Sample quiz questions solutions

The quiz will take place on the Hub.

You may use Spyder or the Python interpreter during the quiz, but the quiz format will be such that it won't be easy to paste code snippets into Spyder.

Question

What is the output from the following piece of Python code?

```
>>> x = 2
>>> y = x ** x
>>> x = y - x
>>> print(x)
```

1. `0`
2. `2`
3. `4`
4. `6`
5. An error

Correct answer: Option 2

Question

What is the output from the following piece of Python code?

```
>>> x = [1, 3, 5, 9]
>>> x = x + x
>>> print(x[5])
```

1. `1`
2. `3`
3. `4`
4. `8`
5. An error

Correct answer: Option 2

Question

What is the output from the following piece of Python code?

```
>>> x = [1, [2, 2]]
>>> print(x[1][1] - x[0])
```

1. `0`
2. `1`
3. `2`
4. `-1`
5. An error

Correct answer: Option 2

Question

What is the output from the following piece of Python code?

```
>>> x = 0
>>> y = 0
>>> for i in range(2):
...     x += 1
...     for j in range(1):
...         y += 2
>>> print(x, y)
```

1. `2 4`
2. `3 5`
3. `2 3`
4. `3 4`
5. An error

Correct answer: Option 1

Question

What is the output from the following piece of Python code?

```
>>> def g(x):
...    if x < 3:
...        return x
...    return x - 3
>>> def f(x):
...    x = x + 1
...    return g(x - 2)
>>> def h(x):
...    x = x + 3
...    return f(x - 2)
>>> print(h(2))
```

1. `1`
2. `2`
3. `3`
4. `0`
5. An error

Correct answer: Option 2

Question

The function below should remove empty spaces from the input string. Which of the following pieces of code is correct?

1.

```python
def remove_space(s):
    for c in s:
        if c == " ":
            c = ""
    return s
```

2.

```python
def remove_space(s):
    ss = ""
    for c in s:
        if c == " ":
            ss += c
    return ss
```

3.

```python
def remove_space(s):
    for i in len(s):
        if s[i] == " ":
            s = s[:i] + s[i+1:]
    return s
```

4.

```python
def remove_space(s):
    ss = ""
    for c in s:
        if c != " ":
            ss += c
    return ss
```

5. More than one of the above

Correct answer: 4.

Question

How would you rate the following functions in increasing order of asymptotic complexity?

$$\begin{gathered} T_1(n) = n \\ T_2(n) = n^2 \\ T_3(n) = 2^n/1000 \\ T_4(n) = 5 \end{gathered}$$

1. T_1, T_4, T_2, T_3
2. T_4, T_1, T_2, T_3

3. T_1, T_2, T_3, T_4
4. T_2, T_1, T_4, T_3
5. None of the above

Correct answer: Option 2

Question

What is the worst-case complexity of `K(n)`? (Choose the most accurate alternative.)

```
def K(n):
    """ assume n is a nonnegative integer """
    y = 0
    i = n
    j = n
    while  i > 0:
        while j > 0:
            y += 1
            j -= 1
        i -= 1
    return y
```

1. $O(\log n)$
2. $O(n)$
3. $O(n^2)$
4. $O(n \log n)$
5. None of the above

Correct answer: Option 2

If this seems surprising, think about how many times the inner loop ends up running. The first time it runs when `i=n`, `j` goes down to zero. Then `i` is set to `n-1` and the inner loop just does one comparison because we still have `j=0`. So the inner loop does not do `n` iterations every time the outer loop runs!

Try the code out in Spyder and add print statements to see what happens.