

Q1

What will be the output of the following code?

```
import re
string = 'bat, lat, mat, bet, let, met, bit, lit, mit, bot, lot, mot'
result = re.findall('b[ao]t', string)
print(result)
```

- ☐ 'bat, bet, bit, bot'
- ☐ 'bat, bot'
- ☒ ['bat', 'bot']
- ☐ ['bat', 'bet', 'bit', 'bot']

Q2

$$L_2 = \sqrt{\sum_{i=1}^n (a_i - b_i)^2}$$

Assume **a** and **b** are two (20, 20) numpy arrays. The L2-distance (defined above) between two equal dimension arrays can be calculated in python as follows:

```
def l2_dist(a, b):
    result = ((a - b) * (a - b)).sum()
    result = result ** 0.5
    return result
```

Which of the following expressions using this function will **give an error**?

- ☒ l2_dist(np.reshape(a, (20 * 20)), np.reshape(b, (20 * 20, 1)))
- ☐ l2_dist(a, b)
- ☐ l2_dist(np.reshape(a, (20 * 20)), np.reshape(b, (20 * 20)))
- ☐ l2_dist(a.T, b.T)

1 | 实际上在spyder (numpy 1.19.1) 中测试，都不报错

Q3

Consider the following variables in Python:

```
a1 = np.random.rand(4)
a2 = np.random.rand(4, 1)
a3 = np.array([[1, 2, 3, 4]])
a4 = np.arange(1, 4, 1)
a5 = np.linspace(1, 4, 4)
```

Which of the following statements regarding these variables is correct?

- ☒ a5.shape == a1.shape
- ☐ a4.ndim() == 1
- ☐ a3.shape == a4.shape
- ☐ a1.shape == a2.shape

Q4

Which of the following is the correct output for the code given below?

```
import numpy as np

old = np.array([[1, 1, 1], [1, 1, 1]])
new = old
new[0, :2] = 0
print(old)
```

- ☒ `[[0 0 1] [1 1 1]]`
- ☐ `[[0 1 1] [0 1 1]]`
- ☐ `[[1 1 0] [1 1 0]]`
- ☐ `[[1 1 1] [1 1 1]]`

Q5

Given the 6x6 NumPy array `r` shown below, which of the following options would slice the shaded elements?

0	1	2	3	4	5
6	7	8	9	10	11
12	13	14	15	16	17
18	19	20	21	22	23
24	25	26	27	28	29
30	31	32	33	34	35

- ☐ `r[2:3,2:3]`
- ☒ `r[2:4,2:4]`
- ☐ `r[[2,4],[2,4]]`
- ☐ `r[[2,3],[2,3]]`

Q6

```
import re
s = 'ACBCAC'
```

For the given string, which of the following regular expressions can be used to check if the string starts with 'AC'?

- ☒ `re.findall('^AC', s)`
- ☐ `re.findall('[^A]C', s)`
- ☐ `re.findall('AC', s)`
- ☐ `re.findall('^[AC]', s)`

Q7

What will be the output of the variable `L` after the following code is executed?

```
import re

s = 'ACAABAACAAAB'
result = re.findall('A{1,2}', s)
L = len(result)
```

- ☐ 4
- ☐ 12
- ☒ 5
- ☐ 8

Q8

Which of the following is the correct regular expression to extract all the phone numbers from the following chunk of text:

```
'Office of Research Administration: (734) 647-6333 | 4325 North Quad
Office of Budget and Financial Administration: (734) 647-8044 | 309 Maynard, Suite 205
Health Informatics Program: (734) 763-2285 | 333 Maynard, Suite 500
Office of the Dean: (734) 647-3576 | 4322 North Quad
UMSI Engagement Center: (734) 763-1251 | 777 North University
Faculty Administrative Support Staff: (734) 764-9376 | 4322 North Quad'
```

- ☒ `[()\\d{3}()\\s\\d{3}[-]\\d{4}`
- ☐ `[()\\d{3}()\\d{3}[-]\\d{4}`
- ☐ `\\d{3}\\s\\d{3}[-]\\d{4}`
- ☐ `\\d{3}[-]\\d{3}[-]\\d{4}`

Q9

Which of the following regular expressions can be used to get the domain names (e.g. google.com, www.baidu.com) from the following sentence?

```
'I refer to https://google.com and I never refer http://www.baidu.com if I have to search anything'
```

- ☐ `(?<=https:\\/\\)([A-Za-z0-9]*)`
- ☐ `(?<=[https]:\\/\\)([A-Za-z0-9.]*)`
- ☐ `(?<=https:\\/\\)([.]*)`
- ☒ `(?<=https:\\/\\)([A-Za-z0-9.]*)`

Q10

The text from the Canadian Charter of Rights and Freedoms section 2 lists the fundamental freedoms afforded to everyone. Of the four choices provided to replace X in the code below, which would accurately count the number of fundamental freedoms that Canadians have?

```
text=r'''Everyone has the following fundamental freedoms:
(a) freedom of conscience and religion;
(b) freedom of thought, belief, opinion and expression, including freedom of the press and other media of communication;
(c) freedom of peaceful assembly; and
(d) freedom of association.
...'
```

```
import re
```

```
pattern = X
print(len(re.findall(pattern,text)))
```

- ☒ `'freedom'`
- ☐ `'[a-d]'`
- ☐ `'(.)'`
- ☐ `'\\(.\\)'`