning the key from any other sources is an instance of plagiarism. You have to show (step-by-step) how did you achieve the plaintext and key.*
- Marking criteria is given after each question.
- Upload your solution to the Assignment Box, located in the subject's site.

---

1. You are employed to design a database management system for the personnel of XYZ company. You have involved the client in the design, informing the CEO, the director of computing, and the director of personnel about the progress of the system. After gathering user/system requirements it is now time to make decision about the kind and degree of security to build the system.You have described several options to the client. Because the system is going to cost more than previously planned, the client decides to opt for a less secure system. You believe that the information will be stored by the company is extremely sensitive (i.e., it will include performance evaluations, medical records for filing insurance claims, salaries, and so forth), and thus, requires a reasonable level of security.

   With weak security, employees working on client machines may be able to figure out ways to gain access to this data, not to mention the possibility of online access from hackers. You feel strongly that the system should be more secure. You have tried to explain the risk, but the CEO, director of computing and director of personnel all agree that less security will do.

   What should you do? Should you refuse to build the system as they request? Discuss the ethical issues in this case study. You should be able to make some recommendations as to how this ethical problem may be resolved. Be sure to support any recommendation with reasons informed by your research and analysis of the ethical issues identified in your discussion. More precisely:

   (a) What code of ethics, as set by the ACS (Australian Computer Society), are in direct confrontation with the attitudes of the CEO and directors?

   [4 marks]

   (b) If opting for the less secure system is a must, how do you avoid or lessen the repercussion of a security violation in the future (from both reputational and legal implication points of view).

   [3 marks]

Marking Criteria:

(a) 1 mark for each of the 4 clauses (Hint: see 'The Primacy of the Public Interest', and 'The Enhancement of Quality of Life' code of ethics)

(b) Answers will be different from student to student, but should include software/system development, and communication with all stakeholders (i.e., employees, CEO, and directors).

2. **Cryptanalysis of a Polyalphabetic Cipher:**
In this question you learn a classical polyalphabetic substitution cipher (known as Vigenére cipher), and are required to cryptanalysis a given cryptogram.

Cryptanalysis of an information system is *the study of mathematical techniques for attempting to defeat information security services.* A cryptographic system is said to be *breakable* if a third party (i.e., cryptanalyst), without prior knowledge of the key, can systematically recover plaintext from corresponding ciphertext within an appropriate time frame.

Background

Julius Caesar used a cipher which moved each letter of the alphabet to the letter three to the left in the predetermined order of the letters of the alphabet. Figure 1 shows original English alphabet and corresponding cryptogram alphabet in Caesar cipher:

```
a b c d e f g h i j k l m n o p q r s t u v w x y z
d e f g h i j k l m n o p q r s t u v w x y z a b c
```

Figure 1: English alphabet letter and their corresponding cryptograms in the Caesar cipher

In order to use mathematical notations, let convert letters of the alphabet to integers. The most natural conversion is to assign to each letter an integer which indicates the position of the letter in the alphabet. That is, assign $0, 1, \cdots, 24, 25$ to $a, b, \cdots, y, z$, respectively. Using this conversion, Caesar cipher can be expressed as:

$$C = E_k(M) = M + 3 \pmod{26}$$

where 'C' is the cryptogram, 'E' is the encryption algorithm, 'k' is the key, 'M' is the message/plaintext (one may replace integer 3 by letter 'd').

Caesar cipher is from the family of *shift* ciphers, in which the cryptogram is a shifted version of the original alphabet. Cryptanalysis of the Caesar (and all shift ciphers) is easy, because there are 26 possible keys/shift.

Vigenére Cipher

In Vigenére cipher the key is more than one letter. That is, Vigenére cipher can be considered as a combination of n shift ciphers, where n is the key-length (i.e., the number of letters in the keyword). Let the message/plaintext be 'individual character' and the keyword is 'host'. Vigenére cipher encrypts the message as follows:

```
Plaintext               i n d i v i d u a l c h a r a c t e r
Keyword                 h o s t h o s t h o s t h o s t h o s
Cryptogram              p b v b c w v n h z u a h f s v a s j
```

That is, the first four letters of cryptogram computed as:

'i' + 'h'	$= 8 + 7$	$= 15 \pmod{26}$	i.e., p
'n' + 'o'	$= 13 + 14$	$= 1 \pmod{26}$	i.e., b
'd' + 's'	$= 3 + 18$	$= 21 \pmod{26}$	i.e., v
'i' + 't'	$= 8 + 19$	$= 1 \pmod{26}$	i.e., b

Since the plaintext is longer than the keyword, keyword is repeated till all letters of the plaintext are encrypted. As it can be seen, a particular letter of the plaintext may be encrypted with different letters from the keyword. For example, the first occurrence of letter 'i' from the plaintext is encrypted with 'h', where its second and third occurrences are encrypted with letters 't', and 'o' respectively. That is, Vigenére cipher is a *polyalphabetic* substitution cipher.

To break a polyalphabetic substitution cipher, the cryptanalyst must first determine the key-length of the cipher. This can be done using *Kassiski* method. The Kassiski method uses repetitions of patterns in the ciphertext in order to get a good guess about the key-length. For example, suppose the plaintext 'to be or not to be' has been enciphered using the key 'now', producing the ciphertext below:

```
Plaintext               t o b e o r n o t t o b e
Keyword                 n o w n o w n o w n o w n
Cryptogram              g c x r c n a c p g c x r
```

In this cryptogram (i.e., **g c x r** c n a c p **g c x r**) a repeated pattern is **g c x r**, where the distance between these repetitions (i.e., the number of characters from the first letter of the pattern in its first occurrence to the first letter of its second occurrence) is 9. This *could* be the sign in which the same letters from plaintext is encrypted with the same letters from the keyword. Since in Vigenére cipher the keyword is repeated, the key-length is probably 9 or a divisor of 9 (i.e., 3, because 9 has no other divisor). Assuming that the key length is 3, we split the cryptogram into three cryptogram. That is, the 1st, 4th, 7th, ... characters of the cryptogram are the result of encrypting the 1st, 4th, 7th, ... characters of the plaintext with the first letter of the keyword (in other word, they are shifted with the same number, as in the Caesar cipher). Similarly, the 2nd, 5th, 8th, ... characters are the result of encrypting the corresponding letters in the plaintext with the second letter of the key. and the same for the third file. That is, this Vigenére cipher is a combination of 3 Caesar ciphers, where the cryptogram of each Caesar cipher is given as below:
Cryptogram 1: g r a g r
Cryptogram 2: c c c c
Cryptogram 3: x n p r
In order to break each of these Caesar ciphers, we use the letter frequency in the English text. As it is shown in Figure 2, 'e' is the most common letter in English texts. That is:

In Cryptogram 1, we can guess that either 'g' or 'r' could be the corresponding letter to 'e' in the plaintext.
If 'g' corresponds to 'e', then the first letter of the key should be $'g' -' e' = 6 - 4 = 2$, which is 'c'.
If 'r' corresponds to 'e', then the first letter of the key should be $'r' -' e' = 17 - 4 = 13$, which is 'n'.

In Cryptogram 2, we can guess that 'c' is the corresponding letter to 'e' in the plaintext.
If 'g' corresponds to 'e', then the first letter of the key should be $'c' -' e' = 2 - 4 = -2 = 24$ (calculation mod 26), which is 'y'.

In Cryptogram 3, each character is appeared only once, and thus letter frequency does not work.

Remark: This example is just to show the mechanism of the Kassiski attack. This attack is very effective for large cryptograms (e.g., in the size of cryptograms given in this assignment).

Your Task:

In the following you can find 10 cryptograms, that are created by Vigenére cipher, where the plaintext is English text and the keyword is a meaningful English word. You are required to decipher the cryptogram that matches with your Student-ID.

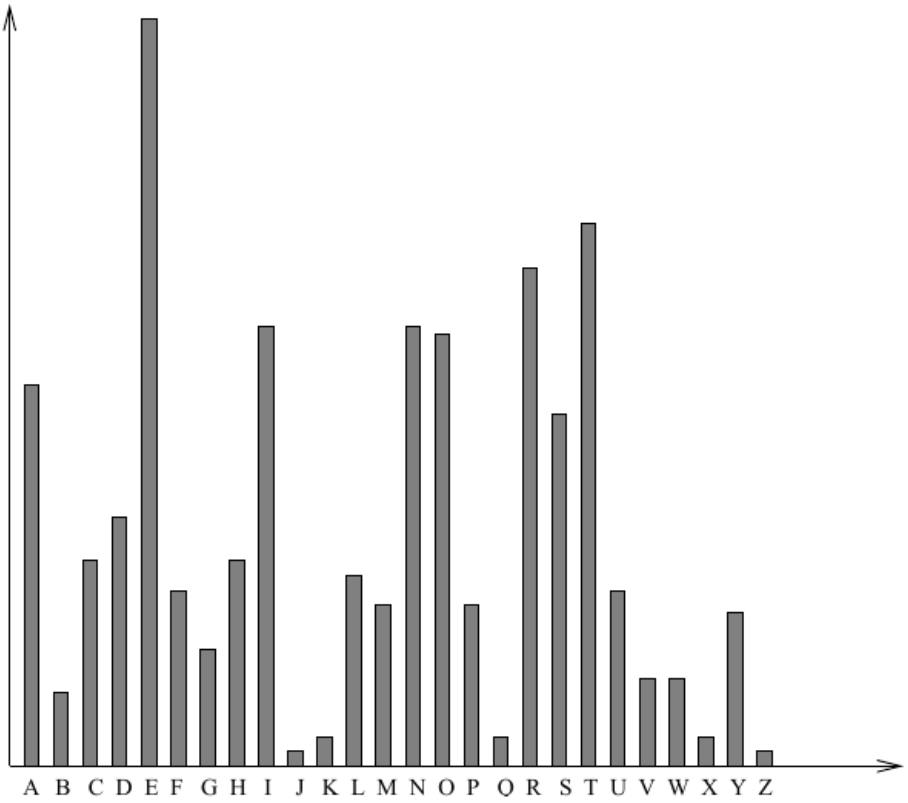

Figure 2: Letter frequency in English texts

[13 marks]

Marking Criteria:

- 1 mark for determination of at least two patterns of length no less than 4 characters.
- 1 mark for determination of the distances between the appearances of the patterns founded in the previous step (highlight the patters in the text/cryptogram).
- 3 marks for obtaining the key-length, i.e., the greatest common divisor of all the distances you computed in the previous step.
- 3 marks for separation of the cryptogram into 'k' cryptograms, where 'k' is the key-length computed in the previous step.
- 3 marks for the determination of the keyword, with proper justification for each letter of the keyword (i.e., applying letter frequency).
- 2 marks for deciphering the cryptogram and obtaining the correct and readable plaintext.

Note that determination of the keyword/plaintext from incorrect results in previous steps is not acceptable.

Cryptogram for whom their Student-ID is XXXXXXX0

oifwkigabwggzeuilnfvqoinxpvcuckxrzlldwkmuyfaamirrpwflglaoikpfzrpvytzvr
amjlwxlpvytqflazsvhngapvkonguoehbvwmzgfosyussgrjmvvkbbtchkgimfdhpsgrnp
pblxbjgnvsmiicjifnglystqusugzbagulgzpwwtimtifhfzepvsehyczqygsiahvfhhuc
uglasfppoagocqpofthlplbzbgzqdpqmvvqpofthlplqkngvbawltyvromjxggmuaauwcg
aggyhyczqygsidvzkbueckuwlgrelaggsfdapwzfvyamkmotfpmnxavlaagyafblzfvfpn
awykogffqkmvvbpoamocqpofthlpllazwkysaazbrrbzwlgymbtvuszlhawggvqpuaeoir
vpsgrnppblxbjgnvsmiiczaagqvyjwhrcwcsmumfflpkvhqlklvllwjgkmfmwtysbgmvvm
yqybbrjkqybhrjzqygoksymkaomcawuksrrlagfsjmybgyrzepbseseahxknzrrpwfycir
omvhqlklvllcrlfqfmsidlzwgqvupbzxwkflzamgtmubwghjmybzxgzeuilnfvuptdusuc
amumsuupbztjvpfpazvgpvjsuwcgagagciblzlhotfpmnxhygzzwjizpluwghrbpoamocq
pofthlplwftavqziyxwjyzxwvwrjlvukmgrpwfhtkfluwlgrelbzthtyujwtdgjpmvhbcw
iglasccnqlbarrlaazbvpapsmwjgukgghiyzblhvrlkejbhkcuaazbrrbzwlkygjpskszl
kmhxbucubxkcdromexgjynmkmvvbpoamocqpofthlplaengkqvuwacnzpvvmckfluwlgre
lwxvclpzmagpfropsgrnppblxbrlklazwkysaazbrrbzwlqyctmkmvvplkwbjvpvnlasjg
nvsmiictckmpvyitwmcmcyqxrhyczqygoksymsaoebdzamhvlzqygoksymaljvppnaxrsw
jweioiguoamhfmapwkolromfmwtqpofthlplaxhfvvhuheszlvzvxfkmdqlariyduggspd
ywetprlrbzxprlrkgfdrplalasjgnvsmiicdqlacecdpavvzqwzgowuckiltqtmbvlhdvl
pvymwdchdwkwwgjilbcemmivbuzrhtkbueyacjxvfuldwkbvckalhognsgsioirpkmeoig
uowgsiysihnpcgjtqdbfuuidzcigapelcrbpoamocqpofthlplauasdcpasvccjlklbcem
mbohocevzamvdqhvvfijroinxhycmwdecnguohkcgcybaxgkflaazbzlnidzcigapetgjg
nvktgzeuilnfvmmbzxgzeumjyffkapwlskmmidedfqzqtesmyscwlcwromkbueyacjxgkf
laazbzlnidzcigapexlvabbwlwenvtqgcdghtlbavdvzsgcgnvvwghnfvlgxgemasfhkkf
lawvfvrrmqbhjfvcdwpvavuhnhrrpwftzcwpvlkotrhjdxhfdvzyxojgnvsmiicapsmwjr
vnagrrthtawgzeuilnfvdvzszwmcuuwlgrelbzxjvppnavokgvvseufppbzfhrilasiisj
pkagtfptilbcemmbzxgzeumjtavqziyxoebhoaoseqpofthlplwxmvvklaktuvgazwmiil
zgwlwwromkbueyacjxwjelvmbbvmapwkkzqlqlksksyvkgckfldwkwwgjilbceysogkwkf
tqfzsecyidbgrnbjdbqcwrvgpbgmsgfhazysbafsrjnwjbhykzwsgmfllksgijcpblhqyc
jsoaskflzsfsjqhowfokaomkmvvqpofthlplwjgck

Cryptogram for whom their Student-ID is XXXXXXX1

omqisespiakgwfvoangvkuvqdiqimfsrtklowuiakgwfvzprpzljmekzbnbusyqmprgkjo
ljweagvqhymeuhgkxggnbruucahtwxzrggwtlvbxbubusjmiwaryqmprgkjoliwtsxmlol
kzqbbjixmccgcriewekxgchfoxicvplamgckpkqegzuvtrqfuvcgokquvnzimwcvfvukvg
gditgfqymsmfvrdkjrsexxwccjmjnbftwtlhqkqtofstcxmiwtsxmlolkzqbbjitmaucqy
pnitbowawjilqegkxxqpsfxkvowuiakgwfvzprpzlgubiebyiesbvueahfirtcoibomfoe
lhqqrvzyighvuvbgcfczjvrviipbhymxbusyqmprgkjolqsinuznuzdkvgwdmucgdvzowq
kzvyiardcybcopitizclvzmdirtzwgvveovaweohqqoemtoywjpgcphzwtqfhymswfhnmr
txbfetbldvwlihqkquvnbuqyevrvtecfsunuzesrtkagokmnwjsmmxqgzvayiqogbgjysk
wuvywemyqgirbowagtwsxnfvlzwfsrtklowuiakgwfvylhskwobffvtoiaqvwtzrocbour
diqimhduizmfseorqfvrvjdvqbzkgnitbowagrzkkbbjqjmesuiyifqvvjqauuckbbhymh
qqrvzyjvruqtohdkpkarhktkurbkxxqps

Cryptogram for whom their Student-ID is XXXXXXX2

fhwvseoehmswyudmmcqvwesitiwkeiohaveceeukikehskmeswslgfzsawiiqdtrwvhejt
prgtzhvjeewysiqxsftcqsztqzdkgmlrdiamsrzduaeizekllryijlyxsekmwktalmliqs
zhpueczxqvefgklzqrskgyucsekiauhlgrzbwkirxirxhskgaomesmgkijtajxwkahazlv
dlwoicbajmmtupsgxjwolaeiucggwzpejxhyuejtvttiutpktrwllfxdkvlvyekbrntiua
ejumheikunamliqszhpueczxqvusslwfoismiuiilaxyqilapvhedhjryudmmcqvwekiau
hmlvabnbsledjtasmcchjktiklscgtahrzetztxzfdgxweathksmudwvseoujkieoysfse
sdayjvdefmpvhedlswtiwkeiohavecsrgntjutgwmjoukliueeukikehskmesfgkkvzejt
procwlwjfrmvxldektrubrgoiufhsmimqrqtgtqsklxigclnvvoafuiiqadbdvpbqttvdf
wvxjqcjxxjtajbrxeczxqvfhwfezzdjtasmcchjkteakwtteexmjfhsmxyqmgkigdinbpv
sevieifiubtrztktvvmskbkeqddhrxqrkaeiqskbqdankiszztwwslftztxktekhplfigg
wwarkxgiqtkaeiunybrdgllbpvhedzvfgpkivfbokxhskeskpzqrsnxyarktvvzolxjwuc
axrkteknkxqslxhvrfavmvztyxsdqtjbgrxswvvvfsztvzzgkvlvyekpmkttzxvvcuakiu
brgiiifiwllfienxvyuskhplfiggmjmphemtmbdxsexylhegmrlbglxajvejqoxfycfidx
zvxgjhygemgkigdeubwvxyzxhzecmlwvpswvvvfsztvzzgagqlxtaeimqlykslbsobxyba
jmmtglsketoeklwkduumyiqstkmtwedewkgdaxhxqnwkeceeukikehskmesiffycfidxzv
xgjhygeafwtiavwwxymtammjboklmsxelhgfzslkytfivxeceeukikehskmessuaidqsxh
vrzyenpkulwoicmcuxwjetjngkgrwbrsdiudicxsnxgkarkietqcggwkduummfztzxpfie
juslzdggxyqsasifrtzxqfpudnwgeirxswfhwymvxdagayuczmlvoadvycmtahrjmrwuiz
zgvhrvusuhrjudwkesxydtvxqifmlzeswvxzanoxtiqswgxrzexymtuefmwfxulbserojl
itdelllrdifzmeyudmmcqvwekiauhlsldsuaidqikuejqdggxyqsztqzdsuaidqafwmjbe
jyitfafwmuqadbrfgrkvlvyelaicawwkffgnvhrkteehhlxukbwjugfbjzoafmppemsepv
dtztrzzbjbgbqldlwtteexmepewwxyqcgghzfiggtzegjxekqrlaeezakbrjtaebvjaraz
memlkvlvyealwlrfavmvztlhmdblwfiefomktiapgliueczxqv

Cryptogram for whom their Student-ID is XXXXXXX3

cgqprcccgfwewmhhtreexwfkqcklggbprkepgqhtrfnweweuxjsrxrjxumeiedshauaike
tmogygxqudppycefketfktobwyzrkhetaipamqprjvggqbbcifjqgydyevetciivkdxtzr
ihttwvpnyzdwegcseprtmrvqgwymevipslwgrfdeegtmbimzpkhmgyfvfsdhijepsjpmgp
gcrihzwisztrrxkczxnklkgenskioqtprrgvsdhwvvghdpnjjqfytdlwkbspvvvagubpci
uinhtzxwhudnzxyoegerwqbmqlvxqoehudivvmityiefketfktoylajwvfacgvrqiswajq
qgfdfklgdaieexkoxptkeeyqgsnitsualzxgfmierrfvaeewynzkdtyitgiduchvvuckkl
chfweuseiytnkacgigikxgbucaeypyzdwejqfqxgepcbsjaxikhipshykqwayiiczuoeux
jofihveuggbpkmqbauaemibagaexchfpcbitkmhnfxtsmaijxkqydskicfxnelvqdqpntv
adfdspwvsyhwvvgrqhixrgrfdwzxjgfpnuxjsmitrgmgaueuyeoftdftrcztnkwyvaznva
vvqtntvadfxoettcotsjfwhpxdesvyzdwklgqdnpksifmehzgmskpdumvwacacpawflajv
gegtskifhtptklgszrrptvwacaehfsogygxkczerfgggetstswzpqeuspscjitonmghurp
nmnnhrrfcdliklvvqpiushaqrhrrkqmadvzkqqhslgjoeihvgkdttrumuyucvvrvspqyci
qbnptkmuomabvvvwmityidssxnempuautyipwzttviphtreexwfkihvjkfeimvgjozxcrp
gzqrtimeoxbatlkbqhwvvgwzirfhwqqsffvhoeieegtmbiifrvvuhwrwvvquiiwvpdtabx
jfajgympqdnpksifmehpwjozcoempvuhsvqkbmawfvmzmxdklghttoiivwoplwswbpptzs
pgaumfhgfzrrptvcsgaglavqjsvhkbrdrdevwactyiqfkiorrczkhetmrvqgsrrfqacszh
gfqstyiucoplcifddddlgvquehvvuktxcyyusebacpuinhtzxwhudnsszseroergqftdsc
nodveitgfyjtrxkczqooiuggqskmvifxoefqlqhacwqqmalvhupamejetsodnkvqzxtdsc
cfqaakmxsxnsysthogygxqudppymeyqntfttchxdvgqbrjszsphttpvvoifptzsppamejl
qkqkeilcjqcobiahttiiwvfgrtlvgweuioifozstyiadddvzhgruuflwkczerfhwqfrigl
gfeprvengaieiqgreenvxycdzsnmvvajtvbesbiifruoxacicrhavrrtjwoplxstwfwmje
tsnpsvhqbodmgyvofxoewkbrxnzxgoxvesvcwohtiyehggejiiuddugwtwzvswmgzphaeh
xsoioiwrootsklgfqhucxucrihvwgqabplxchudnjetsmawrcusjpckrqfajnumpuagagt
tcjxmrxkczxszrxcxkeusphttcfrvfmgyrwkbsaesmvsdgoimphttietwhauaecefketfk
tobwitenuagiklouqceievsepnlrkbftnkmqbmarvwwzfleuiuqdxbvhcbqlaehgtrxczi
phmagfvkhtbffvvvqbucxkdxxcrxkczdfwpqofxnxtqwzinlqdsdhwvwwustskifhidsvg
wfqesvyfcdpnusopuigvrgfmioiwdoetdfrvfmcstiprqctrppiyqeiwvvqhekaqqxpsji
ucrirrruqqcdvrvoxhaiicdbaivhvcodnjxtioinfzgzqccicrhudnrpicdxtyqu

Cryptogram for whom their Student-ID is XXXXXXX4

iyselxmteqsjtfxfbteezsrfeheeiysgtveitcnxidrzomrvmsvapoidctfzaxavioqsmo
pcupcmfwdkjelaevbmjezswimwceevqjqmqszaqwiytehbemacusulmxhzhxlwptmsmztq
swfpxpgrztfcezsmssjwadepfneytrgulrppirgzvqctfzaxudewomezzzbhlrpdkvfcra
cdwmtxmgpoqapurrhjzrexkitpwfwvgbxirtzguppeiiideydtnwuswtdihfchmirpmzgw
hrbelwtdihfcoqnrgbxefivfpqjmrkhipoqntcoeeucjtjqxkhzljyhqevbeprfperftkt
igostxkrysdvfuijrvpxaxkgxthqjkwmtwmizcoelqsvgxlwqmksodmhtcmjyzqhkwhlxq
srbelrmapgfoxttvlqpvuteqfhmfwkvflrmapgjdsriysepwspmswlpgpszftrexxvudmz
ifhiphqhzuoavaevfutiedwqsjtfdxfbalurrzhzvuiyatlqacxguelqbrbzoiervbelrf
hftusiptjkizwqhkfvnxggvkbdfmhvrpyjqxjhfwtqgdiulxudeospxttaoqlrqhvtbdxq
ctfzaxudeomrsdxkvnlrpiysbfwfgrzjlrxdbwbwkagzhixraivhilxmachipendmsnprf
xfbfogdnghprvmeywddceivatlvqeiwwlxqzvmtjwftdgjytdxmoupoqntfzaxahpgupqe
qfhielqteqsjtfxfbbyhfwvrfnvkekwpyoqnjospwqrisulrptzhipvfwvgbxiagkvfvra
lcseriaufbfzjfwvajdwguwwdtizikcepxqgdwopxttfhipvfwzgjdatngfjgeftbszdce
ivatlvqpcgpnexavrtjqytkfjnwkhksndhuuwwflrpwvzmxezxehszhgrvrusiodeqfaxa
ugicwmozvmdccbifgzdxqbjdvmpurbsznvkekctjwftdgbwwarrzmphmhpanpxdxtgzdxq
bjitpxiduwgqidtehlpcedesjdtgqcwdhluavhipsfwvfjdoqekgfnvqitzflvxnzhjdvq
flwsphfwrhdzqbjkworxttjsdcifzvmgcsyiysqffxxtcoplmhkccpmziiodeenavhiciq
svgjrreqrgfosziysozxudecgaynazqlpcenjhfxwitisqffxxjvfovukvgudlmbzfbyhm
scsnlrewfkfolalkvfqeoiffjdefxfbqcsnavadzyxsssvdipifqpywfglqultgqcwdvik
rimqesenjhfxxtxjwtelqlvzmvraleftlgdnghpdceivanpvwavooolqacabyyetuhipoz
pggbnobgfpmpquckvftvodegucyoizcoxgqazsdpfgxchbdceivaxsmowrdqwmqsvfszvo
diffnxucxqpoiearhfcmztcubxexrzhfppspusttkztuoqffxxtyfjgdnghpdceivavdmz
vkvfomerisuppavrfjelyeiccwiybzzmpvmcuypmpuiqgvrkqhksefwucxsmwmbizqdfvh
tjhpoiexxbqffxxtyfjgdnghpdceivat

Cryptogram for whom their Student-ID is XXXXXXX5

pchhlptizjhfatcrifnkhctoqvgxbusvwggszbjchmwvghnvetdsqnrkxtslmdbsuczhtt
iysunjtcldlhcwjkqkitktmsumgtjthlipmwvghfnxgxfdxwtacmoiyxgjvlmjxgftiytn
ckwoudnnvfdwexekgdoemxfbvihmwzgwsrxpiszcfxapivyfbcdouegmhnwwbrxgzgkude
ttcpgqwxkwhmunryovmgtufcgxwmryoxwvbdegkuxxiysquvngrzslqitihbihvdeqhunb
cxhkynhhzbjvkwhrzouwvizcqmfbhtivmgwhftdljtkvphyplxeuoykgiysvypltkvdnva
tislmqgapcqyuxacsucptrfbwcpndlggiwuavoxwvbdeqguvatisdlgfpemeoaxgjoqxux
acsumyadtcqnkgjfivfamgrrhuubcxzhwqfbfrlnauxugdlgfpkqkyftcuqoycktucyytm
xdsdwehguwqavhiysdoemxfbuonxhtrdmcktkmscetacmrjggqzrwbgutjhnhqpcvldgre
tftdwftxjovyengzhlyufpiyhnunryovnjxcvkbitdhkcfegqryoqaggnjswbgkteczyzb
hkbxggkdlgrhnbcvpuimxgjwwyuljtvdmehbdghwvapkcizgkhvfycexhwcunttszbjcpl
ttiucvbtjadlmxijcqfkgtsfregkhvlkcdbikvhmcftwzdquthdcuyehcmsqnkhcrzrhnb
cvoxwvbdegdhfhuwsuhqydiarzrkdksfnkhckcecfwtigfixxgruhihlttiucvrxjgxyuy
diqguubhcwpcvxsnoqacgscsxhiigfdrmgwpjqkyoxufffipwjthlhilttiuycgsrbrhaf
dlgfxclwfkhpgkiywvmeatdslmkghvqxlgtcurryugdkogxtxhjhkyuxrlflnkxhdouegm
pjdhwvhutrdmyxlzzoxklrlgvnjbhzbvyemxfb

Cryptogram for whom their Student-ID is XXXXXXX6

eflrxdztocjcwtuehkxttpskviclkjrxsrtdiycvnfqfresbinskvigfukvnpqxkbgtssn
esqivpwwoynciatchildnvhukwiaggvuxwxtsvuldpgjrterhnzrexxhpcsdehbehrtqhm
jogcvtwkgpwwhxfpekiueabbyeetthlkwhhosbpidkuczgxwbpujjmrausafwgxesvxihh
tanpmennoggwxghceoeibqbgjihxprrtmhmjsccvirkbnesbfwbveeibqbfawixohucxxl
vvrnivbvwzcxtmtoauqxmvseqjxghceoeibqbgjigxesvxigbuhugtpkvmvperhoahpmrt
vwbpwnlvszvlpmkggjixgvsafiskgqvrmtgvcskruhtanvmdgcbnfztkuoeamhtroevcxg
cqboqjgkqnvmdgumfvibmjogkwcxkhugviaggrphtkpcetirxkjrtecwyvvelikksfvssx
hsnvxwxkbsqvbtvwbpwtvwfvvchxtjveiqxkbtrvdokrrfftmysrpxwxusafigtpreggtb
xseuirkgqlgrhntsfvlpmkbsqvbtvwbpjahyprvatxphugwtgfsecrsmjseggtbxsekwjg
kbggpabiwoniihqigumsxtgvvtghvspvwxghceoeibqbniexguhgjvttvgocwtwqbrcztl
ffbrtxgiwavivkkhlgrpunsfvltkgqrkztkvcigvxyakugxwxthugqtluotglpldsrpxpf
rseghlbvvoasjmuwqgvhpjwyuxxgvfnpwxmxwncrjguspwvtwevnprtekhrpwjkgggjeit
pmzqhxykqnvmdgqtgjihmtsnosufggfcktlywynftwghrextwcbvficmktveeibqbbttpk
vmnwxwxphveeibqbnuwjkgggjietthvgwdyvvrkvxwgbgkxnfggfckttwhugribeogksci
tcikhtlvcgjietthlylxvjfreixoggnoihlcurgzxwgbpgsumjsvficmkhlqjiaggrphtk
cqucrcxnwfcqttpgbhgdgxslkrvbptbtqpmkcahvdfqbrregmahbcrdmjsecwtvwfrelpg
psyqvpitwicxtvjoapiabucagjghokukgwtpoqxiglcflfstlpcgjekxvvrcfxekhlvsgx
qfqgvsxnsggmclgfgqvgxcrnpyclgqhtisvjoapiahtocwfabequcrcxnwfqrtytczylxv
jdntxxxucgjigmjoavldlgtbtawbevgjixghceoeibqbvumcmgbqghrtpfrqvsxtrrniix
kbfgvihtfrchtgeflrxxhpwfvltitwzkxxogqeatihifnrlxvqdrteibqbhuismqsauygx
usptirrqfpqrubfsavmpekhlqjxghceoeibqbgteclowgvistefbuwpgwbfggjkgrpqqbn
pwpcxxhpqucrcxnhugicvtmcvmdgqdrteibqbgcotlcdvggthhwahsgfchvqrpeucpcpax
faruwpzgcerppbphrzxpgfhecrhyqfzumibphbcggrrhbivpfqfpktwxthrzxjlkbtcwtv
tsgevnivctteeakqxgcsxeflrxxhpwfvltkgjrtwthrsecxxhphbgrrkadgkscmjseggtb
xseyldaqzquxwxecetirmusptiidgmpcrgxecigviagaruwpzgdycmcmglghvdfvvrevni
vcttebvkdugvixzh

Cryptogram for whom their Student-ID is XXXXXXX7

yhmphtvdpbtieeqgwccklrozoytvdpbtieeqgwccklriaebvtwokpxlvjtplnuixcztvvw
yhmdnvtgyaeyghjskccgxnovzzkljevnlptyiwyiihjczjjkmtnxcitixsqqnyiweqdhfr
jeleiumxtqyalmxhmywicutqzhwvtmlpwicutqzhnihatwnyircwwfvgyidpfpgnpppljs
wczjjksxyaeydwurqgukipeglfjshatwyuwdmupnimhczjjksxyaeydwzsmebvwfmmdytv
jtspswswevnlptyiwyuehiekcsgxnovlfkltuosnyijnkcsgxnovlhuhjczjjkmtnspsjh
tnwehviitwmyzhjnbtwrpyhmvhfaqelryfjtnmzzkljmafzwmheaeiffyaqynyittpplgy
glqnevcflazwrpqellmpqrebcctgwyxeijcxtmxmlwjaltzwiweveevckozphtvdpbtiee
sdlpwicutqzhkljkvzqciigmzzfrjkmjbfajvmcxfixnweucptwbsyfxmezeisiiebpldm
sellieibagqoegyiwycjekuvnnzssfwcqymhhqecjifsgeitsrpceyzxxviwovjwoutnje
wgcxyexxbceckmxdqqzzgzlbeiiiaezdyzxyhiecjxtfqyxzxxazrodistavhfannotnjz
flcpwicutiyuccxiatmkljsbfxpskmiebvqftqnucxjcpychyjsnzlrxyeuanzrltwoywi
ftqyzfvrabtiewjcccckcxezgctixakcsgxtsgdnvqtrinlptyoocuglncajmkirialavr
jriwnvvrrmqyivnnoeirwjtwqwicutwrlrtmikalzqntqgyjyxeleigvtvqoyzrkozxukm
tnapwlvntgdyiznemdgfwyoneyexmiaeyiqnscdyumscwydlrhtqzhnmyhxccdmyidpmgv
tvqocekhovqcuistqlfzxdtplnzwjnkcsgxnovlhvrhrganzsssgdnvqnsalcuxtbmmlve
pajwyzjftptlutfrbjqzxmocejimtrsyinpjdopiwxmespstessgdnvqftqnucpdrmnimi
wptlcexjxbqlfqhozcyjttnlthxgnppplkictetnymsswxyrturwalzeyebtgvjwaupnyi
tbrpwkmaewqnyikotwinmsgienrgpsqdnfwdsbpgrxnciwfpvjcwgyitqaqynvbyfzzgtm
uhmcnvbyozppvrrozpxiextqnucpdtwoyuyhebsyuihrganzsskmjutmuhmcnvbyovwsrx
yakvcjsseesykljrbsyrhaezduictrkcsgxfniwsjxyrqpmksielfwvxmelpwicutqzhbi
dozafrmstminsctbaplmmsgktjyiwtminfrqyiysvrhrganzsssksydiautyyieglmeikl
nsbjjvskabeutonskzhjmiezpxksgekzggpjtmwszrxekflvepnwhhgpfiveyoxftblwbm
xovpqyiwebsyrhaezduicmaalklestqesfjulithkictiyxtswrmdjfriivrwztmezeyox
fcpzmvrulithkictienrgpiazhvamezpnyifddpljewyksifwjsxwuzryefeuehnsbsyek
nvmywfvweaaiehnnoncgljrbprkwzbapklisttjnyifddpljewycdyjxmeqyzfvrabtieh
jdcnyumsozoyixtrmnimiwptlcexjxbniivjsxzhumsgbzjiiaiwfmccznapyegnppplki
ctwcnfjnnlebvojyiajcmjdinbfwjnktjyiwtminrxyakvcjsseesyiiyhmlxmiwsicsji
qekemkljcqabvvyefeuehnsbsyeknvmynyihozcyjttnlthxtqaqynvbytppisnjcbtpvm
xtpphksgeimfvxtdmootiyhmafrmstminwvtmltzwiwevewztmezeyox

Cryptogram for whom their Student-ID is XXXXXXX8

vauxgjkzvvhtramgrmcxpvxjbqjwnbgfhychwumwdnjzvtbkamqvxfzmibqtgjcnacvfpn
owikogfdkurgkchqumvvqzkwkwkwjnvasjwnbgfhycmmcksugangkserrialweucqeaotp
txvhgpqomofopzzagviicvuqgukfzuyxqflnqfxfkfznqezfudvifcucgahhfvtvtwthzl
bbjxgvapzkmmfdvktrdkmngumsdsikqgrzrdwptzjcxctbhpyxzaihfqtavxazqnikwhfz
zcpvcebdbkhbrjgguxqlpzqhtbrbqmtloiwcixbbxsitkfwkcykqfdlrvbkhbrjmmuhiia
zaetbemolgysrropglmjrzuwgqflyqvbceygagviigoghhfrlzvekmgrdwplmjrzuklqrj
gmfisidzkvlstpzkaycinzzhxqkqzktxqpmwagkjrrdwphtkfzkkivvpomzmdimqqfxgem
dvhhfdyoqqgkyyoaqxjvpowcgoutzzutfpyimexgjymgehbugoqqgtfpvaafavrmqedspc
iktrdkgjvurgkchbqusllxwpwwkgjvcezpqzkwkszqopcmhycfmausrrgmclhrqgwpzojr
cmoxgjybmvasflzbkfsgyyqutbvvvuresfdvvwgqflyqvbceygtalstsmmggqiwkbkhbrj
bwtbhykkcdewtizgggqiwkbkhbjacmoxgymrmxxftyivqmpvsikqgrzrdwptzcwnmenfva
jurnhrrdwptzjcxctbhprcqufsrqpzglhycvuqnbkmakqfdlrvbkhbrjznhhfkpzywbfvb
wgvasscnbenficibnryemrvoxhymyavhrvdzivtgpqomotdimkwuxrrjbwtbhykdautwur
jjgvcdnpbcmwflvtnrgvapzgbtkfzxgkqvgqmfesmcgwhvcdnpbcmwflmmsnwicybqwswc
vbkmsoazmflhycxwoiikyoqqgocpzaqnftcnwhmvvftxqmvvqdagwoutzzutfpkjavhtkf
zjglhbljepvfpnowurgkchakgqlpmmpmijcvzgvcdnpbcmwflvtnrgvapzgmvvkzudxfjm
abjbgtjvautfvqjugmwdcninlctygtgwdiyxbkvocjtagviickzqoosjzagviigogcvfpn
owurgkchqulozbowdxdimqidemjcxctxwwrcmfbtwgxcnmmfdymhxokgiokmqrlwmuacnl
owdxsjqzvvbocjtiuwwwddkwehrqnwnoweevegezbljepwwwddkwehgpjjnxajsxpclwer
zogktraowtbgrrdwphfkfzkqfdlrvbkhbfdyquvfvrztqzoigopoldimqidesjcxctbhpg
nkqggzbzzgwhfzzifxelyomhhfdmnbrkotrdkceogngqethzmiaehagsoivbceygagviig
ogkgqcsymuifftvjnxgvapzkmmrqvxthdvpncdlsk

Cryptogram for whom their Student-ID is XXXXXXX9

buebrrmlqdkrhyirlaxalsjciyspccfzgiipxuxqfkflvqzyevrzzlxhyqkghuwwkclvjt
vplvpikghuwglaahwzvebzpokghumbtcgamjvqvyirzrvhvriczpwhiympsbvqvyskjckc
mqvqtuhweqnyebtcypvgkjrsekjatufsdywlawkfklkoibmvffvydprukfxyyzvqyvvsoy
fwpsucyhyzkggnsbgyrtibkmkprgzbxyxfrbbukqfsekvsjseambrdbuioebhynozjllrh
vlvlebfralvgfjnamceglasdimophsrlbugserbcigtfxtihfpxdefunxvtzvrahxtfjev
ahyckbpsjdhyilrkisissyrvjtvplhjsvbuhgyjwlaiakftaezcmpzfipckzebuqxspsiq
mvgfvymltffdbsigrzhbxsraavxvvpuhwsumgwvsmghbwrvyeprujygfsbvatuzwvumoig
vnkvjwccliitfpxlrurebukweznzmbvqldmhyralmbugophirjtiymvphywscjxyawkftz
louwkltikympsbtyghpgfzxipotiepwhvbyysawsmbvsrsvamcenkvgsvbbukgzltkhwkg
hugfvbbagoibklkwjrkhxwflvhrpvsllhojnkvstfdbkibkgmfebuqxjyfzrrmsfgyrtib
kgghwwdgehvarlglvsjakvagvpopgsjpxxywictsppzbwlvgkmiseqvralmfgyrtibkggl
wqimpdlwtfbziwkfxyvswsgkirfpwltcjgmlhrvnxuhweehuxvvynjxwflhbxqfkxhphvp
ghxscwbuwiiygjiqrlulstwcklhhfntyxwtgihrhjggzmhlympsbjualvskfxfwiwdxypc
jqtzefvqnsxcwsgmewizxoejzmny