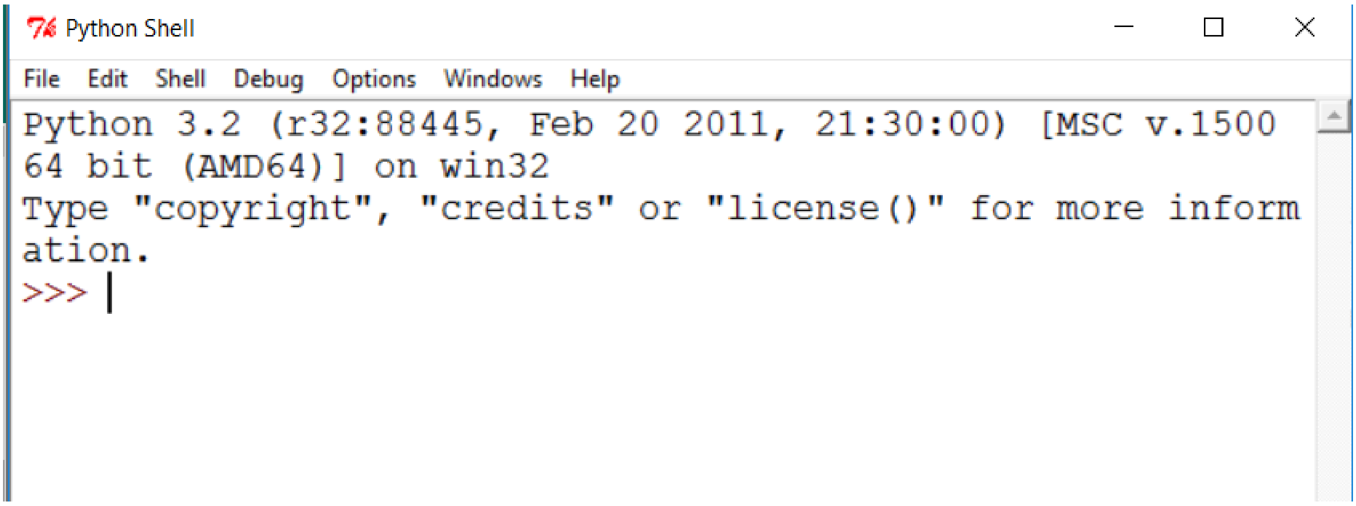
Caesar

Name:	Class:	Date:

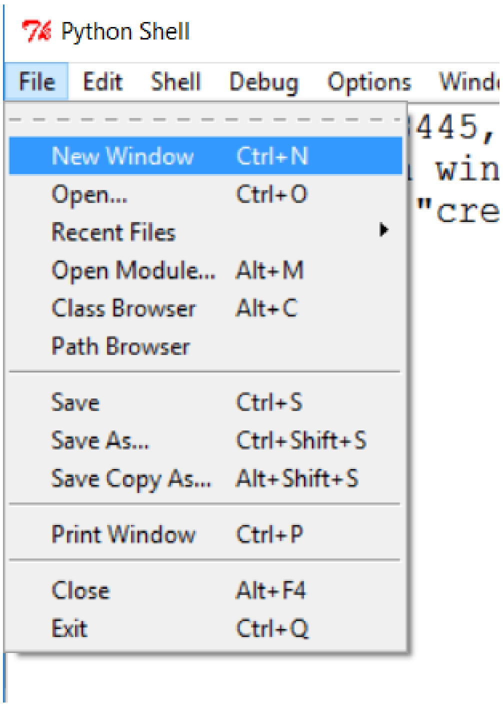
Create a new Python project as follows:

Open IDLE, ideally the newest version.



```
Python 3.2 (r32:88445, Feb 20 2011, 21:30:00) [MSC v.1500
64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more inform
ation.
>>> |
```

Click file and create a New Window:



Name this file:

Caesar.py

Caesar

Caesar ciphers are a substitution cipher that has existed since ancient times. It is credited to Julius Caesar and recognised as one of the earliest ciphers.

It is a simple premise as letters are shifted x places along the alphabet.

The below is a shift of 3.

A	B	C	D	E	F	G	H	I	J
D	E	f	g	h	I	J	K	L	m

The shift wraps around the alphabet so Z will go back to C with a 3 shift.

In maths this is done by modulus so with an alphabet of 26 we mod 26.

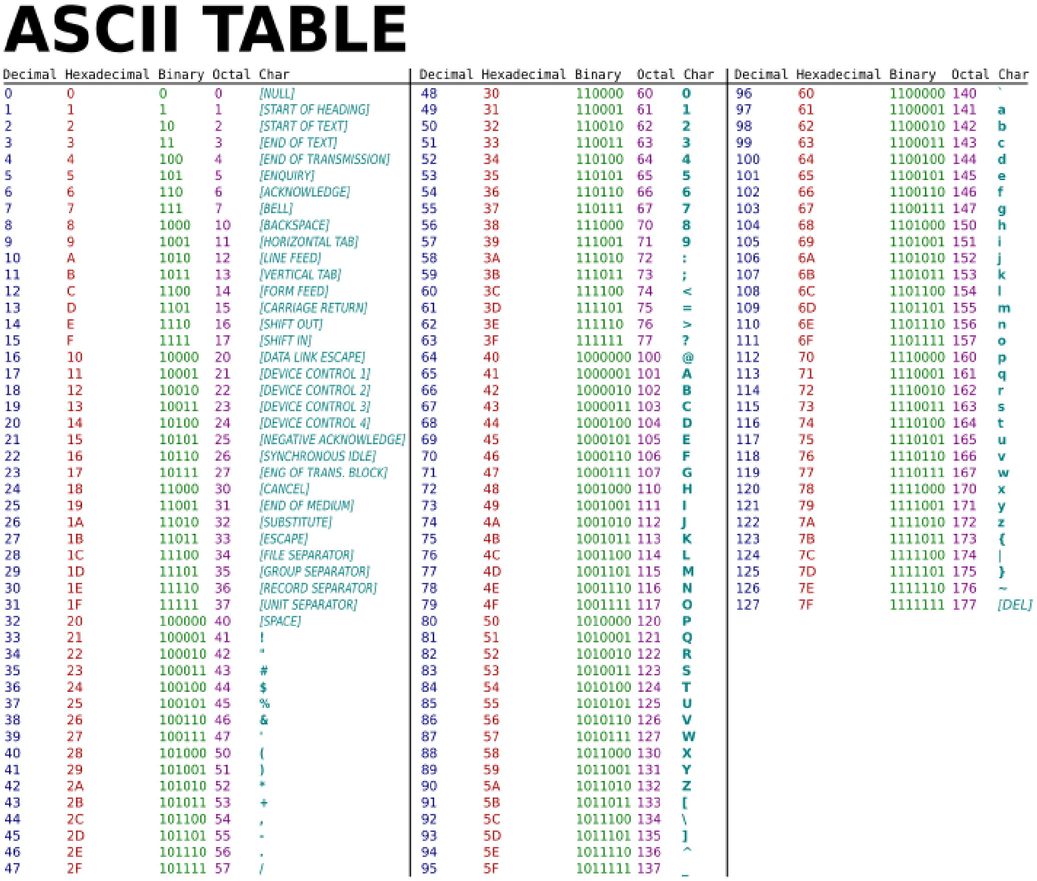
Z = 26

Z + 3 = 29

29 mod 26 = 3

3 = C

We don’t use 26 letters in a computing alphabet as to create all the characters on a keyboard we need to expand this. We will use the Ascii table which as a standard has 0—127 characters starting from NULL to DEL.



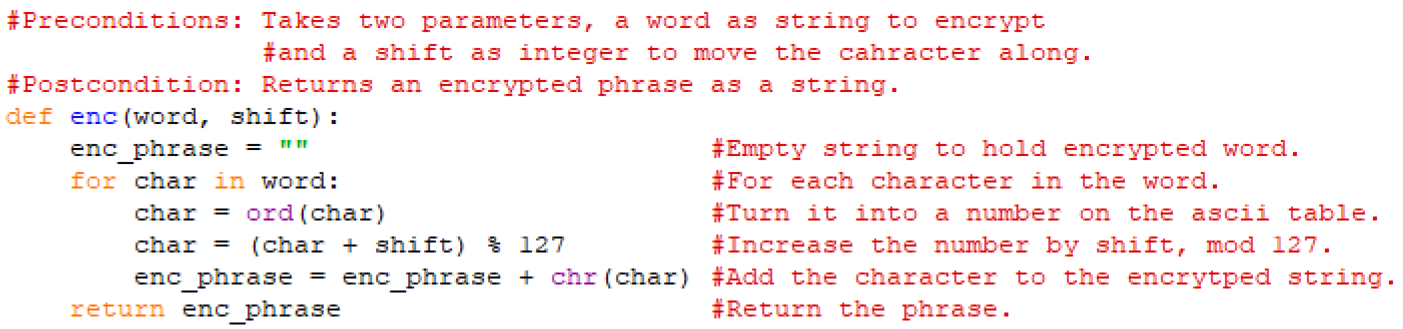
ASCII TABLE

Decimal	Hexadecimal	Binary	Octal	Char
0	0	0	0	[NULL]
1	1	1	1	[START OF HEADING]
2	2	10	2	[START OF TEXT]
3	3	11	3	[END OF TEXT]
4	4	100	4	[END OF TRANSMISSION]
5	5	101	5	[ENQUIRY]
6	6	110	6	[ACKNOWLEDGE]
7	7	111	7	[BELL]
8	8	1000	10	[BACKSPACE]
9	9	1001	11	[HORIZONTAL TAB]
10	A	1010	12	[LINE FEED]
11	B	1011	13	[VERTICAL TAB]
12	C	1100	14	[FORM FEED]
13	D	1101	15	[CARRIAGE RETURN]
14	E	1110	16	[SHIFT OUT]
15	F	1111	17	[SHIFT IN]
16	10	10000	20	[DATA LINK ESCAPE]
17	11	10001	21	[DEVICE CONTROL 1]
18	12	10010	22	[DEVICE CONTROL 2]
19	13	10011	23	[DEVICE CONTROL 3]
20	14	10100	24	[DEVICE CONTROL 4]
21	15	10101	25	[NEGATIVE ACKNOWLEDGE]
22	16	10110	26	[SYNCHRONOUS IDLE]
23	17	10111	27	[ENG OF TRANS. BLOCK]
24	18	11000	30	[CANCEL]
25	19	11001	31	[END OF MEDIUM]
26	1A	11010	32	[SUBSTITUTE]
27	1B	11011	33	[ESCAPE]
28	1C	11100	34	[FILE SEPARATOR]
29	1D	11101	35	[GROUP SEPARATOR]
30	1E	11110	36	[RECORD SEPARATOR]
31	1F	11111	37	[UNIT SEPARATOR]
32	20	100000	40	[SPACE]
33	21	100001	41	!
34	22	100010	42	"
35	23	100011	43	#
36	24	100100	44	$
37	25	100101	45	%
38	26	100110	46	&
39	27	100111	47	'
40	28	101000	50	(
41	29	101001	51	)
42	2A	101010	52	*
43	2B	101011	53	+
44	2C	101100	54	,
45	2D	101101	55	-
46	2E	101110	56	.
47	2F	101111	57	/
48	30	110000	60	0
49	31	110001	61	1
50	32	110010	62	2
51	33	110011	63	3
52	34	110100	64	4
53	35	110101	65	5
54	36	110110	66	6
55	37	110111	67	7
56	38	111000	70	8
57	39	111001	71	9
58	3A	111010	72	:
59	3B	111011	73	;
60	3C	111100	74	<
61	3D	111101	75	=
62	3E	111110	76	>
63	3F	111111	77	?
64	40	1000000	100	@
65	41	1000001	101	A
66	42	1000010	102	B
67	43	1000011	103	C
68	44	1000100	104	D
69	45	1000101	105	E
70	46	1000110	106	F
71	47	1000111	107	G
72	48	1001000	110	H
73	49	1001001	111	I
74	4A	1001010	112	J
75	4B	1001011	113	K
76	4C	1001100	114	L
77	4D	1001101	115	M
78	4E	1001110	116	N
79	4F	1001111	117	O
80	50	1010000	120	P
81	51	1010001	121	Q
82	52	1010010	122	R
83	53	1010011	123	S
84	54	1010100	124	T
85	55	1010101	125	U
86	56	1010110	126	V
87	57	1010111	127	W
88	58	1011000	130	X
89	59	1011001	131	Y
90	5A	1011010	132	Z
91	5B	1011011	133	[
92	5C	1011100	134	\
93	5D	1011101	135	]
94	5E	1011110	136	^
95	5F	1011111	137	_
96	60	1100000	140	`
97	61	1100001	141	a
98	62	1100010	142	b
99	63	1100011	143	c
100	64	1100100	144	d
101	65	1100101	145	e
102	66	1100110	146	f
103	67	1100111	147	g
104	68	1101000	150	h
105	69	1101001	151	i
106	6A	1101010	152	j
107	6B	1101011	153	k
108	6C	1101100	154	l
109	6D	1101101	155	m
110	6E	1101110	156	n
111	6F	1101111	157	o
112	70	1110000	160	p
113	71	1110001	161	q
114	72	1110010	162	r
115	73	1110011	163	s
116	74	1110100	164	t
117	75	1110101	165	u
118	76	1110110	166	v
119	77	1110111	167	w
120	78	1111000	170	x
121	79	1111001	171	y
122	7A	1111010	172	z
123	7B	1111011	173	{
124	7C	1111100	174	|
125	7D	1111101	175	}
126	7E	1111110	176	~
127	7F	1111111	177	[DEL]

Caesar

Building the Caesar Cipher will require two functions one to encrypt and one to decrypt.

Lets start with enc():



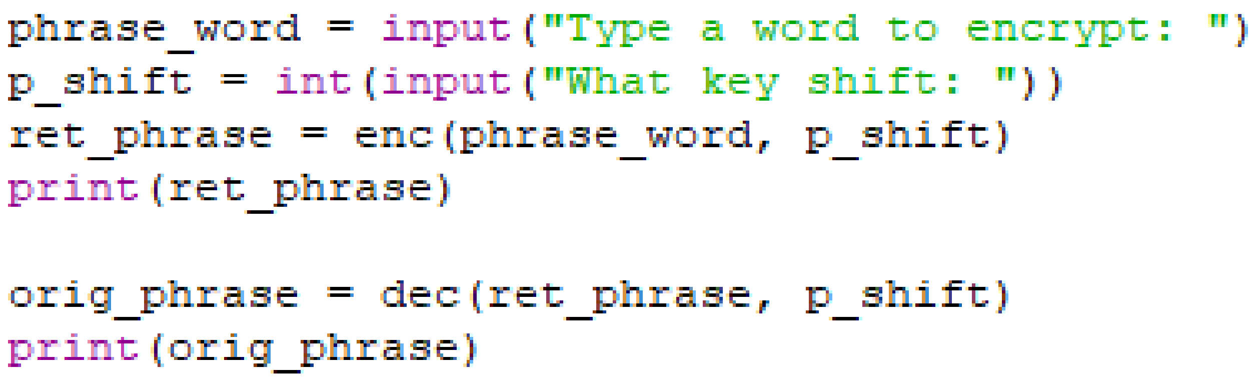
```
#Preconditions: Takes two parameters, a word as string to encrypt
                #and a shift as integer to move the cahracter along.
#Postcondition: Returns an encrypted phrase as a string.
def enc(word, shift):
    enc_phrase = ""                         #Empty string to hold encrypted word.
    for char in word:                       #For each character in the word.
        char = ord(char)                    #Turn it into a number on the ascii table.
        char = (char + shift) % 127         #Increase the number by shift, mod 127.
        enc_phrase = enc_phrase + chr(char) #Add the character to the encrytped string.
    return enc_phrase                       #Return the phrase.
```

This function simply takes the word and applies the shift one character at a time.

We do however use data type conversion to change the character into a number using ord(). We also use chr() to change a number to a character.

Now complete the dec(): unction. I won't give you the code as you should be able to work it out from the code above!

Finally, you need to run the cipher with some values.



```
phrase_word = input("Type a word to encrypt: ")
p_shift = int(input("What key shift: "))
ret_phrase = enc(phrase_word, p_shift)
print(ret_phrase)

orig_phrase = dec(ret_phrase, p_shift)
print(orig_phrase)
```

There we go, a Caesar Cipher in Python!