**CSC 120** **ICA-12**

Work with your neighbor. (This will be graded for participation only.)

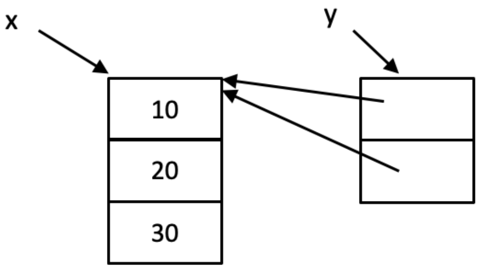
1. Given the code:

```
x = [10, 20, 30]

y = [x, x]
```

Draw the resulting diagram:

**ANS:**



How many aliases (references to the same data object) are there in this diagram?

**ANS:**

There are three aliases in the diagram.

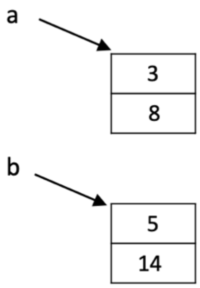
2. User-defined types. Just as we can draw diagrams for Python built-in types, we can draw diagrams for objects that are instances of user-defined classes.

   a) Draw the diagrams for these `Point` objects defined below. Each `Point` object will have two boxes, one for each attribute (i.e, `self._x` and `self._y`).

```
a = Point(3, 8)

b = Point(5, 14)
```

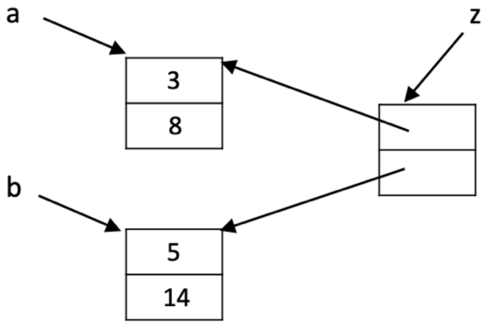
**ANS:**



b) Given the assignments for `a` and `b` above, what is the diagram for `z`?

```
z = [a, b]
```

**ANS:**

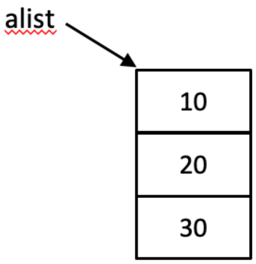


3. Compare the diagrams of a built-in Python list vs a linked list.

a) Draw the diagram for this list:

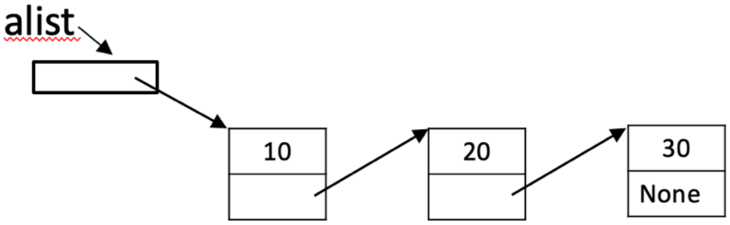
```
alist = [10, 20, 30]
```

**ANS:**



b) Now draw it as a linked list

**ANS:**

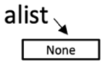


4. The `LinkedList` and `Node` classes (first pass…)

| | |
|---|---|
| `class Node:`<br>`    def __init__(self, value):`<br>`        self._value = value`<br>`        self._next = None` | `class LinkedList:`<br>`    def __init__(self):`<br>`        self._head = None` |

Draw a diagram that shows the `LinkedList` object `alist` after the assignment is executed:
`alist = LinkedList()`

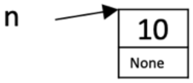
**ANS:**



Draw a diagram that shows the `Node` object `n` after the assignment is executed:

`n = Node(10)`

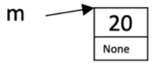
**ANS:**



Draw a diagram that shows the `Node` object `m` after the assignment is executed:

```
m = Node(20)
```

**ANS:**



5. We can draw these objects now, but how do we get them to be connected?

    - How do we get the reference in `alist._head` to refer to `n`?
    - How do we get the reference in `n._next` to refer to `m`?
    - Discuss this with your neighbors!

**ANS:** We need to do assignments to the `_head` attribute and `_next` attributes to connect them.