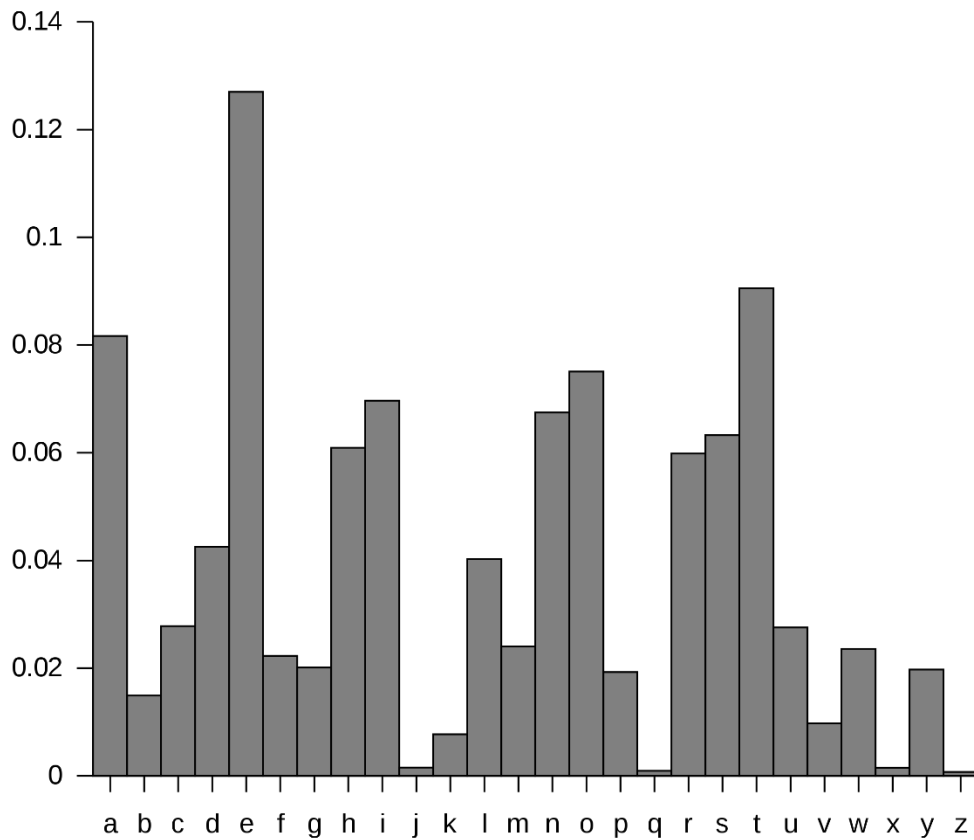


| A | B | C | D | E | F | G | H | I | J  | K  | L  | M  |
|---|---|---|---|---|---|---|---|---|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |

| N  | O  | P  | Q  | R  | S  | T  | U  | V  | W  | X  | Y  | Z  |
|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |



Frequency of letters in the English Alphabet

### Caesar cipher:

1. Choose a key between 1 and 25.
2. Add this number to the decimal-encoded letters of the message in mod 26.
3. Convert the decimal-encoded letters back to letters.
4. To decrypt, reverse by subtracting instead of adding the key.

### Vigenère cipher:

1. Choose a 4-6 letter word as a key
2. Add this word to the message in mod 26 under a decimal-encoding of the letters. If the word is shorter than the message, repeat the word over and over again.
3. Convert the decimal-encoded summed message back to letters.
4. To decrypt, reverse by subtracting instead of adding the key.

### RSA algorithm:

1. Alice says hello to Bob.
2. Bob choose two large prime numbers  $p, q$  (for this exercise, choose 2-digit prime numbers)
3. Bob chooses an exponent  $k$
4. Bob sends  $(n, k)$  to Alice as a public key.
5. Alice has a message  $m$ , and she sends  $b \equiv a^k \pmod{n}$  to Bob.
6. Bob decrypts the message by computing  $a \equiv \sqrt[k]{b} \pmod{n}$ , because he knows  $\phi(n) = (p - 1)(q - 1)$