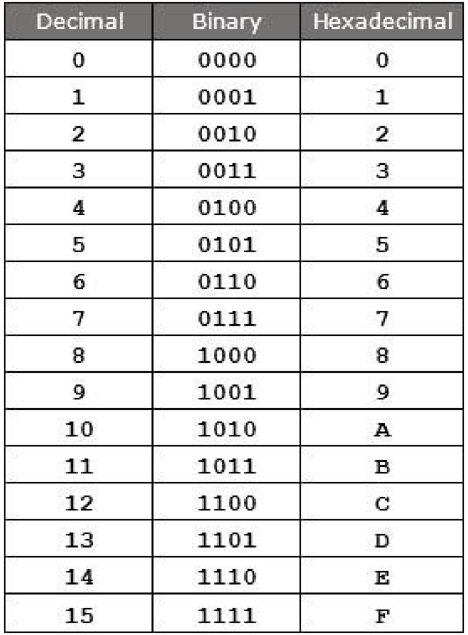
Graphics and Computer Vision

Theory and Understanding

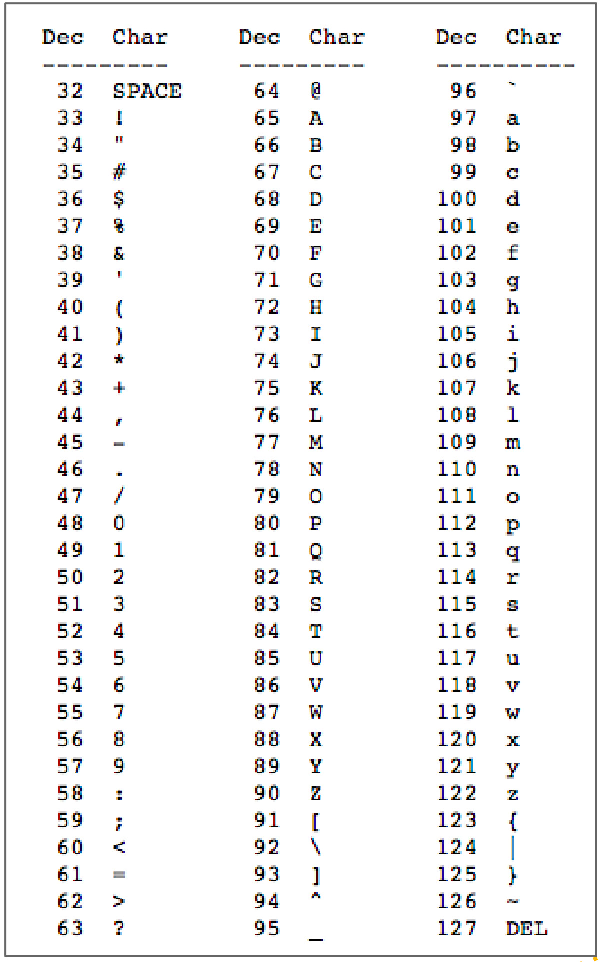
Question 1

a) How many bytes does the string "Aha!" need to be coded using the ASCII code?

b) Express how 33 it is represented using 1-byte binary.



Decimal	Binary	Hexadecimal
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F



Dec	Char	Dec	Char	Dec	Char
32	SPACE	64	@	96	`
33	!	65	A	97	a
34	"	66	B	98	b
35	#	67	C	99	c
36	$	68	D	100	d
37	%	69	E	101	e
38	&	70	F	102	f
39	'	71	G	103	g
40	(	72	H	104	h
41	)	73	I	105	i
42	*	74	J	106	j
43	+	75	K	107	k
44	,	76	L	108	l
45	-	77	M	109	m
46	.	78	N	110	n
47	/	79	O	111	o
48	0	80	P	112	p
49	1	81	Q	113	q
50	2	82	R	114	r
51	3	83	S	115	s
52	4	84	T	116	t
53	5	85	U	117	u
54	6	86	V	118	v
55	7	87	W	119	w
56	8	88	X	120	x
57	9	89	Y	121	y
58	:	90	Z	122	z
59	;	91	[	123	{
60	<	92	\	124	|
61	=	93	]	125	}
62	>	94	^	126	~
63	?	95	_	127	DEL

Question 2

What will be the result of executing this code? If there is some problem, how can it be fixed?

```
def functionA(p):
    x = p + 100
    return x
functionA(1)
print(x)
```

Question 3

What will be the result of executing this code? If there is some problem, how can it be fixed?

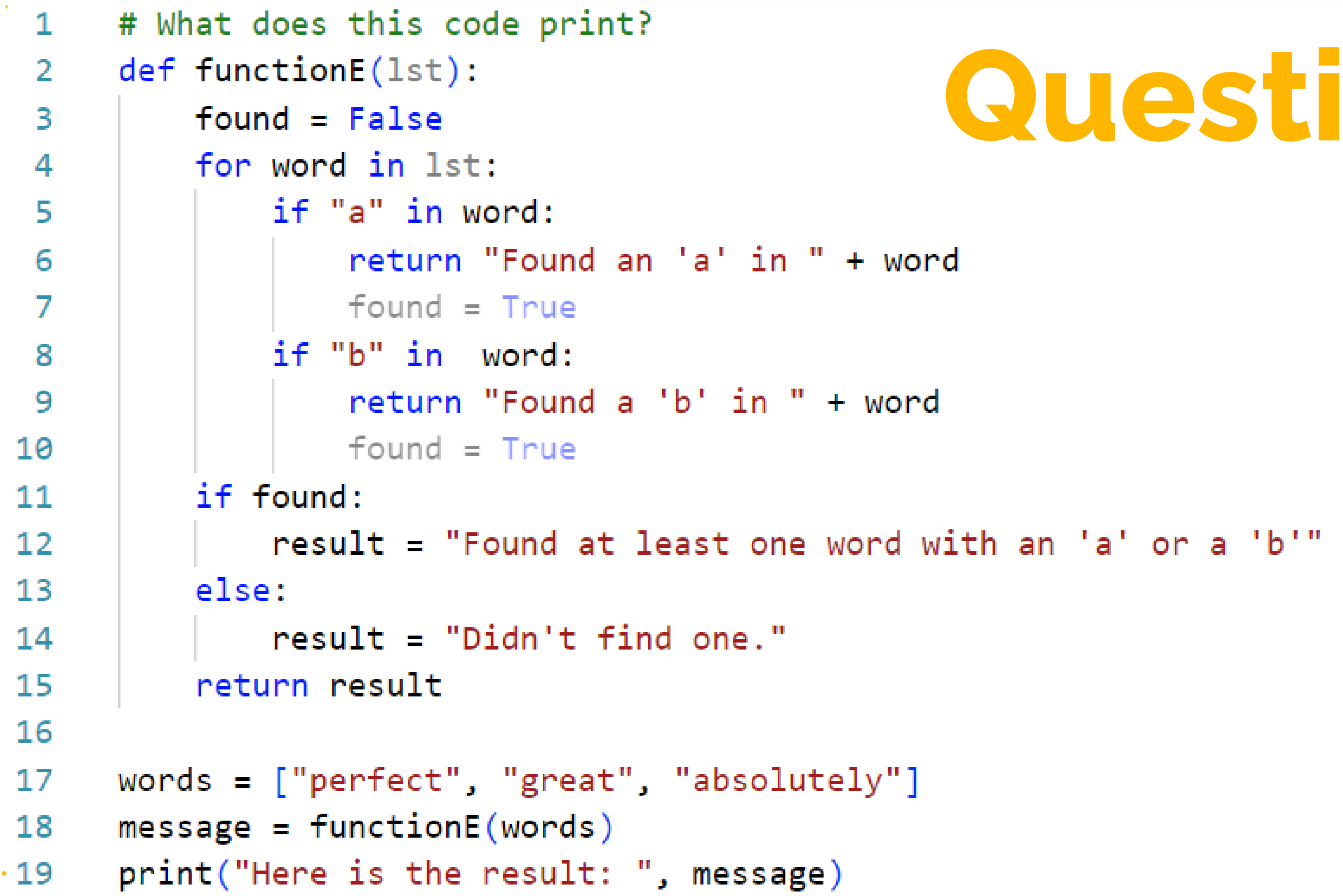
```
def functionB(p):
      p = p + 100
      return p
arg = 1
print("arg before function",arg)
value = functionB(arg)
print(value)
print("arg after function",arg)
```

Question 4

What will be the result of executing this code?

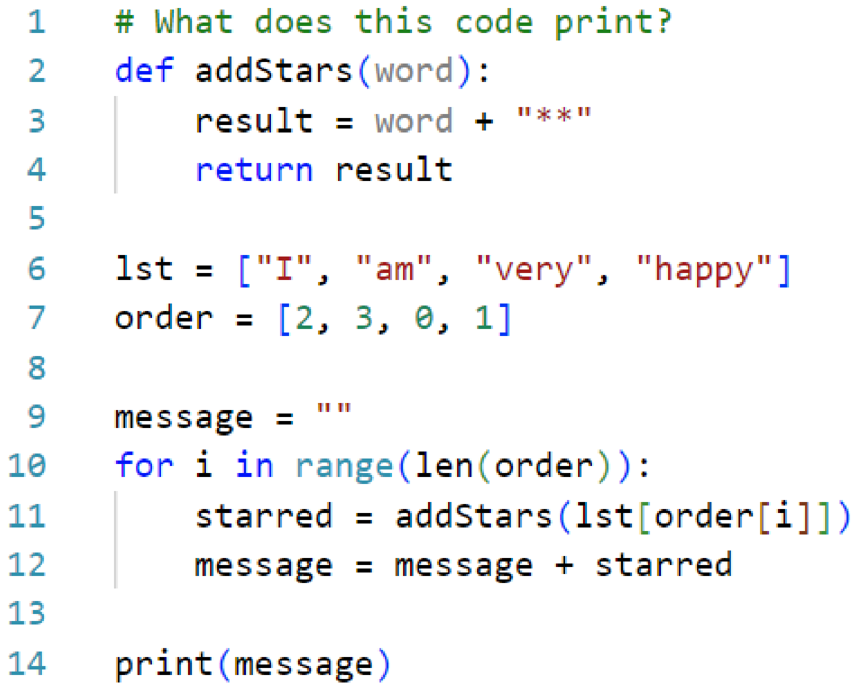
```
def functionC(p):
    x = p + 100
    print(x)
arg = 1
value = functionC(arg)
print(value)
```

Question 5



```
# What does this code print?
def functionE(lst):
    found = False
    for word in lst:
        if "a" in word:
            return "Found an 'a' in " + word
            found = True
        if "b" in  word:
            return "Found a 'b' in " + word
            found = True
    if found:
        result = "Found at least one word with an 'a' or a 'b'"
    else:
        result = "Didn't find one."
    return result

words = ["perfect", "great", "absolutely"]
message = functionE(words)
print("Here is the result: ", message)
```

Question 6



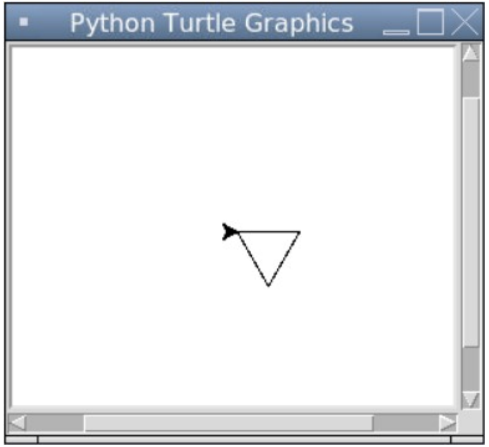
```python
# What does this code print?
def addStars(word):
    result = word + "**"
    return result

lst = ["I", "am", "very", "happy"]
order = [2, 3, 0, 1]

message = ""
for i in range(len(order)):
    starred = addStars(lst[order[i]])
    message = message + starred

print(message)
```

Coding

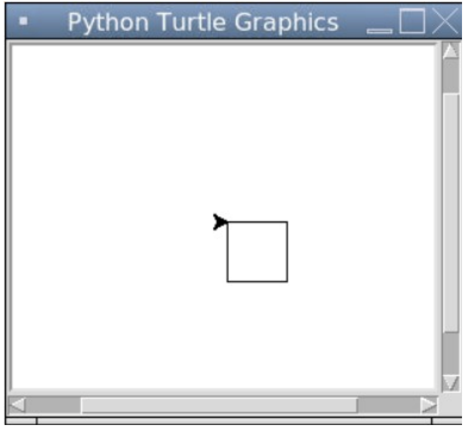
Question 1

Define a function in Python called **draw_polygon(sides_num, sides_length)** that draws a polygon with number of sides equal to sides_num and length of each side equal to sides_length. Here are a few sample runs:

draw_polygon(3, 40)



draw_polygon(4, 40)



Question 2

Consider the following program:

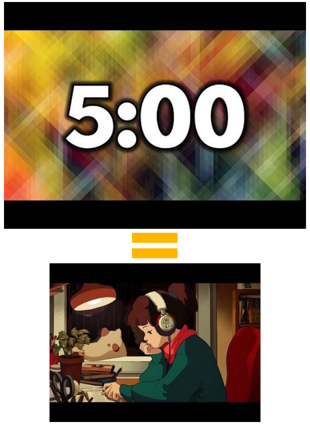
```
colours = ['Red', 'Green', 'Blue', 'Yellow', 'Pink']
for i in range(0, len(colours), 2):
    print(colours[i])
```

Rewrite the program above using a **while** loop instead of a for loop.

Question 3

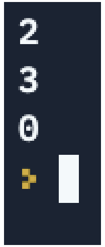
Create a function **numvowels(mystring)**, that, given a string as a parameter, it returns how many vowels are in that string.

Note: Vowels are a,e,i,o,u and can be present either in lower or upper case.



Example test cases:

```
print(numvowels("hello"))
print(numvowels("eEe"))
print(numvowels("tsktsk"))
```



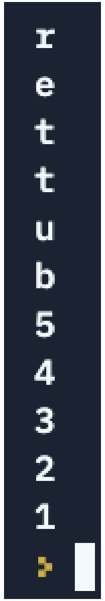
```
2
3
0
>
```

Question 4

Create a function **backwards(myword)** that prints out the letters in a word (received as parameter) backwards, with one letter on each line.

Here are some sample runs for the following test cases:

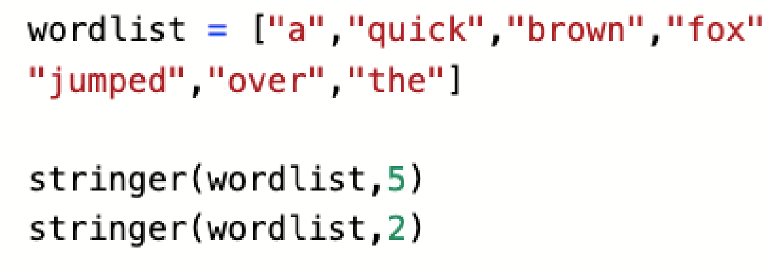
```
backwards("butter")

backwards("12345")

backwards("")
```



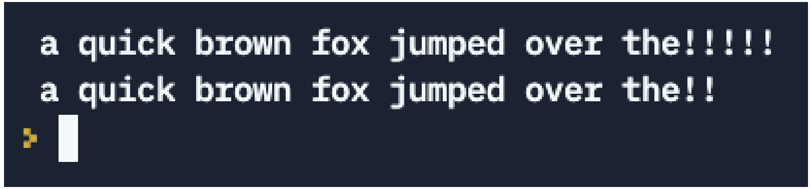
```
r
e
t
t
u
b
5
4
3
2
1
>
```

Question 5

Define a function **stringer(wordlist,n)** that takes as parameters a list of strings wordlist and an integer n. It should print out a string that contains all the words in the list separated by spaces, followed by n exclamation marks. Here is an example test case:



```
wordlist = ["a","quick","brown","fox",
"jumped","over","the"]

stringer(wordlist,5)
stringer(wordlist,2)
```



```
a quick brown fox jumped over the!!!!!
a quick brown fox jumped over the!!
>
```