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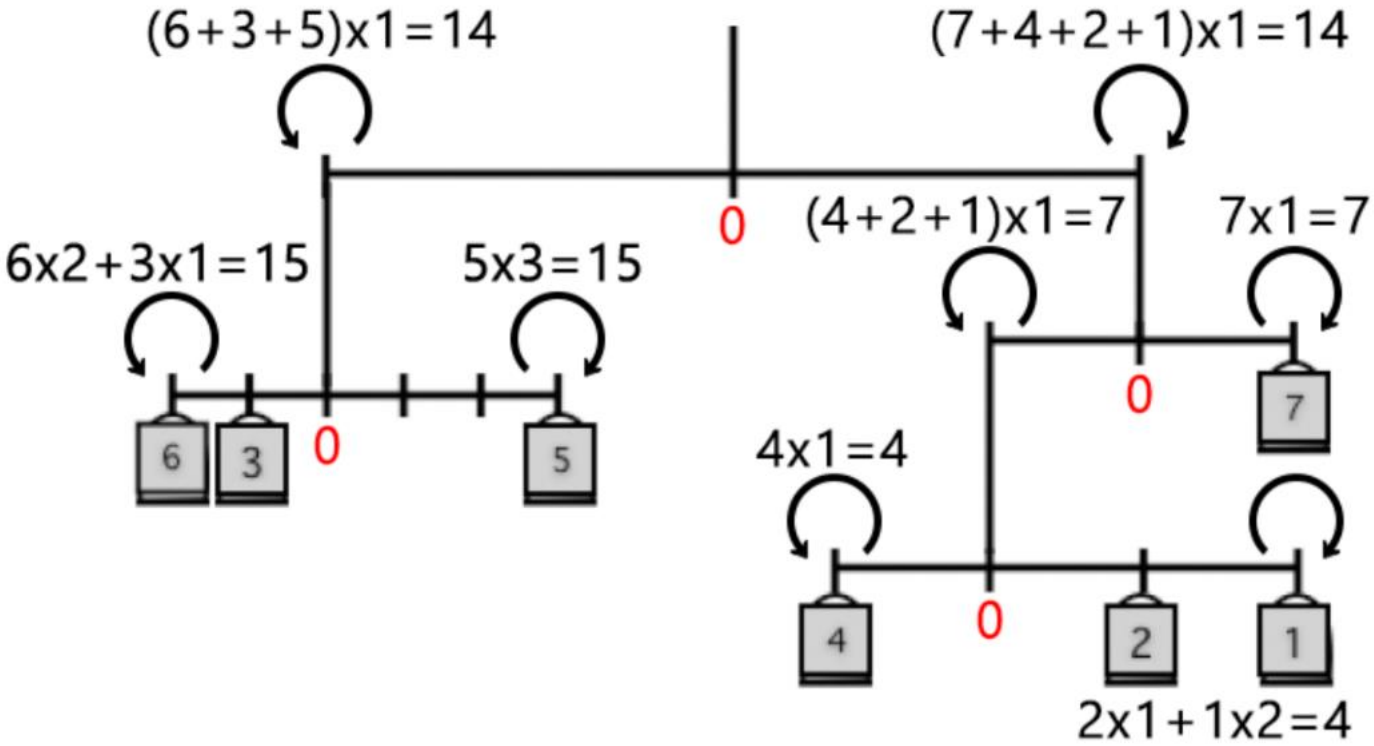
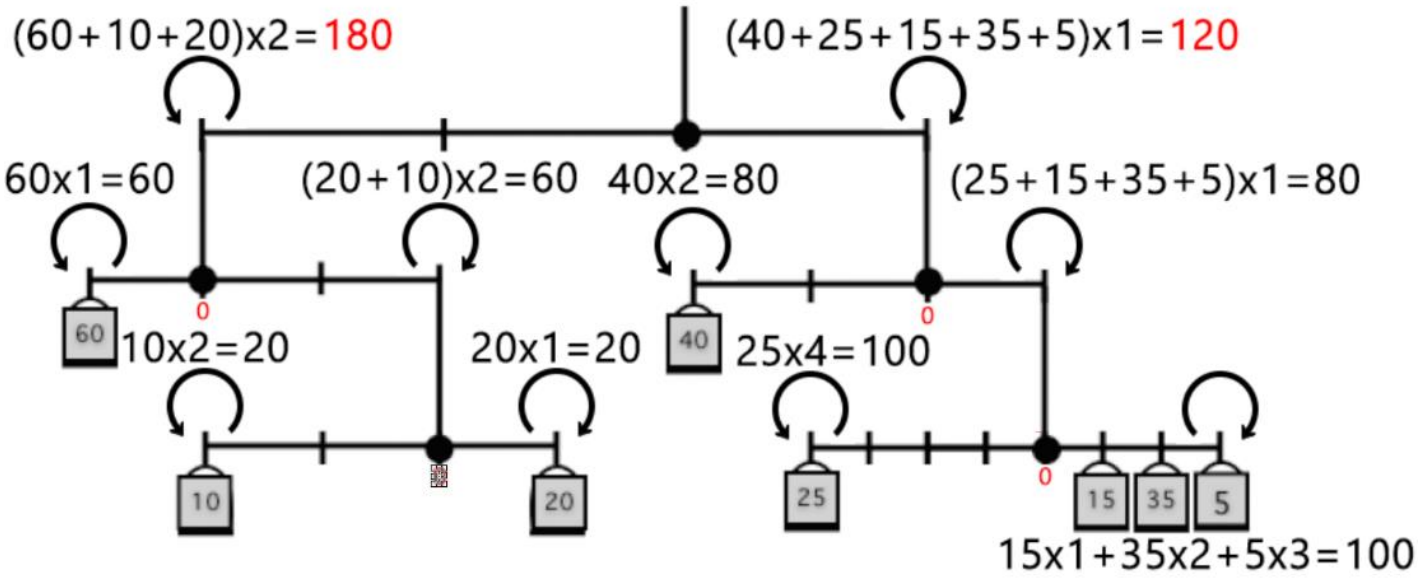
Activity 1: Problem Solving

1. (1) It is **balanced** because torque on each beam is 0.



(2) It is **unbalanced** because torque on the root beam is not 0.



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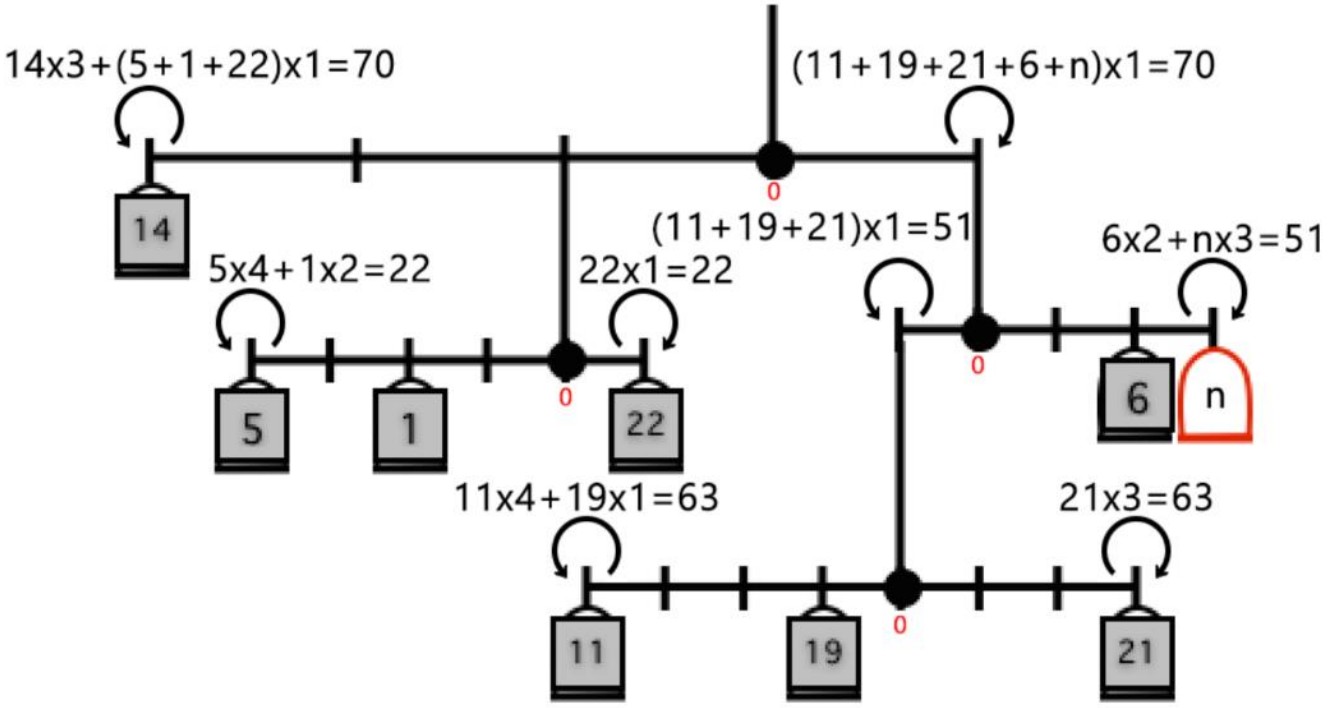
2. Balanced → torque on all beams equals 0 →
   (11 + 19 + 21 + 6 + n) x 1 = 70 or 6 x 2 + n x 3 = 51 → **n = 13**



3.

```
__slots__ = "support_point", "weights"
# support_point: the point at which the beam is supported (held up)
# weights: a dictionary with positions as keys and their weights as values
```

4.

```
class Beam:
    # … (skip __slots__ and __init__)
    def weight(self):
        result = 0
        for w in self.weights.values():
            result += w.weight()
        return result


class Weight:
    # … (skip __slots__ and __init__)
    def weight(self):
        return self.weight
```

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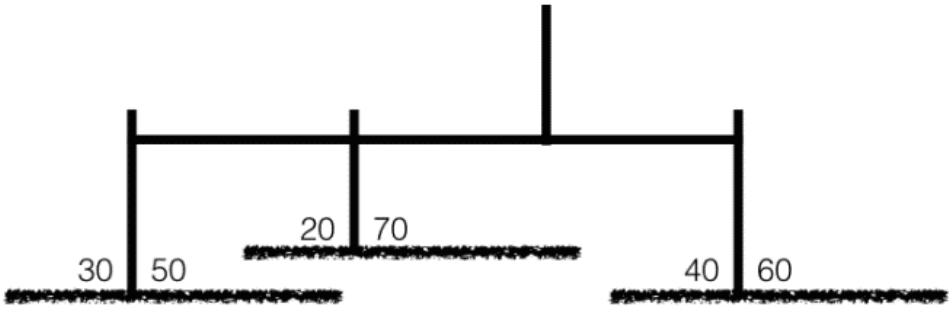
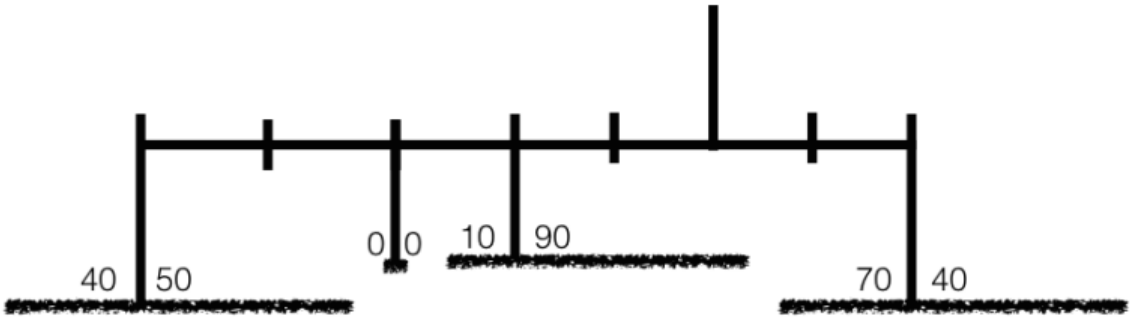
5.

(a-1)



All possible scale factors:
(50 + 20 + 20) / 1 = 90
(70 + 20 + 40) / 2 = 65
Pick the larger one → Ans: **90 pixels/tick**

(a-2)



All possible scale factors:
(50 + 20 + 0) / 2 = 35
(0 + 20 + 10) / 1 = 30
(90 + 20 + 70) / 4 = 45
Pick the largest one → Ans: **45 pixels/tick**

(b-1) left: 30 + 90x2 = **210 (Pixels)**
right: 90x1 + 60 = **150 (Pixels)**

(b-1) left: 40 + 45x5 = **265 (Pixels)**
right: 45x2 + 40 = **130 (Pixels)**