OLD: Practice Exam 1 (Spring 2024)

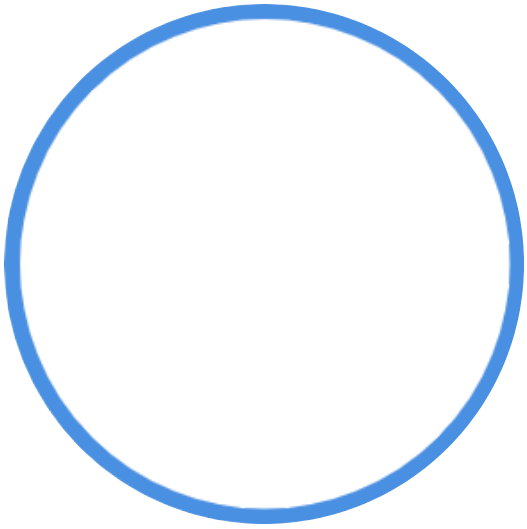
This is a preview of the published version of the quiz

Started: Oct 8 at 1:47pm

Quiz Instructions

Honorlock Chrome Extension

This assessment requires Google Chrome and the Honorlock Chrome Extension.



Extension Required

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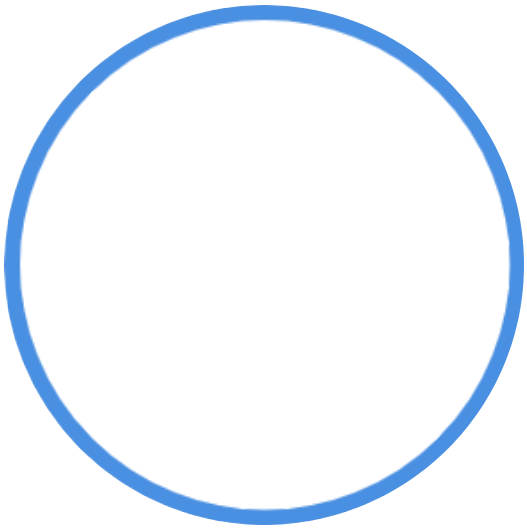

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NOTE: This exam has been edited due to two incorrect questions from the semester in which it was given. You can expect the exam for this semester to be slightly longer.

Question 1 0.5 pts

Which of the following translates Python code into machine code for a given instruction set?

- CPU
- Virtual machine
- Interpreter
- Operating system
- Version control system

Question 2 1 pts

Image 1:

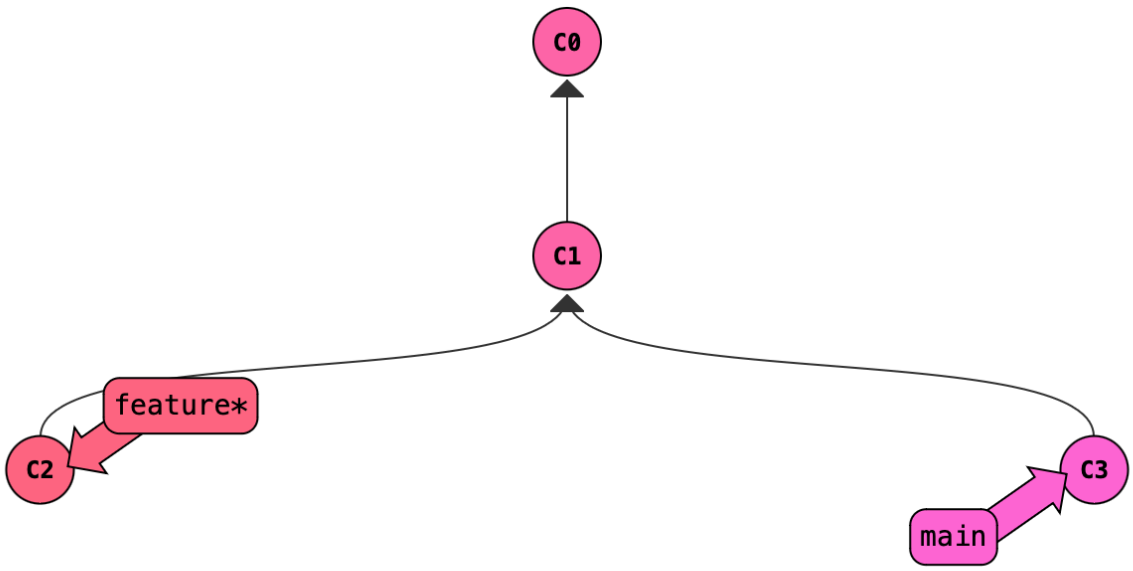
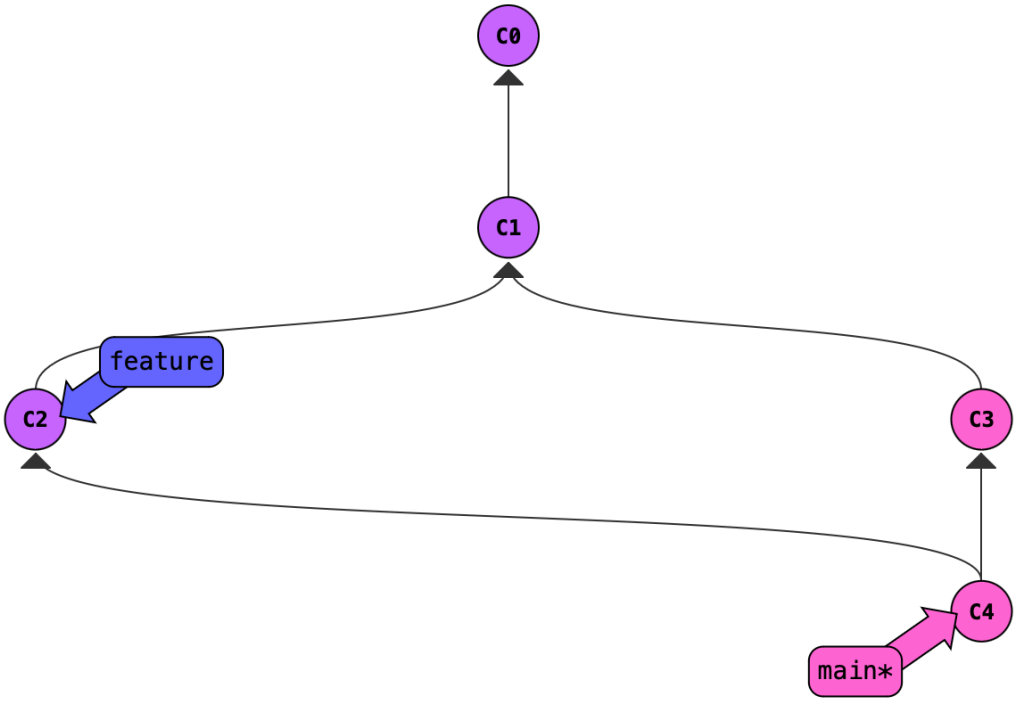


Image 2:



Suppose you have the git setup pictured in **Image 1** (two branches named *feature* and *main* with different commits and *HEAD* pointing to *feature*). Which git command(s) would produce the setup shown in **Image 2**? (Assume commands on separate lines are entered sequentially).

Hint: Please note where the head is currently pointing to.

○

git checkout main

git merge feature

○

git merge feature

○

git checkout main

○

git checkout main

git pull

Question 3 1 pts

Let n be an integer. What is the time complexity of the following code snippet?

```
nums = []

for i in range(n):

    nums.insert(0, i)
```

○ $O(1)$

○ $O(n)$

○ $O(\log n)$

○ $O(n^2)$

Question 4 1 pts

True or False, if a function $f(n)$ is in $O(\frac{1}{2}n^2)$ then $f(n)$ must be in $O(n \log n)$?

○ True

○ False

Question 5 1 pts

What does the following code print?

```
class Badger:

    name = “Mr. Badger”

    def __init__(self, weight):

        self.name = “Bucky”

        self.weight = weight


new_badger = Badger(15)

print(new_badger.name)
```

○ new_badger.name

○
Bucky

○
15

○
Mr. Badger

Question 6 1 pts

What does the following code print?

```
class TA:
    def __init__(self, name, favorite_numbers):
        self.name = name
        self.favorite_numbers = favorite_numbers
    def __len__(self):
        return len(self.favorite_numbers)//2

favorite_ta = TA(“Elliot”, [2,7,1,8])
print(len(favorite_ta))
```

○
2

○
4

○
1

○
7

Question 7 0.5 pts

True or False, in order to call sorted on a list of custom objects, you must implement the __eq__ method.

○
True

○
False

Question 8 1 pts

What is the output of the following code?

```
def foo(a, b):
    while True:
        yield a * b
        a += 1
        b = a - 2

gen = foo(2, 3)
print(next(gen))
print(next(gen))
print(next(gen))
```

○
6
3
8

○
3
8
15

○
3
8
6

○

6

0

8

Question 9 1 pts

```
class Rectangle:
    def __init__(self, width, height):
        self.width = width
        self.height = height
        self.area = width * height
    def calculate_area(self):
        return self.height * self.width


class Square(Rectangle):
    def __init__(self, side_length):
    # Missing line
```

Suppose we wish to call the parent class constructor of Square from within the constructor of Square. What should we replace "# missing line" with?

○ super().__init__(side_length, side_length)

○ super().__init__(side_length)

○ Rectangle(side_length)

○ Rectangle(side_length, side_length)

Question 10 1 pts

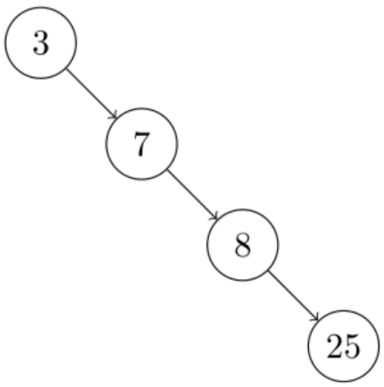
What is the output of the following code?

```
def foo(n):
    if n <= 1:
        return 1
    else:
        return foo(n-1) + foo(n-2)

print(foo(5))
```

- ○ 13
- ○ 5
- ○ 15
- ○ 8

Question 11 0.5 pts

Is this a valid BST?



- ○ Yes
- ○ No

Question 12 0.5 pts

Which data structure would best help us efficiently implement **breadth-first search** in a graph?

- dictionary
- deque
- list
- data frame

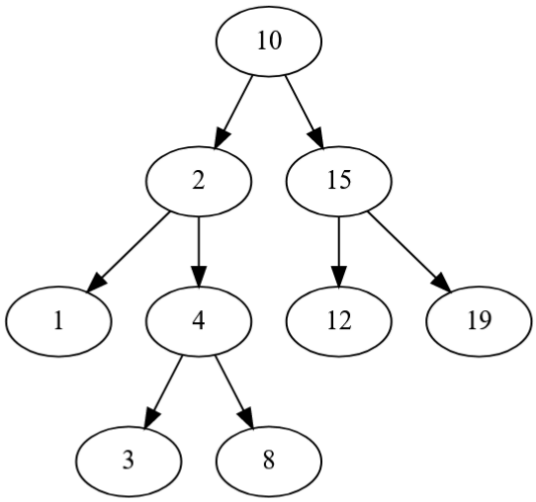
Question 13 0.5 pts

What is the output of the following code?

```
from collections import deque

todo = deque(["B", "A", "D", "C"])

todo.append("E")
x = todo.popleft()

print(x)
```

- B
- E

Question 14 1 pts



Consider the above BST with root node **10.** In what order will the nodes be visited if we start from node **10** (the root node) and perform a ***breadth-first search*** for node **12**?

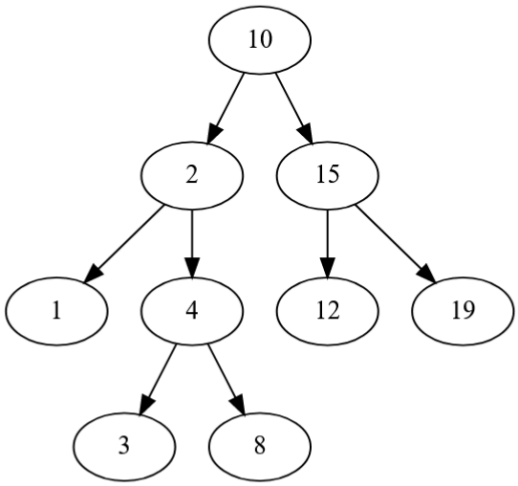
○
10, 2, 15, 12

○
10, 2, 15, 1, 4, 12

○
10, 2, 4, 12

○
10, 2, 1, 4, 12

Question 15 1 pts



Consider the above BST with root node **10.** In what order will the nodes be visited if we start from node **10** (the root node) and perform a ***depth-first search*** for node **4**?

○
10, 2, 15, 4

○
10, 2, 1, 4

○
10, 2, 15, 12, 19, 1, 4

○
10, 15, 12, 4