

Week-9, Graded, Theory

Week-9, Graded, Theory

Problem 1

Question 1

Answer

Solution

Question 2

Answer

Solution

Question 3

Answer

Solution

Question 4

Answer

Problem 2

Question 5

Answer

Solution

Question 6

Answer

Solution

Problem 3

Question 7

Answer

Solution

Question 8

Answer

Solution

Question 9

Answer

Solution

Question 10

Answer

Solution

Question 11

Answer

Solution

Problem 4

Question 12

Answer

Solution

Question 13

Answer

Solution

Problem 1

Common data for questions 1,2, 3 and 4.

`file.txt` is a non-empty file. Each line in the file has at least one character that is neither a space nor a newline (`\n`). The following snippet of code runs without any errors.

```
1  ### Beginning of snippet ###
2  f = open('file.txt', 'r')
3  nums = list()
4  line = f.readline().strip()
5  while line != '':
6      nums.append(int(line))
7      line = f.readline().strip()
8  ### End of snippet ###
9  ### Answer questions assuming that you are at line-9
10 f.close()
```

NOTE

Whenever a variable is referenced in the questions that follow, use the value stored in it at line-9 of the code given above. That is, assume that lines 1 to 8 have been executed and we are now at line-9. Line-10 has not yet been executed.

Question 1

What is the type of `f`?

- (a) `list`
- (b) `dict`
- (c) `set`
- (d) `tuple`
- (e) None of the above

Answer

- (e)

Solution

The file object is different from `list`, `dict`, `set` and `tuple`. It is an instance of class `_io.TextIOWrapper`. More about class will be covered in upcoming lessons. Hence, option (e) is true.

Question 2

Which of the following statements evaluate to `True`? Remember that we are at line-9 in the code and haven't executed line-10 yet. [MSQ]

- (a) `f.readline == ''` # there is no space between the quotes
- (b) `f.readline() == ''` # there is no space between the quotes
- (c) `f.readline == line`
- (d) `f.readline() == line`
- (e) We get the following error: `ValueError: I/O operation on closed file.`

Answer

(b), (d)

Solution

After the end of the loop all the lines of the file has been read and there are no more characters left. A call to `readline()` will return an empty string `''`. The variable `line` stores an empty string `''` causing the loop to terminate. Therefore option (b) and (d) are true.

Question 3

Which of the following expressions gives the number of lines in the file `file.txt`?

- (a) `len(line)`
- (b) `len(f)`
- (c) `len(f) - 1`
- (d) `len(nums)`
- (e) `len(nums) - 1`

Answer

(d)

Solution

The list `num` contains each line of the file which is an integer as its elements. Therefore, (d) gives the number of lines in the file.

Question 4

If `nums` is a non-empty list of integers, is the following statement true or false? For answering this question, take the perspective of a human reading the file. Do not look at it from the point of view of the computer.

Each line in `file.txt` contains an integer after ignoring leading and trailing whitespaces.

(a) True

(b) False

Answer

(a)

Self explanatory

Problem 2

Common data for question 5 and 6.

```
1 f = open('file.txt', 'w')
2 f.write('list')
3 f.write('tuple')
4 f.write('set')
5 f.write('dictionary')
6 f.close()
```

Question 5

How many lines are present in the `file.txt` at the end of the execution of the above code? It is a Numerical Answer Type (NAT) question.

Answer

1

Solution

`write` function will not add a new line character by default, hence those all four `f.write` statement will produce a document with single line `listtuplesetdictionary`

Question 6

The following code snippet is executed after the main code. How many lines are present in the `file.txt` at the end of the execution of the below code? It is a Numerical Answer Type (NAT) question.

```
1 f = open('file.txt', 'r')
2 ln = f.readline()+'\n'
3 f.close()
4
5 f = open('file.txt', 'a')
6 for i in range(10):
7     f.write(ln)
8 f.close()
```

Answer

11

Solution

The first line of `file.txt` `listtuplesetdictionary` is read and store with newline character at end in `ln` using read mode. The the same file is opened with append mode and the variable `ln` is written ten times. Where the first line will be written after the final character. The last line is an empty line.

```
1 listtuplesetdictionarylisttuplesetdictionary
2 listtuplesetdictionary
3 listtuplesetdictionary
4 listtuplesetdictionary
5 listtuplesetdictionary
6 listtuplesetdictionary
7 listtuplesetdictionary
8 listtuplesetdictionary
9 listtuplesetdictionary
10 listtuplesetdictionary
11
```


Problem 3

Common data for question 7, 8, 9, 10 and 11

Assume `somefile.txt` is a file having 10 lines of text.

Code - 1

```
1 f = open('somefile.txt', 'r')
2 l1 = []
3 text = f.read()
4 while '\n' in text:
5     index = text.find('\n')
6     l1.append(text[:index])
7     text = text[index+1:]
8 f.close()
```

Code - 2

```
1 f = open('somefile.txt', 'r')
2 l2 = f.readlines()
3 f.close()
```

Code - 3

```
1 f = open('somefile.txt', 'r')
2 l3 = []
3 while True:
4     text = f.readline()
5     if text == '':
6         break
7     l3.append(text)
8 f.close()
```

Question 7

What will be the value of `len(l1) == len(l2) == len(l3)`?

- (a) True
- (b) False

Answer

- (b) False

Solution

If a file containing a 10 lines of text then 10th line will not have any newline character `'\n'`. Thus Code-1 reads up to the newline character, since it appends first nine lines and exits loop. Then `len(l1)` will be 9. Code-2 reads all the line in the file and stored in `l2` as list of strings, hence `len(l2)` will be 10. The Code-3 reads all the lines and append it into `l3`, thus `len(l3)` be 10.

Thus, `9 == 10 == 10` will be evaluated False

Question 8

What will be the value of `l1 == l2`?

- (a) True
- (b) False

Answer

- (b) False

Solution

The length of `l1` and `l2` are different and every element in `l1` have no newline character at the end, hence False.

Question 9

What will be the value of `l2 == l3`?

- (a) True
- (b) False

Answer

- (a) True

Solution

The length of `l1` and `l2` are the same and every element in `l1` and `l2` have newline character at the end, hence True.

Question 10

What will be the value of `l1[0].strip() == l2[0]`?

- (a) True
- (b) False

Answer

- (b) False

Solution

`l1[0]` have no newline character at the end and `l2[0]` have newline character at the end. Hence, False.

Question 11

What will be the value of `l2[0].strip() == l3[0].strip()`?

- (a) True
- (b) False

Answer

(a) True

Solution

The contents of `l2[0].strip()` and `l3[1].strip()` are the same and every preceding and trailing space including newline character are removed, hence True.

Problem 4

Question 12 and 13 are based on `scores_dataset.csv`. The data is read into Pandas dataframe variable `data_df`. Assume `pandas` library is already imported into the program as `pd`.

Question 12

The Pandas dataframe variable `data_df` that holds `score_dataset` can be shown in visual form as below (showing top 5 rows). Which of the following option is true about the variable `data_df`. [MSQ]

	SeqNo	Name	Gender	DateOfBirth	CityTown	Mathematics	Physics	Chemistry	Total
0	0	Bhuvanesh	M	7 Nov	Erode	68	64	78	210
1	1	Harish	M	3 Jun	Salem	62	45	91	198
2	2	Shashank	M	4 Jan	Chennai	57	54	77	188
3	3	Rida	F	5 May	Chennai	42	53	78	173
4	4	Ritika	F	17 Nov	Madurai	87	64	89	240

- (a) `data_df` stores two dimensional data along its rows and columns also known as tabular data
- (b) `data_df['Name']` gives a list/series of student names
- (c) A row in `data_df` represents a record specific to a student (first column is unique for each student, called index column)
- (d) `data_df['Mathematics'][0]` gives mark in `'Mathematics'` subject by student named `'Bhuvanesh'`

Answer

(a), (b), (c), (d)

Solution

Self explanatory

Question 13

What is the output of the following code :

```
1 | data_df[data_df['Mathematics'] > data_df['Mathematics'].mean()]['Name']
```

- (a) Name of students who have total score more than average
- (b) Name of students who scored more than the average score in `Mathematics`
- (c) Name of all students who have marks in `Mathematics`
- (d) Average of all student marks in `Mathematics`

Answer

- (b)

Solution

`data_df['Mathematics'].mean()` : gives the average score of all students in the subject 'Mathematics'.

`data_df['Mathematics'] > data_df['Mathematics'].mean()` : This condition is true if a student scored more than average marks of all students in the 'Mathematics' subject

Therefore, option (b) is the correct answer.