

Appendix A

Examples of the take-home programming tasks

Question 1

In this exercise, the 26 letters in English will be mapped to a number. The mapping is not case sensitive (i.e., lowercase, and uppercase of a letter will map to the same number)

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

Write a Python program that will accept users' surname and calculate the sum, product, and average of the characters as shown in the letter-to-number mapping above.

Example: For an input "Cheung",

Sum = C + H + E + U + N + G = 3 + 8 + 5 + 21 + 14 + 7 = **58**

Product = 3 x 8 x 5 x 21 x 14 x 7 = **246,960**

Average = sum/number of character = 58 / 6 = 9.67

```
Please enter a surname. Accepts only English alphabets: Cheung
Surname: cheung
Sum: 58
Product: 246960
Average: 9.67
```

```
Please enter a surname. Accepts only English alphabets: Biden
Surname: biden
Sum: 34
Product: 5040
Average: 6.8
```

Question 2

In cryptography, we hide and distort messages so that adversaries or third parties cannot understand our communication with a trusted partner.

Write a program that can encrypt and decrypt a message by swapping every character with the 5th letter (e.g., $a \rightarrow f$, $b \rightarrow g$, $u \rightarrow z$, $w \rightarrow b$). The characters are non-case sensitive (i.e., uppercase and lowercase characters will be treated as the same). Numbers and other special characters will remain unchanged.

```

Enter 'E' for Encryption and 'D' for Decryption: e
Please enter a message for encryption or decryption: I love you
Message:  i love you
***** Encrypted Message *****
n qtaj dtz
*****
Enter 'E' for Encryption and 'D' for Decryption: d
Please enter a message for encryption or decryption: n qtaj dtz
Encrypted Message:  n qtaj dtz
***** Decrypted Message *****
i love you
*****
Enter 'E' for Encryption and 'D' for Decryption: E
Please enter a message for encryption or decryption: Programming is fun but requ
ires deep thinking
Message:  programming is fun but requires deep thinking
***** Encrypted Message *****
uwtlwfrnsl nx kzs gzy wjvznwjx ijju ymnspsnl
*****
Enter 'E' for Encryption and 'D' for Decryption: d
Please enter a message for encryption or decryption: uwtlwfrnsl nx kzs gzy wjvz
nwjx ijju ymnspsnl
Encrypted Message:  uwtlwfrnsl nx kzs gzy wjvznwjx ijju ymnspsnl
***** Decrypted Message *****
programming is fun but requires deep thinking
*****
Enter 'E' for Encryption and 'D' for Decryption: |

```