

LAB 1

Cracking codes

EXPERIMENT 1.1. Open Mathematica and compute $2+2$. Hint: Shift+Enter.

EXPERIMENT 1.2. Try out the `StringReplace` command:

(a) What does `StringReplace["asdf", {"a"->"b"}]` do?

(b) Why doesn't `StringReplace["asdf", {"S"->"B"}]` change anything?

(c) How do you change two letters?

PROBLEM 1.3. Use `StringReplace` to decode the following text encoded with a Caesar cipher. Write down the formula for the cipher and the author of the text.

QNaN RB SJVNB QNWAH CAXCCNA FQNW QN FJB JKXDC OXDA HNJAB XUM.
DY DWCRU CQRB CRVN, QN QJM QJM J QJYYH URON, URERWP YNJLNODUUH FRCQ
QRB VXCQNA JWM OJCQNA RW J KNJDCRODU QXDBN KNBRMN CQN BNJ. CQNaN
FNAN JUFJHB YUNWCH XO XCQNA LQRUMANW OXA QRV CX YUJH FRCQ, JWM CQNaN
FJB J BJWMH KNJLQ OXA QRV CX ADW JKXDC XW, JWM CQN XLNJW CX YJMMUN
RW. RC FJB CQN YNAONLC URON OXA J BVJUJ KXH.

CQNW, XWN MJH, SJVNB VXCQNA JWM OJCQNA FNWC CX UXWMXW CX MX
BXVN BQXYRWP, JWM CQNaN J CNAARKUN CQRWP QJYYNWNM. KXCQ XO CQNV
BDMNNUH PXC NJCNW DY (RW ODUU MJHURPQC, VRWM HXD, JWM XW J LAXFMNM
BCANN) KH JW NWXAVXDB JWPAH AQRWXLNAXB FQRLQ QJM NBLJYNM OAXV CQN
UXWMXW IXX.

PROBLEM 1.4. Use `StringReplace` to decode the following text encoded with an Affine cipher (a cipher whose encoding function is of the form $ax+b$). Write down the author of the text, and then figure out the encoding function. Hint: does the decoding function look similar?

L HBEG GN XMBBW HLCG VZ TPV LE VZ VNPGC RES ENH GCBGBX TPV LE
 VZ CRLO RES HCBE L TNG NPG NK ABS GCLX VNOELET L GOLWWBS NE GCB
 XDRGBANROS RES AZ VLXGRDB L SONWWBS VZ XHBRGBO LE GCB XLED HCLMB
 GCB HRGBO HRX OPEELET RES L JNPMS GBMM LG HRX TNLET GN AB R GBOOLAMB,
 CNOOLAMB, EN TNNS, YBOZ ARS SRZ.

PROBLEM 1.5. Use `StringReplace` to decode the following text encoded with a substitution cipher. Write down the author of the text.

THJFN ITY ENCJRRJRC BM CNB DNKS BJKNO ML YJBBJRC ES WNK YJYBNK
 MR BWN ETRA, TRO ML WTDJRC RMBWJRC BM OM: MRFN MK BIJFN YWN WTO
 VNNVNO JRBM BWN EMMA WNK YJYBNK ITY KNTJRC, EZB JB WTO RM VJFBZKNY
 MK FMRDNKYTBJMRY JR JB, TRO IWTB JY BWN ZYN ML T EMMA, BWMZCW THJFN,
 IJBWMBZ VJFBZKNY MK FMRDNKYTBJMRY?

YM YWN ITY FMRYJONKJRC, JR WNK MIR GJRO (TY INHH TY YWN FMZHO,
 LMK BWN WMB OTS GTON WNK LNNH DNKS YHNNVS TRO YBZVJO), IWNBWNK BWN
 VHNTYZKN ML GTAJRC T OTJYS-FWTJR IMZHO EN IMKBW BWN BKMZEHN ML CNBBJRC
 ZV TRO VJFAJRC BWN OTJYJNY, IWNR YZOOHRHS T IWJBN KTEEJB IJBW VJRA
 NSNY KTR FHMYN ES WNK.