

Homework 2: Cryptanalysis

This homework is due **Thursday, September 16, 2021 at 11:59 p.m.** and counts for 5% of your course grade. Late submissions will be penalized by 10% plus an additional 10% every 5 hours until received. Late work will not be accepted after 24 hours past the deadline. If you have a conflict due to travel, interviews, etc., please plan accordingly and turn in your homework early.

We encourage you to discuss the problems and your general approach with other students in the class. However, the answers you turn in must be your own original work, and you are bound by the Honor Code. Submit your solution on GradeScope following the instructions at the end of this document.

To solve these problems, you will probably want to write some short programs; submit them with your answers. We recommend Python, but you may use any common language or numerical package.

1. Here is some ciphertext that was produced by a simple substitution cipher that we learned about in class:

OBRGXIMYAZZAWCATBNMUYHHAZNVGFCXPVVSIIJSVLKIFAVGBIECAZSBWGRGRQWUCHMMOCYE
FLGQQNKFSHQMGYALNKCIIJQVEKVWNFOYFYQBESGOYTXMAYTXSISNBPMMSGOJBKFWRTTMLS
BNQMLLRGFNZUAWHZLBRVZGHUVZMCKJEHSLSWGXCNZYEXRIMLPXRIXNUXRNSNRPHFDHBMAY
WKHTKNGNUXRNUJUVGMNYEYNLYYGPYFSBNQQWUCHMMSLRWTFDYQRNOJUEWNLVUZIDHWXLH
TLKNEXMALBRQGUMMGXCUFXLHTLLRTROJYFIDHLIGADLUBVXENSCALVCDFFIQCFAHISILU
XXZXNUAMZAWISRNOJYKMQYECGRSBWHAHLUFBBPDPWLJBRYOCYEAYSVYXSI SPRKSNZYPHMM
WKHXMWWMGAZNEOFMDHKORMGOKNUHTAZQRAZPWBRTQXGZFMJAXUTRNWCAPZLUFRODLFYFL
GUKHRODLTYRGYWHNLRIUCNMDXOCGAKIFAQXKUQMVGFZFBVLSIJSGADLWCFGNCFMGTMMWI
STBIMHGKXBSPPVGFVWHRYHNWXSNGHLEBNHYYQPZLXUEXNHDSBGDQZIXGNQKNUXCCKUFMQI
MMRYEYUNFHEUDIAZVUJWNGQYSFVSDNZYFNOLWGRBLJGLGTMWWISKZJAXVMXCFVEBMAAHTB
SNGUPENMWCGBRIFFLHMYOBBBRNZIEHTAZFLTBMUVGSYVQVMGNZYROHFKISPZLOBBVZHLB
BKNOYBYRTHVYELSUFXGADJJISBSUTFRPZSGZPTQLQCAZHNGHGADMCCYEEODARGDLSFQHDM
FIGKZCKYNLDWGHQEDPQHRBSBWLKDBAMFNOJDSJTFIFMYHZXWXZHQYLBNGSQAWRHMWWQNK
HMYPEZLWXUXVCDFAHSQSMGXOLWWVHTMLCZXHHOUVMHHYZBKQYAHSHQWGRGSMFIEPHFDB
RMTLFBVLZLESOTBEXIEYQYKBFNOJDCRLAOLWEHRMWMGADYFYZZRRZJIAMHYJQVMGIMNQXKU
QNUXUUDORHENAGRMGULCFUDCFANEHNLFRGTGYSXBYXIMLBIOIFYAMGUKWBNMNWXSHQGGLRM
GUFYVMGYJHHFDLAWNEROHYEBNLANLHQNZYABBYKNPTKWMFMHIFMJBSBJYTTQXLIPLGAM
FTQCSN

Assume that encrypting with the key letter A results in no change, B results in an increment by one place in the alphabet, C results in an increment by two places, and so on.

What is the key? (Show your work.)